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*Jutta Hartmann, Marion Knecht,
Andreas Konietzko, Susanne Winkler (Eds.)*

FREEZING

THEORETICAL APPROACHES AND
EMPIRICAL DOMAINS

STUDIES IN GENERATIVE GRAMMAR

Jutta M. Hartmann, Marion Jäger, Andreas Kehl, Andreas Konietzko,
Susanne Winkler (Eds.)

Freezing

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Michael Rochemont (1950–2018)
in memoriam

This book is dedicated to the memory of Michael Rochemont,
linguist, teacher, colleague, mentor and friend.

Contents

Jutta M. Hartmann, Marion Jäger, Andreas Kehl, Andreas Konietzko,
and Susanne Winkler

**Exploring the concepts of Freezing: Theoretical and empirical
perspectives — 1**

Part I: Theoretical advancement

Ur Shlonsky and Luigi Rizzi

**Criteria Freezing in small clauses and the cartography of copular
constructions — 29**

Ángel J. Gallego

Freezing Effects in a free-Merge System — 66

Gereon Müller

Freezing in complex prefields — 105

Part II: Empirical domains

Norbert Corver

The Freezing points of the (Dutch) adjectival system — 143

Jutta M. Hartmann

Freezing in *it*-clefts: Movement and focus — 195

Josef Bayer

Criteria Freezing in the syntax of particles — 225

Michael S. Rochemont

Only syntax — 264

Maria Polinsky

Freezing and phi-feature agreement: On the role of [PERSON] — 284

Balázs Surányi and Gergő Turi
Freezing, Topic Opacity and Phase-based Cyclicity in Subject Islands — 317

Part III: Interface extensions

Peter W. Culicover and Susanne Winkler
Freezing: Between grammar and processing — 353

Andreas Konietzko
Heavy NP shift in context: On the interaction of information structure and subextraction from shifted constituents — 387

Rui P. Chaves
Freezing as a probabilistic phenomenon — 403

Marion Jäger
An experimental study on freezing and topicalization in English — 430

Index — 451

Jutta M. Hartmann, Marion Jäger, Andreas Kehl,
Andreas Konietzko, and Susanne Winkler

Exploring the concepts of Freezing: Theoretical and empirical perspectives

The investigation of displacement as a “core property of human language” (Corver 2006b: 566) and a “ubiquitous” one (Chomsky 2000: 25) has been a central concern in generative grammar, which goes back to at least Chomsky (1964) und Ross (1967). While island phenomena have been investigated in detail from various perspectives (see the contributions in Sprouse & Hornstein 2013; Boeckx 2012 and references therein), a different empirical domain, the domain of Freezing, has received less attention. The Freezing Principle was originally defined as a constraint which blocks extraction of and from constituents in non-canonical/non-base positions (originally Wexler & Culicover 1980, see Corver 2006a for an overview). This volume brings together papers which are concerned with the theoretical approaches and empirical domains of Freezing and the Freezing Principle in relation to other restrictions on extraction with the goal to contribute to a broader understanding of the nature of restrictions on displacement.

In order to set the stage for the contributions in this volume, we outline the current state of the art of the study of Freezing by concentrating on the following three central questions, which we will address in turn in the following sections (for a more detailed review see Corver 2006a, 2017):

1. What are the different concepts of Freezing and what is their theoretical contribution?
2. What are the different empirical domains that they can explain?
3. Are there alternative explanations to different Freezing phenomena, such as information structural restrictions or processing effects?

1 Concepts of Freezing and theoretical advancements

There are at least three different concepts of Freezing in the literature that play a major role in the general discussion of displacement in generative grammar: (i) the Original Freezing Principle which subsumes the Raising

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Principle and the Freezing Principle of Wexler & Culicover (1980) (see for predecessors Ross 1967; Wexler & Culicover 1973), (ii) the idea of Criterial Freezing (CF) as in Rizzi (2006) and follow-up work, and (iii) Müller's Freezing of last-merged specifiers, i.e. Müller's Freezing Generalization (MFG) in Müller (2010: 56).

1.1 The Original Freezing Principle

The notion of Freezing goes back to at least Ross (1967), where he discusses the Frozen Structure Constraint, see (1):

(1) Frozen Structure Constraint

If a clause has been extraposed from a noun phrase whose head noun is lexical, this noun phrase may not be moved, nor may any element of the clause be moved out of that clause. (Ross 1967: 295)

This constraint restricts movement of a noun phrase from which a clause has been extraposed as in (2a), and movement from the extraposed clause of that noun phrase, as in (2b).

- (2) a. *Which packages didn't Sam pick ___ up which are to be mailed tomorrow until it had stopped raining?
 b. *The coat which a girl came in who had worn ___ was torn.
 (Ross 1967: 294)

Note that Ross (1967) dispenses with this constraint. Instead, he suggests an ordering of transformations, where extraposition cannot be followed by extraction, so that the complex NP constraint suffices to account for the ungrammaticality of (2).

Based on Ross' Frozen Structure Constraint, Wexler & Culicover (1980) define a more general principle, the Freezing Principle as in (3) (see the definition and details in earlier work in Wexler & Culicover 1973; Culicover & Wexler 1973a,b).

(3) Freezing Principle

If a node A of a phrase marker is frozen, no node dominated by A may be analyzed by a transformation. (Wexler & Culicover 1980: 119)

A node is frozen if “the immediate structure of that node is nonbase” (Wexler & Culicover 1980: 119). Additionally, they propose the Raising Principle in (4):

(4) Raising Principle

If a node A is raised, then no node that A dominates may be used to fit a transformation. (Wexler & Culicover 1980: 143)

The Raising Principle excludes subextraction of all types of moved constituents. The Freezing Principle explains the extraction restrictions from dative shift examples as in (5), and from Complex NP shift structures as in (6) (frozen constituents are given in square brackets).¹

- (5) a. John [gave Mary] the books.
 b. *Who did John give _ the books?
 c. *Mary, John gave _ the books.
 d. *Mary is tough for John to give _ books.
 (Wexler & Culicover 1980: 275)

- (6) a. John [gave to Bill the picture that was hanging on the wall].
 b. *Who did John give to _ the picture that was hanging on the wall?
 c. *Bill, John gave to _ the picture that was hanging on the wall.
 d. *Bill would be easy for John to give to _ the picture that was hanging on the wall.
 (Wexler & Culicover 1980: 279)

Additionally, Wexler & Culicover (1980) use the Freezing Principle to account for extraction restrictions in pseudoclefts, see Culicover (1977) for details.²

- (7) a. What Susan did was [prove the theorem].
 b. *Which theorem was what Susan did prove _?
 c. *This is the very theorem that what Susan did was prove _.
 (Wexler & Culicover 1980: 282)

¹ Note that Wexler & Culicover (1980: 274) assume that in the dative shift option the shifted dative forms a constituent with the verb as indicated in (i).

² Wexler & Culicover (1980: 284) also include a rule of s-contraction, which we do not discuss here.

The Raising Principle accounts for extraction restrictions of extraposed PPs, see (8),³ extraposed relative clauses, as in (9),⁴ and extraposed complement clauses as in (10).

- (8) a. A review _ came out last week of a new book by Fred.
 b. *Which book did a review come out last week of _?
 (Wexler & Culicover 1980: 335)
- (9) a. A book has just appeared written by Fred.
 b. *Who has a book just appeared written by _?
 (Wexler & Culicover 1980: 340f)
- (10) a. I expressed my belief to Mary that the United States should give away a million tons of wheat a week.
 b. *Exactly how many tons of wheat did you express your belief to Mary that the United States should give away _?
 (Wexler & Culicover 1980: 341f)

Thus, the notion of Freezing in the Freezing and Raising Principle is closely related to the notion of subextraction, which describes the extraction from inside a frozen constituent (both with the Freezing Principle and the Raising Principle). This frozen constituent can be a noun phrase, prepositional phrase, a verb phrase or even a sentence (S/TP). As both concern subextraction they can be subsumed under one notion (see also Corver 2006a, 2017), which we call the Original Freezing Principle (OFP), despite the fact that the two principles target a different and partially overlapping set of phenomena.

While the OFP has not been further developed as a principle on a theoretical level, several contributions in this volume are concerned with the empirical domain of the OFP. The contributions show that the set of phenomena is not uniform in the strength of the extraction restriction. While extraction from embedded topicalization in English is ungrammatical, see Jäger (this volume),

3 Note that these cases do not fall under the Freezing Principle proper: the new structure is possible as a base structure as in *A review came out last week in the New York Times* (Wexler & Culicover 1980: 336). Additionally, raising does not freeze the VP: *Which newspaper did a review appear in of that new book by Fred?* (Wexler & Culicover 1980: 336).

4 Extraposed relative clauses do not fall under the complex NP constraint, as they are no longer part of the noun phrase, but adjoined to the VP. Additionally, it is not obvious that reduced relative clauses are S' so that the extraction restriction could be explained by some notion of cyclicity or subjacency.

extraction from HNPS and PP-extraposition is much more acceptable, see Culicover & Winkler (this volume), Chaves (this volume) and Konietzko (this volume). Additionally, Corver (this volume) extends the empirical scope from the sentential domain to the domain of adjectival phrases and displaced constituents within the extended projection of the adjective.

1.2 Criterial Freezing

The second approach to the notion of Freezing, known as Criterial Freezing (CF) has been proposed by Rizzi (2006, 2007); Rizzi & Shlonsky (2007). CF is defined over a constituent that satisfies a criterion in the sense of Rizzi (1991, 1997), see (11), and this constituent cannot be moved further.

(11) Criterial Freezing

A phrase meeting a criterion is frozen in place (Rizzi 2006: 112)

The original cases that have been considered as CF are the ones in (12), i.e. cases of the *wh*-criterion; in more recent work Rizzi (2007) has extended the domain of CF to focus and topic features and also to the notion of subject.

(12) *Which book does Bill wonder [t C_Q [she read t]]? (Rizzi 2006: 112)

As the noun phrase *which book* in the specifier of the embedded CP satisfies the criterial feature Q on the embedded C, the full phrase is frozen in this position. This does not necessarily mean that subextraction from the phrase that satisfies the criterion is also restricted. In fact, both positions have been defended.⁵ Subextraction from a criterial position seems to be possible in Italian (according to Rizzi 2006), but not in English, as the contrast in (13) vs. (14) shows.

- (13) ?[Di quale autore] ti domandi [quanti libri t] siano stati
 [by which author] you wonder [how-many books t] have been
 censurati t
 censored t
 'By which author do you wonder how many books have been censored?'
 (Rizzi 2006: 114)

5 See Rizzi (2006) and Gallego (2009b) and references therein for discussion on this point.

- (14) ?? $[_{CP} \text{Who}_i \text{C do you wonder } [_{CP} [\text{which picture of } t_i]_j \text{C Mary bought } t_j]]$?
 (Lasnik & Saito 1992: 102)

Rizzi (2006) proposes that CF is part of syntax proper. The head that is relevant for satisfying the criterion (the criterial goal) is frozen in place. Subextraction is not per se excluded. Rizzi (2007, 2015b) explicitly states that subparts of the phrase are in principle free to move on, i.e. whatever restriction applies to subextraction is different from the restriction that applies to the criterial goal. Gallego (2009b), however, proposes that (13) is not an instance of subextraction, but that the wh-phrase is “aboutness dependent in the matrix clause” (Gallego 2009b: 38), so that CF also restricts subextraction from a phrase in the Criterial Position. Gallego proposes that this is not due to any feature checking mechanism, but to interface conditions.

Criterial Freezing accounts for a range of different phenomena including subject-object asymmetries such as the *that*-trace effect, but has been extended to other configurations such as HNPS and locative inversion (see Rizzi & Shlonsky 2006). Thus, CF is phrased as a general restriction on dislocation.

More recently, CF has been recast in terms of a labeling mechanism⁶ in Rizzi (2015a,b), where CF is a result of the general mechanism of merge, remerge and labeling. In this framework, remerge (or movement) is driven by the labeling mechanism. This approach is further explicated in the contribution by Shlonsky & Rizzi (this volume) and applied to copular clauses in terms of a syntactic mechanism alone. Gallego (this volume) also uses the mechanisms of labeling, yet introduces a link to discourse interpretations in order to account for Freezing. Thus, they differ with respect to which empirical observations should be accounted for by which aspects of the language system. They also differ with respect to the empirical coverage. In Rizzi’s view of CF, there is some overlap with the cases covered by the Freezing Principle. In the approach Gallego takes, subextraction restrictions are subsumed in CF and therefore, the empirical domain overlaps with the Freezing Principle and Subject Islands (see below); at the same time, Gallego does not account for them in syntactic terms, but in terms of the interpretation at the interfaces.

1.3 Müller’s Freezing Generalization

The third major approach to Freezing is Müller’s (2010) Freezing Generalization. He concentrates on the availability of subextraction and proposes that the crucial

⁶ Labeling has been introduced in Chomsky (2013); for recent applications of the theoretical concept, see the contributions in Bauke & Blümel (2017) and references therein.

generalization is that it is impossible to extract from a last merged specifier: extraction out of a noun phrase is impossible if that phrase is the last phrase to move to the edge of the phase. Thus, (15) is ungrammatical, because the phrase *was für ein Buch* is the last merged specifier to the vP phase. Once there is still another phrase that needs to scramble out of the phrase, as in (16), the example becomes acceptable.

- (15) *Was₁ haben [_{DP₃} t₁ für Bücher] [_{DP₃} den Fritz]
 what have [t for books.NOM] [the Fritz.ACC]
 beeindruckt?
 impressed
 ‘What kind of books impressed Fritz?’

- (16) Was₁ haben [_{DP₃} den Fritz] [_{DP₃} t₁ für Bücher]
 what have [the Fritz.ACC] [t for books.NOM]
 beeindruckt?
 impressed
 ‘What kind of books impressed Fritz?’

Müller refers to the case in (16) as a case of melting, where subextraction from an otherwise frozen constituent is available, because another phrase still needed to move to the edge (for the precise details see Müller 2010).⁷ Thus, this approach can be taken to subsume the domain of moved phrases and the domain of subjects to the extent that they are last-merged specifiers.

More recently, Müller (2014) has reinterpreted his Freezing Generalization in terms of feature sets of phrases that collect the derivational history of a phrase (so-called *buffers*). This is explicated further and applied to complex prefields in German in Müller (this volume).

1.4 Freezing and other displacement restrictions

In sum, we can distinguish at least three different notions of Freezing in the literature: (i) The Original Freezing Principle subsuming Freezing of moved constituents (i.e. Wexler & Culicover’s Raising Principle) and Freezing of constituents that are non-base (i.e. Wexler & Culicover’s Freezing Principle), (ii) Criterial

⁷ Whether or not melting is really a result of core properties of the syntactic system or whether the presented examples should find a different explanation is under discussion, see Winkler et al. (2016).

Freezing, which does not necessarily account for subextraction restrictions, and (iii) Freezing of the last merged specifier as in Müller (2010).

Linked to these different notions, there is a range of phenomena that share the restriction on (sub)extraction. However, the question whether and how all of these restrictions on (sub)extraction can be explained uniformly is still a controversially debated issue, and there are a range of proposals that provide explanations for a more or less defined subclass. Syntactic approaches have provided a set of constraints on movement which restrict the domain and the distance of movement: Subjacency (Chomsky 1973, 1977), the Condition on Extraction Domains (since Huang 1982), the Empty Category Principle (Chomsky 1981), Barriers (Chomsky 1986); i.e. conditions, which have been discarded in a minimalist derivational framework, or which have been partially replaced with Criterial Freezing (Rizzi 2006, 2007), the Phase Impenetrability Condition (Chomsky 2001 and follow-up work), last-merged specifiers (Müller 2010), derivational rules (e.g. Gallego & Uriagereka 2007), or late adjunction and PF rules (Stepanov 2007) to name a few. Besides these syntactic approaches there are proposals that suggest that the observed restrictions on (sub)extraction are based on limited memory resources or parsing difficulty while parsing complex structures, especially in the domain of islands (see Phillips 2013 for an overview of the processing literature; Culicover 2008; Culicover & Jackendoff 2005 for a theoretical approach to processing complexity). In the following sections, we introduce the relevant empirical domains of the current volume as well as proposals which seek processing and interface explanations for the observed data.

2 Advances in the empirical domain

Research in the last decades yielded a range of data which indicates that the extraction restriction is not categorical for individual phenomena or specific configurations. Here we will concentrate on the domains addressed in this volume, namely (i) the empirical domain of the Original Freezing Principle, (ii) extensions of the domain of Criterial Freezing and (iii) the domain of subextractions from external and internal arguments.

2.1 The empirical domain of the Original Freezing Principle

The empirical domain of the Freezing Principle is closely related to sentence types that involve syntactic operations that are affected by information structure

or affect information structural interpretations. These are at the core of the Focus Constructions that are discussed in Rochemont & Culicover (1990), such as topicalization, HNPS, PP extraposition (see Hartmann & Winkler 2012 for a collection). Freezing in this domain has received only limited attention. Closer investigation of the original constructions shows that not all of them are frozen in the same way. It has been shown for some types of right dislocation that whether or not the right-dislocated phrase is frozen, depends on a number of factors. Huck & Na (1990) proposed that one important factor in right dislocation and extraction from right dislocation is focus and, linked to that, prosodic stress. Thus, the following example is considered grammatical:

- (17) a. Okay, you saw a picture yesterday, but just whom did you see a picture yesterday OF?
 b. I know Alger found letters in the files TO Chambers, certainly, but I'm not sure I can remember whom he found letters in the files FROM.
 (Huck & Na 1990: 66)

More recently, Hofmeister et al. (2015) investigate the cumulative effect of filler-gap distance on the acceptability of PP-extraposition in a rating study and found that both extraposition and extraction reduce acceptability, but they did not find an interaction. A similar result is presented for the extraction from *it*-clefts in Hartmann (2013, this volume): both extraction and the cleft structure reduce acceptability, but again, there is no additive effect.

The papers in this volume extend the empirical domain on two dimensions. Most previous work concerns the sentential domain. Corver (this volume) extends the domain of Freezing to the adjectival phrase and does important groundwork for extraction restrictions on dislocated phrases within the adjectival phrase. Additionally, Hartmann (this volume) considers Freezing in *it*-clefts, which can be considered to be part of the OFP covering focus constructions. Finally, various papers in this volume work on the empirical domain of the OFP and include interface and processing explanations (see section 3).

2.2 Extensions of Criterial Freezing

The empirical domain of CF has mostly addressed the question of further movement of a phrase in a criterial position. The set of criterial positions is not yet fully established: besides the core cases of *wh*-elements, topic and focus, CF has also been considered to hold for quantificational noun phrases (such as e.g. *beaucoup*

in French as discussed in Laenzlinger 1998; Rizzi 2014). This insight from the quantificational domain is extended to the domain of the interpretation possibilities and word order restrictions of discourse particles and focus-sensitive operators such as *only* in the contributions by Bayer (this volume) and Rochemont (this volume). Bayer (this volume) takes discourse and focus particles to occupy fixed functional positions which he identifies as criterial positions. Rochemont (this volume) zooms in on the interpretation possibilities of adverbial *only* and constituent *only*, and suggests that the reduced interpretation possibilities of adverbial *only* are due to CF.

Another empirical issue concerns the role of CF for subextraction, which is disputed on a theoretical level (see above) and still needs further empirical work. As discussed above, Rizzi's (2006) notion does not exclude subextraction from criterial positions. Empirically, it seems that we find variation between different languages: while English does not allow subextraction from left dislocated *wh*-phrases (Lasnik & Saito 1992), Italian seems to allow it (Rizzi 2006; Gallego 2009a). The contributions in this volume also enlarge the empirical basis with respect to topicalization. Topicalization in English does not allow subextraction as in (18), see the discussion in Jäger (this volume); this is not universal though, as the contribution by Surányi & Turi (this volume) shows for Hungarian.

(18) ??Vowel harmony, I think that [_{IP} [_{NP} articles about *t*], [_{IP} you should read *t* carefully]] (Lasnik & Saito 1992: 101)

In sum, the contributions in this volume extend the empirical scope of CF to different syntactic configurations including the interpretation possibilities of discourse and focus particles, and add to the empirical investigation of subextraction possibilities in CF configurations.

2.3 Freezing and subextraction from subjects and objects

The notion of Freezing has been central to the discussion of the proper generalization for extraction from subjects (see Haegeman et al. 2014 for an overview, Greco et al. 2017). From a theoretical point of view, the connection between extraction from subjects and Freezing is highly relevant because subjects have been considered a core case of islandhood, as formulated already by Ross (1967). If subject islands can be reduced to Freezing, they would no longer be a primitive of syntactic theory but would follow from an independent derivational constraint. A precondition for the assumption that extraction from subjects may fall under Freezing is the *vP*-internal subject hypothesis. Under this view subjects originate

in vP and are moved to SpecTP to check EPP, at least in English. Any further movement from a derived subject position would then fall under Freezing. An approach to subject islands along these lines has been proposed by Stepanov (2007). Stepanov argues that a uniform treatment of subject and adjunct islands as captured by the CED (Huang 1982) is crosslinguistically inadequate. Rather, the decisive factor that governs subextraction from subjects is the ‘derivational history’ of the subject DP. Subjects *in situ* are transparent for subextraction in a number of languages while derived subjects are opaque. Stepanov proposes that the Chain Uniformity Condition (Takahashi 1994) is the decisive formal principle ruling out subextraction from subjects noting that chain uniformity might in fact be viewed as a formalization of the OFP by Wexler & Culicover (1980). Empirical support for such an approach comes from data which suggest that extraction from subjects *in situ* is not blocked, as the following data from Lasnik & Park (2003: 651) suggest:

- (19) a. Which candidate were there posters of all over the town?
 b. *Which candidate were posters of all over the town?

The contrast in grammaticality between (19a) and (19b) falls out from the Freezing condition if one assumes that the subject remains in vP in the *there*-construction in (19a). In (19b), by contrast, the subject raises to SpecTP, hence further subextraction results in ungrammaticality. More recently, Bianchi & Chesi (2014) have proposed an account of subject islands in Italian in terms of CF along the lines of Rizzi (2006). Investigating subject islands from a cross-linguistic perspective, Polinsky et al. (2013) argue that subextraction from subjects cannot be fully captured by Freezing. One type of evidence comes from the fact that subextraction from subjects of unaccusative and passivized verbs is better than subextraction from external arguments. Acceptable cases of subextraction of passive subjects have already been reported by Ross and the discussion of their relevance has been revived in Chomsky (2008).

- (20) Of which cars were the hoods damaged by the explosion? (Ross 1967: 242)

- (21) a. Of which car was the driver awarded a price?
 b. *Of which car did the driver cause a scandal?
 (Chomsky 2008: 147)

Note that the contrast in (21) cannot be due to Freezing, since the subject occupies SpecTP at the surface in both cases. Freezing then should equally rule out (21a) as well as (21b). Chomsky uses data such as (20) and (21) to argue that subextraction in (21a) has to take place from the base position

and argues for a phase-based account to subject islands (cf. Haegeman et al. 2014 for discussion). The generalization that subextraction from object position is better than subextraction from external arguments is also supported by the experimental data in Surányi & Turi (this volume) on subextractions from external and internal arguments in Hungarian. Note, however, that this does not mean that extraction from objects is unrestricted. Polinsky (this volume) provides evidence that subextraction from objects can be further constrained by agreement (cf. also Lohndal 2011). This evidence suggests that the correct crosslinguistic generalization is not only based on the distinction between internal vs. external arguments but depends on the feature set-up of the DP which determines its derivational options. Thus, both Surányi & Turi (this volume) and Polinsky (this volume) provide important empirical investigations to further our understanding of the correct generalization(s) of subextraction restrictions independent of the Original Freezing Principle cases.

In sum, recent empirical work has brought to light that there is a multitude of factors that give rise to freezing effects and it is still under debate as to which factors are universal and which are language specific. The papers in this volume make an important contribution to this overall discussion.

3 Information structure and processing

While many of the theoretical approaches have taken freezing effects to be explained by syntactic principles or part of derivational restrictions, a separate strand of research suggested that the restrictions are rather due to factors such as mapping difficulties between syntax, information structure, semantics, and pragmatics (Williams 2003; Gallego 2009b), or to processing complexity (Erteschik-Shir 1973, 2007; Culicover & Winkler 2014). Thus, extraction seems to be sensitive to the focus-background partition of the clause and discourse-pragmatic factors. Erteschik-Shir (1973) suggested already that extraction can target only new/focused constituents (in her terms this is the dominant part of the clause), whereas Meinunger (2000) and Bayer (2005) suggest that it is not possible to extract from the topic domain (but see Surányi & Turi this volume).

3.1 Freezing and information structure

Winkler et al. (2016) have shown that the extraction restrictions on subjects (see Müller's 2010 freezing and melting effects discussed above in section 1.3) can be

derived from the interaction of focus properties (assign default focus to the preverbal position), focus restrictions on extractions (extract from focused phrase only) and other prosodic constraints (destress given). As these concepts are information-structural, they can be influenced by context, and Winkler et al. (2016) show that freezing effects can be reduced by appropriate contextualization, as in the case of *was-für* splits in German.

Winkler et al. (2016) investigate experimentally the contrast reported in Müller (2010) and illustrated in (15) vs. (16) above. In addition to these structures, they also investigate subjects which have been clearly displaced, as they appear to the left of modal particles, giving rise to a Wexler & Culicover type freezing configuration, see (22).

- (22) *Was₁ haben [_{DP3} t₁ für Ärzte] denn [_{DP2} den Minister]
 what have [t for doctors.NOM] PRT [the minister.ACC]
 kritisiert?
 criticized
 ‘What kind of doctors criticized the minister?’

Winkler et al. (2016) investigate to what extent the configurations in (15), (16) and (22) improve in a context which renders the subject contrastively focused. For (22) the relevant context would be *Dass den Minister Journalisten kritisiert haben, weiß ich schon, aber ...* ‘I already know that journalists criticized the minister, but ...’. Winkler et al. show that under such a context, freezing configurations as in (22) benefit most, extraction from last-merged subjects benefits slightly less, while melting configurations are not affected by this type of context. The authors attribute this effect to a facilitation in processing induced by the context. In essence, the parser expects the gap to appear in a preverbal position; this is guaranteed in the melting configuration irrespective of context. In the case of subextraction from last-merged subjects and in freezing configurations, the parser benefits from the context information. However the structures remain marked because of the violation of independent information-structural constraints such as preverbal focus assignment. Information-structural accounts of Freezing suggest that Freezing is not a primitive of syntactic theory. If freezing configurations were ruled out by a syntactic formalism, ameliorating context effects would not be predicted. It should be noted, however, that freezing phenomena might differ in this respect and that not all freezing phenomena might equally improve with context information (cf. the data discussed in Müller, this volume).

3.2 Freezing and processing complexity

Accounts of Freezing which attribute freezing effects to cumulative violation costs point in the same direction. The goal of these accounts is to disentangle the processing costs for each movement step in a freezing configuration. Under this view, Freezing is the result of syntactic complexity. The logic of the argument goes as follows: in a configuration such as Freezing, which involves two separate steps in the derivation, the violation cost of these derivational steps should be purely additive under the assumption that Freezing, as a syntactic principle, does not exist. Only if we observe superadditivity, do we have evidence for a syntactic Freezing Principle.

Konietzko et al. (2018) provide experimental evidence showing only additive violation costs for subextraction from heavy NP shift. This type of subextraction should be subject to Freezing under Wexler & Culicover (1980). The relevant base configurations are shown in (23) and the respective freezing structures in (24).

- (23) a. The professor praised a detailed review of the new book in his article.
 b. The professor praised a detailed review of the new book passionately.
 c. The professor gave a detailed review of the new book to his colleague.
- (24) a. What₂ did the professor praise t₁ in his article [a detailed review of t₂]₁?
 b. What₂ did the professor praise t₁ passionately [a detailed review of t₂]₁?
 c. What₂ did the professor give t₁ to his colleague [a detailed review of t₂]₁?

Konietzko et al. (2018) test three HNPS configurations (HNPS across adverbial PPs, adverbs, and argument PPs) and show that the judgments for the three structures in (24) are purely additive and result from the violation cost for the shift operation and the violation cost for wh-movement.

HNPS is not the only operation which resists the expected freezing effect. Hofmeister et al. (2015) report similar findings for subextraction from extraposed constituents, which suggests more generally that rightward movement does not create freezing configurations (cf. also Konietzko, this volume). Hofmeister et al. (2015) investigate the following paradigm which manipulates extraposition and subextraction and tests for an interaction of the two factors:

- (25) a. You told me your friend read a story [about an actor] twice while having breakfast.
 b. You told me your friend read a story t₁ twice [about an actor]₁ while having breakfast.

- c. Tell me which actor₁ your friend read a story [about t₁] twice while having breakfast.
- d. Tell me which actor₂ your friend read a story t₁ twice [about t₂]₁ while having breakfast.

If Freezing were an independent syntactic primitive, (25d) should not merely reveal the additive cost for extraposition and *wh*-movement. The results, however, do not show the interaction predicted by the Freezing Principle. The experimental results, which allow for isolating processing costs for individual steps in the derivation, provide a new type of evidence that can inform syntactic theory.

It is crucial that this type of evidence provided by fine-grained experiments cannot be obtained by introspective judgments. The application of experimental methods have not only proven fruitful in the domain of Freezing but also in the domain of islands (see especially Sprouse et al. 2012, 2013 and the contributions in Sprouse & Hornstein 2013) where interactions predicted by syntactic theories have sometimes been detected (see for example Jurka 2010, 2013; Dillon & Hornstein 2013). Several contributions in this volume address information-structural and processing aspects of Freezing. Konietzko investigates context effects with subextraction from heavy NP shift. The contributions by Chaves, Culicover & Winkler, and Jäger investigate the relationship between Freezing and processing complexity.

4 Structure of the book

Part I: Theoretical advancement

The first section “Theoretical advancement” contains papers that address central theoretical questions such as: How can the original Freezing Principle be reformulated in current theoretical frameworks? How are freezing domains formulated in a strictly local theoretical framework? And what are the advantages of these new theoretical proposals?

U. Shlonsky & L. Rizzi: Criterial Freezing in small clauses and the cartography of copular constructions

U. Shlonsky & L. Rizzi discuss freezing effects in copular constructions. In a theory in which labeling drives movement, the following pattern emerges:

whereas complements can normally stay in situ or move, as far as labeling is concerned, specifiers belong to two types: if they give rise to a criterial configuration, they cannot move (Criterial Freezing, see (11)); if they are not criterial, they must move out in order to make labeling of the structure possible. Small clause subjects seem to be an exception to this rule on first sight. Shlonsky & Rizzi argue on the basis of inverse copular constructions (Moro 1997, 2000 *inter alia*) in Italian and in Modern Hebrew that these structures fall into the picture, too. The postcopular subject is frozen in clause-final position by Criterial Freezing (ultimately, labeling and maximality) in both Italian and Hebrew.

Á. Gallego: Freezing effects in a free-Merge system

Á. Gallego addresses the issue of labeling and the resulting halting problem. The halting problem refers to the issue how specifiers that have to move to allow labeling can ever stop to move. He proposes (in contrast to the work underlying the contribution in Shlonsky & Rizzi) that a moved XP halts once it becomes the complement of the relevant probe and is assigned a specific interface interpretation. In this approach, moved phrases halt due to the Principle of Interface Freezing, which states that a moved XP is assigned an interface interpretation if it occupies a phase edge. Freezing effects result from a disrupted interpretation of XPs at the edge. Gallego applies his proposal both to cases of A-Freezing in English vs. Romance, and cases of A'-Freezing as discussed in Rizzi (2006). Gallego's proposal opens the narrow syntactic approaches to interface explanations of freezing effects.

G. Müller: Freezing in complex prefields

G. Müller investigates freezing effects that occur with extraction in complex prefields in German. Standard analyses of complex prefields assume either that the prefield in such cases is occupied by a single VP constituent with an empty head or that the prefield is truly complex, filled by more than one constituent. Under the former analysis, the observed freezing effect is unexpected, while the latter analysis faces empirical problems. Against this background, G. Müller develops a novel analysis of complex prefields proposing the structural operation *Remove*, which can apply to heads and phrases. In the case of heads, *Remove* eliminates the head and its projection. This leads to a reassociation of other XPs in the domain of the removed head.

Part II: Empirical domains

The second part of the volume concentrates on the empirical domain of Freezing both in the OFP and CF sense: the OFP is extended to the non-sentential domain and includes a study on *it*-clefts in context; CF is extended to discourse and focus particles. Additionally, some of the papers concern the overlap of CF and research in islands, more specifically subject islands and the relation of agreement and movement as potential explanations for restrictions on subextraction.

N. Corver: The Freezing points of the (Dutch) adjectival system

N. Corver investigates the question of whether freezing effects are not only found in the clausal domain but also in other types of phrasal domains. The hypothesis is that islandhood of a phrase XP as a result of displacement of that XP is expected to be a cross-categorial phenomenon in human language. He selects adjectival phrases and provides a detailed study of freezing effects in this so far neglected domain based on data from Dutch and English. He considers (i) the frozenness of prepositional and nominal complements that have undergone movement within the adjectival system; (ii) the frozenness of (displaced) modifiers (e.g. measure phrases); (iii) the frozenness of clauses that are associated with the adjectival head/projection.

J. M. Hartmann: Freezing in *it*-clefts: Movement and focus

J. M. Hartmann addresses the question of how the focus structure of clauses affects the availability of subextraction in the domain of *it*-cleft sentences in English. Based on experimental results, Hartmann argues that *wh*-extraction of the pivot and extraction from it gives rise to a multiple focus construction. These are subject to the constraint that the two focus phrases cannot be nested (see Krifka 2006). For an overall study of Freezing, the contribution shows that narrow focus restrictions should be taken into consideration in the investigation of freezing effects.

J. Bayer: Criterial Freezing in the syntax of particles

J. Bayer investigates Freezing of scope relations in constructions containing discourse particles and focus particles in German. He proposes a unified account

for discourse and focus particles and argues that these particles occupy fixed functional positions in the clause structure, which he suggests to be criterial positions that result in Freezing. Particles can alternatively be merged with smaller phrases such as DP, PP, etc., yielding a Small Particle Phrase. The particles carry an active feature which is deactivated once the Small Particle Phrase passes through the specifier of a matching criterial head, resulting in scope freezing.

M. Rochemont: *Only* syntax

M. Rochemont discusses the relationship between *only* adjoined to a noun phrase (constituent *only*) vs. *only* adjoined to the vP (adverbial *only*). He argues that the two versions are derivationally related by movement, in two ways: *only* moves from the associate to its scope position. The associate moves at LF to the scope position. M. Rochemont considers to what extent Criterial Freezing can explain the long observed restriction that the associate of *only* cannot move overtly out of the scope of *only*, but rejects such an approach in the light of the full range of prosodically controlled data.

M. Polinsky: Freezing and phi-feature agreement: On the role of [PERSON]

M. Polinsky provides a study of the interaction of freezing effects with agreement. While it is difficult to distinguish movement effects from freezing effects in many languages as the two go hand in hand, the effects can be set apart more readily in ergative languages. Investigating a small but intriguing selection of ergative languages (Basque, sign languages, Tsez, Hindi), the paper reaches the conclusion that the decisive factor for restricting subextraction is a PERSON feature on the frozen phrase, leaving the relationship between Freezing and Agreement to be more indirect than assumed so far.

B. Surányi & G. Turi: Freezing, topic opacity and phase-based cyclicity in subject islands. Evidence from Hungarian

B. Surányi & G. Turi investigate freezing effects with subextraction from subjects in Hungarian and report the results of an acceptability rating study. The basic properties of Hungarian allow for testing the major influence of movement, topic interpretation and base positions of arguments. Comparing different approaches to Freezing and their interaction with Topic Opacity, the paper concludes that the

decisive factor in freezing effects with subextraction is the base position of the respective noun phrase: while subjects of transitive verbs are opaque both in base and moved positions, the opposite holds of unaccusative subjects. This suggests that neither purely movement based-approaches to Freezing nor approaches based on topic opacity account for the complete picture of restrictions on subextraction from subjects.

Part III: Interface extensions

The third part includes papers that investigate the question of whether Freezing is a grammatical constraint or whether the freezing phenomena can be explained by the interaction of grammar with other factors that cause processing difficulties, such as complexity factors and information structure mismatches, and to what extent some of these are subject to satiation effects.

P. W. Culicover & S. Winkler: Freezing: Between grammar and processing

P. W. Culicover & S. Winkler argue that freezing phenomena do not reflect grammatical constraints, but are a result of the complexity of processing the chain interactions that arise when there are multiple movements in the same sentence. The idea is that freezing effects are not dependent on movement per se. On the one hand, acceptability of extraction from a moved constituent decreases gradually with extraction distance, an effect observed with other cases of processing difficulty in grammatical filler-gap dependencies. Additionally, freezing effects also appear with elements in-situ when processing is complex due to independent factors such as a marked information structure, or non-default accentuation. Thus, the authors propose that Freezing must be explained as a phenomenon that is situated between grammar proper and processing.

A. Konietzko: Heavy NP Shift in context: On the interaction of information structure and subextraction from shifted constituents

A. Konietzko investigates freezing effects with subextraction from heavy NP shift (HNPS). Elaborating on the findings in Konietzko et al. (2018), who argue that the markedness of subextraction from HNPS is an additive

complexity effect of two independent chain formations, the present study pursues the hypothesis that extraction from HNPS improves under appropriate contextualization. Based on experimental results from acceptability ratings, the study shows that extraction from HNPS is sensitive to focus. Subextraction from focused constituents receives higher ratings than subextraction from discourse given constituents. The study thus contributes to a better understanding of the interaction of Freezing and information structure.

R. Chaves: Freezing as a probabilistic phenomenon

R. Chaves argues that Freezing is a graded, non-categorical phenomenon. He proposes that Freezing is caused by the highly unusual structures of such configurations, which lead to a processing conflict between the comprehender's expectations and the actual input. R. Chaves presents a series of experimental studies in favor of this account. The experimental results provide evidence for the processing account and suggest that freezing effects can be ameliorated with increased frequency. Moreover, freezing effects remain strongest when other independent factors increase processing difficulty and make the correct syntactic analysis more unlikely.

M. Jäger: An experimental study on Freezing and topicalization in English

M. Jäger investigates extraction from embedded topicalization from an experimental perspective. Extraction from topicalization has been considered as one of the core cases of Freezing. The question addressed in this study is whether the freezing effect is caused by grammatical restrictions or by an interaction of other complexity factors. The results of the study suggest that the three factors topicalization, embedding and extraction contribute to the overall markedness of subextraction from topicalization.

The above discussion has shown that the papers of this volume contribute to the investigation of the core notions of Freezing in at least three important ways: first, the papers close the gap of the different research directions by seeking the common ground between them. Second, the papers present further theoretical developments of the freezing approaches. Third, they try to extend the empirical coverage of the core theoretical concepts. Thereby, the papers reflect an important step forward in the development of a comprehensive theory of Freezing.

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Part I: Theoretical advancement

Ur Shlonsky and Luigi Rizzi

Criteria! Freezing in small clauses and the cartography of copular constructions

Abstract: Criteria! Freezing is a particular instance of freezing arising in criteria! configurations, i.e., in configurations dedicated to the expression of scope-discourse properties. Recent proposals (e.g., Rizzi 2015a,b) try to deduce criteria! freezing effects from more elementary ingredients of linguistic computations, most notably from the labeling algorithm proposed in Chomsky (2013). In this paper, we explore the consequences of this approach for the syntax of small clauses. This leads us to work out a cartography of small clauses, both in selected domains (as in English and Romance), and as main clauses (as in Hebrew, following Shlonsky 2000). The cartography involves distinct subject positions in the structure of the IP, which are associated with distinct interpretive properties at the interface. Special attention is devoted to the syntax of small clauses with a non-verbal, pronominal copula in Hebrew. Direct and inverse copular sentences are analyzed according to the proposed structural map, and various freezing effects are traced back to the theoretical ingredients introduced at the outset.

Keywords: Criteria! freezing, copula, Hebrew copular sentence, labeling, Subject Criterion, small clause, subject position(s), PRON, Inverse copular sentence, Focus, Smuggling

1 Introduction

Among the various manifestations of freezing phenomena, a case that has attracted significant attention lately is the case of “criteria! freezing”. In essence, when a phrase enters into a “criteria! configuration”, a configuration dedicated to the expression of a scope-discourse-property (e.g., the final landing site of wh-movement, a left peripheral topic or focus position), the phrase is frozen, and becomes unavailable to further movement operations (Rizzi 2006 and much related work).¹ Recent research on the topic (Rizzi 2015a,b, etc.), attempts to deduce criteria! freezing effects from more elementary ingredients of linguistic computations, in particular from the locality-based labeling algorithm proposed by Chomsky (2013).

¹ This approach to freezing focuses on the impossibility of continuing movement of a phrase from certain positions, and does not directly address the constraints on subextraction, which are central for other approaches to freezing.

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In this paper we explore several consequences of this approach for the syntax of small clauses. After a short presentation of the labeling algorithm and of its capacity, in combination with other assumptions, to capture the freezing effects, we briefly discuss some implications of this approach for the analysis of small clauses in English and Romance. We then turn to Modern Hebrew, a language that makes systematic use of verbless small clauses in root environments, and, as such, offers more radical and interesting variations on the theme of small clause syntax.

One important peculiarity of Hebrew main small clauses is the appearance (obligatory in some contexts, apparently optional in others) of a non-verbal, pronominal copula in the present tense. We develop a cartographic analysis of this and other peculiarities of main small clauses, which, following Shlonsky (2000), lead to the postulation of distinct “subject” heads, occupying different positions in the clausal spine, and triggering distinct interpretive effects at the interface with semantics and pragmatics.

In the second part of the paper we focus on direct and inverse copular constructions (Moro 1997), and discuss properties of the derivation and agreement patterns of these constructions both in languages with an overt verbal copula (Italian, English, etc.) and in Hebrew, which has a zero or pronominal copula. We conclude with an analysis of different types of freezing effects, arising in direct and inverse copular clauses, and show that they can be elucidated by the fundamental principles advocated for the explanation of criterial freezing effects, namely, labeling and a maximality principle.

2 Background: Labeling, freezing and the Subject Criterion

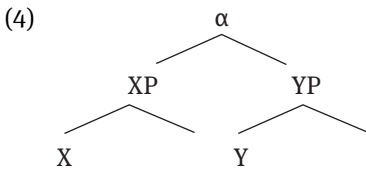
We adopt the approach to labeling introduced in Chomsky (2013), based on the algorithm (1) and the well-formedness condition (2):

- (1) Node α created by merge receives the label of the closest head.
(Chomsky 2013)
- (2) Complete labeling is an interface requirement.
(Chomsky 2013)

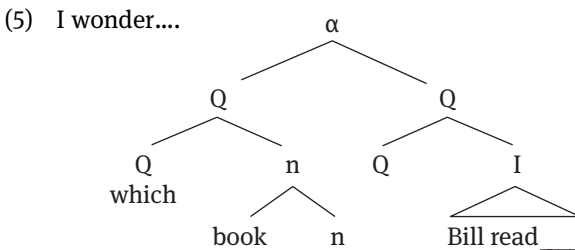
According to (1), labeling is a matter of locality. We borrow from Rizzi (2015a; 2015b) the following more detailed implementation, which builds Relativized Minimality into the algorithm:

- (3) α receives the label of H_1 iff
- i. α contains H_1 , and
 - ii. there is no H_2 such that
 - a. α contains H_2 , and
 - b. H_2 c-commands H_1 . (Rizzi 2015a,b)

The algorithm interacts with the three different subcases of merge: head – head, head – phrase, and phrase – phrase. The interesting case is the last. It gives rise to a configuration like the following:



Here, an ambiguity arises, as both X and Y satisfy the definition of closest head: The algorithm blocks and α remains unlabeled. But this can only be a temporary state of affairs because, under (2), all nodes must be labeled at the interface. Chomsky (2013) argues that the deadlock can be solved in one of two ways: 1. One of the two phrases, let's say XP in (4), moves further, so that Y remains without competitor and labels α (an idea inspired by Moro (2000), which also assumes that movement can resolve a problematic situation for dynamic antisymmetry); 2. [XP YP] is a criterial configuration (Rizzi 1997, 2010), and the criterial feature, a categorial feature shared by both XP and YP in the criterial approach, projects and labels α . For example, in the clausal complement of a verb selecting an indirect question we have:



Here both XP (*which book*) and YP (*Q Bill read*) share the criterial feature Q, which therefore labels α as Q, an indirect question. So, a moved element can remain in a criterial configuration, as the dominating node can be labeled by the criterial feature.

But the effect is stronger here. The phrase satisfying a criterion cannot be moved further, e.g.:

- (6) a. I wonder [[which book] Q [Bill read __]]
 b. *Which book do you wonder [__ Q [Bill read __]]
 (Lasnik & Saito 1992)

In other words, there is a freezing effect in the criterial configuration (Rizzi 2006; 2010; Rizzi & Shlonsky 2007). How can such a criterial freezing effect be captured under the labeling approach? Rizzi (2015a,b) proposes that freezing may follow from a natural maximality principle, which expresses the familiar fact that intermediate projections are inert for phrasal movement:

- (7) **Maximality**
 Phrasal movement can only involve maximal objects with a given label.
 (Rizzi 2015b)

After α is labeled as Q in (5), the phrase *which book* ceases to be maximal, as the node immediately dominating it has the same label. As such, maximality bans further movement of *which book* from the criterial configuration, and criterial freezing is captured.

Under this set of assumptions, the “halting site” for phrasal movement is a criterial position, where a phrase can halt (because labeling of the mother node is possible) and must halt (because of maximality).

One typical halting site for phrasal movement is the subject position in the high structure of the IP zone, the typical final landing site of A-movement. The natural conclusion, given our assumptions, is therefore that the subject position is a criterial position, the A counterpart of A' criterial positions in the left periphery. What would be the interpretive counterpart of a subject criterion? In previous work (stemming from Rizzi 2005, 2006) it was proposed that the crucial property is “aboutness”: The event is presented as being about the subject, and differentiates, for instance, active and passive sentences:

- (8) a. John called Mary.
 b. Mary was called by John.

The calling event is presented as being about the agent in the active, and about the patient in the passive, and this has consequences for the subsequent discourse structure, anaphora resolution etc. (See Rizzi 2005, 2006 for discussion).

The criterial approach borrows from Cardinaletti (2004) the assumption that a functional head, Subj, structurally defines the subject – predicate articulation. Subj

occurs as part of the clausal spine, much as T, Asp, etc., perhaps as the highest element of the IP, adjacent to the Fin head, which initiates the CP system. In syntax, Subj attracts a nominal expression to its Spec, and at the interface it triggers the aboutness interpretation. Overt manifestations of Subj may be the subject clitics of Northern Italian Dialects (Poletto 2000; Manzini & Savoia 2005) and also the “nominal copula” *hu* and its variants in Hebrew, further discussed below.

If there is a subject criterion, one expects freezing effects in subject position, under criterial freezing (ultimately, labeling and maximality). This offers a straightforward analysis for subject – object asymmetries, alternative to the classical GB account in terms of the ECP (Rizzi 2006, Rizzi & Shlonsky 2007):

- (9) a. *Who do you think [that [___ Subj will come]]?
 b. Who do you think [that [Mary Subj will meet ___]]?

In the derivation of (9a), the thematic subject *who* is inevitably attracted by Subj in the embedded clause, it satisfies the Subject Criterion, and gets frozen there. Criteria Freezing therefore bans further movement of *who* to the main C-system. No problem arises for object extraction, as in (9b), because there is no object criterion.

Languages use different strategies to make subject extraction possible (Rizzi & Shlonsky 2007; Shlonsky 2014a). In English, (9a) is made possible by dropping the complementizer *that*. One straightforward approach to this strategy is truncation (Rizzi & Shlonsky 2007; Shlonsky 2014a). If complementizer-less sentences may involve radical structural truncation of the C-system and of the adjacent Subj layer, a sentence like *Who do you think will come?* will have a representation like the following, in which the structure in bold is truncated²:

- (10) Who do you think [_{CP} C [_{SubjP} **Subj** [TP___ will come]]] ?

In (10), as the upper part of the clause is truncated, no criterial subject position is present, and the *wh* subject can be successfully extracted from a non-criterial position, say Spec of T. Other languages use different strategies, such as alternative

² “Truncation” is used here in the sense in which the term is used in the acquisition literature (Rizzi 1993/4 and much related work), i.e., radical absence of structure, akin to “S'-deletion” with *believe* type verbs in Chomsky (1981). This approach may be oversimplified, as an anonymous reviewer points out: if Subj is radically absent with subject extraction, how can the aboutness interpretation in the embedded clause arise, e.g., in active-passive pairs? We will not be able to address the issue here, but it can be noted that the problem can be circumvented in more elaborate approaches which assimilate the C-deletion strategy to an invisible *que>qui* rule. See Rizzi & Shlonsky (2007) for discussion.

ways of satisfying the subject criterion, without actually moving the subject to the criterial Spec of Subj (e.g., the *que>qui* rule in French, Rizzi & Shlonsky 2007; see Berthelot 2017 for recent discussion).

3 Halting, complements, and specifiers: Small clauses in Romance/English

The labeling algorithm draws a sharp distinction between complements and specifiers. Complements are first merged in an X-YP configuration with their selecting head, therefore X always labels the structure created by merge, and no labeling problem arises: Complements may remain *in situ* or move, depending on the presence of a higher attractor, but labeling does not enforce movement (or freezing). The case of specifiers is different. They typically (perhaps always) involve an XP-YP configuration, which gives rise to a labeling problem. Therefore, one of the two possible solutions (creation of a criterial configuration or further movement) must be adopted. In a nutshell:

- (11) As far as labeling is concerned,
- a. complements may stay *in situ* or move;
 - b. specifiers must stay if they are in a criterial configuration; otherwise they must move

A potential problem for this simple picture is raised by the subject of small clauses, which occupies a specifier position, and can both remain *in situ* or be (A or A') moved:

- (12) a. I consider [_α John intelligent]
 b. John is considered [_β ___ intelligent]
 c. A man who I consider [_β ___ intelligent]

Let us consider two possible solutions for this problem.

Solution I. One possibility here would be to weaken (11) and admit a third case, a kind of specifier position, which is not criterial, and permits its filler to both stay and continue to move. For instance, it could be that agreement in Phi features, even if it does not define a criterial position, suffices to qualify a position as a possible halting site, as it permits labeling the mother node as Phi, the features shared by XP and YP (this is, in essence, the position adopted by Chomsky 2016).

For concreteness, we will assume that the minimal small clause in (12) is headed by a Pred head (Bowers 1993; 2010; den Dikken 2006; Svenonius 1994),

merged with the AP; subsequently, the subject is merged with the Pred constituent. (Alternatively, the subject could be merged directly with AP, as in Stowell 1982; the mediation of Pred is not critical here, but becomes crucial for the analysis of DP DP small clauses, as argued by Bowers 1993. See below.) Suppose also that Pred carries Phi features (let's say number and gender, which show up in the adjectival morphology in Romance). Sentence (12a) would then have the following representation:

(13) I consider [α [_{Phi} John] [Pred_{Phi} intelligent]]]

Here *John* and Pred_{Phi} would agree in the relevant Phi features; even if the position is not criterial, α could be labeled as Phi, giving rise to a well-formed structure, akin to AgrP in GB analysis. What about the possibility of extracting the subject, as in (12b,c)? Why wouldn't maximality block extraction in this case, too? If solution I is adopted, one possibility that comes to mind is to appeal to the "uninterpretable" character of the relevant Phi features expressed on the functional head Pred. If indeed such features are uninterpretable, and uninterpretable features are deleted before transfer to the semantic interface (Chomsky 1995), one could imagine that deletion of the uninterpretable Phi features is unordered with respect to labeling. The option of applying labeling first would yield (13) with α labeled as Phi – a well-formed structure with the subject *in situ*; the option of applying deletion of Phi in Pred first would yield a representation like the following:

(14) I consider [β [_{Phi} John] [Pred_{Phi} intelligent]]]

At this point, *John* would be maximal, hence it would be free to move further, as in (12b,c); the small clause β could be successfully labeled as Pred, and the structure would be well-formed again, as far as labeling is concerned; (12a) would have essentially the same representation as (12b,c), the only crucial difference being the ordering labeling > deletion in (12a), and deletion > labeling in (12b,c).

Solution II. Another possibility to deal with the apparent lack of complementarity in (12) would be to stick to the restrictive assumptions in (11), hence assuming that only criterial configurations allow specifiers to halt, and explore the hypothesis that the categorial status of the small clause is substantively different in (12a) with respect to (12b,c). If $\alpha \neq \beta$ in (12), it would be conceivable to continue to assume a rigid complementarity between "halting" Specs and Specs requiring further movement.

Let us pursue this second hypothesis. In (12b,c), the small clause would have the representation previously assumed (now abstracting away from agreement in non-criterial features), with the subject merged with a PredP:

(15) ... [John [Pred [intelligent]]] = (12b,c)

This is a non-criterial XP-YP structure in which labeling requires movement of the subject, as in (12b,c).

On the contrary, (12a) could involve a richer structure like (16), with a Subj head defining a criterial position:

(16) ... [John Subj [__ Pred [intelligent]]] = (12a)

In this view, (12a) and (12b,c) differ in structure, in a manner consistent with the strong complementarity expressed by (11b): In (15), the small clause subject is in a non-criterial position, hence it is forced to move, yielding (12b,c). In (16), the subject is in a criterial position, where it is frozen, yielding (12a).

Which one of the two approaches to (12) is to be adopted?

A first hint which seems to favor solution II is offered by the fact that some verbs tend to exclude a small clause with an overt subject, while admitting a small clause whose subject is moved further, e.g., in some varieties of English (Ian Roberts, p. c.)³.

- (17) a. *I think [_α John intelligent]
 b. John is thought [_β __ intelligent]
 c. A man who I think [_β __ intelligent]

In terms of solution II, the pattern can be simply captured by assuming that *think* selects PredP but not SubjP, while *consider* may select both. In terms of solution

3 The contrast (17a-c) is akin to the Romance pattern discussed in Kayne (1981), Rizzi (1982) according to which infinitives selected by epistemic verbs disallow overt subjects, but permit wh-extraction of the subject. The pattern is not fully parallel, though, as NP-movement does not rescue the Romance structure.

Rapoport (1987:199) notes that adjectival small clauses in Hebrew, embedded under ‘think/consider’, require the preposition *le* ‘to’ which, as in English, also introduces infinitives and indirect objects.

(i) *Saba xošev et Rivka le pikxit*
 Grandfather thinks/considers ACC Rivka to intelligent
 ‘Grandfather considers Rivka intelligent.’

Under passive, however, this preposition is optional, suggesting that more structure is involved when the small clause subject is unmoved, in line with solution II.

(ii) *Rivka nexševet (le) pikxit*
 Rivka consider-PASSIVE to intelligent
 ‘Rivka is considered intelligent.’

I, one would have to stipulate that with *think*, the only possible order of application is Deletion > Labeling, so that movement of the small clause subject would be compulsory; but this is hard to state as a lexically-governed property, while selection (as in solution II) is naturally expressible.

More important evidence for solution II is provided by interpretive and distributional properties of the small clause subject (here we rely on the discussion in Rizzi 2015b). If a variant of the Subject Criterion is satisfied in small clauses like (12a), one would expect this position to pattern with canonical subject positions in other respects.

There is a well-known subject-object asymmetry in the distribution of bare plurals in Italian.⁴

- (18) a. *Gianni frequenta amici*
 ‘Gianni sees friends.’
 b. **Amici frequentano Gianni*
 ‘Friends see Gianni’

Bare plurals are also impossible as subjects of small clauses, as Belletti (1988) observed.

- (19) **Gianni considera [[amici] [simpatici]]*
 ‘Gianni considers friends nice.’

So, there is a clear parallelism between the subject position of full clauses and of small clauses, which is immediately captured by the hypothesis that the two positions have in common the satisfaction of the subject criterion (solution II). On the other hand, solution I would not immediately capture the ill-formedness of (19).⁵

If this analysis is on the right track, (certain) small clauses may share one important structural property with full clauses, namely, the fact of being headed by a Subj head that gives rise to a criterial configuration (but see below for a case in which the parallelism breaks down).

⁴ Belletti & Bianchi (2014) argue that bare plurals in Italian are not (full-fledged) DPs; as such, they presumably fail to satisfy the Subject Criterion in (18b), as the criterion may require a full DP for satisfaction.

⁵ Basilico (2003) observes that the subject of some non-verbal small clauses possess topic-like properties also in English, where “topic-like” is understood in terms of the aboutness property. In this sense, our analysis converges with his, without assuming an explicit Top position as the external layer of the small clause.

The theory of labeling we have adopted leads to a diversified analysis of embedded small clauses in English and Italian, which may involve simple or more complex structures, correlating with the possibility (and obligation) or exclusion of movement of the subject, a pattern now falling under the rubric of the “halting problem” (Rizzi 2015a). Other languages, such as Modern Hebrew, allow small clauses as main clauses. We may therefore ask the question if also main small clauses correspond to a variety of structural configurations, and how the halting problem manifests itself in such configurations.

4 Bare small clauses and copular sentences in Hebrew

Copular sentences are formed with copular ‘be’ in past and future tense clauses, (20a,b), but without a copula in the present tense, (20c). The absence of a copula in (20c) is a gap in the paradigm: The word which corresponds to the morphological form of the present tense of the root *vhyy* is *hove* but it has the meaning of the common noun ‘present’ and not that of the present tense form of ‘be’.

- (20) a. *Dani haya more / xaver-i ha tov.*
 D. was teacher / friend-my the good
 ‘Dani was a teacher / my good friend.’
- b. *Dani yhye more / xaver-i ha tov.*
 D. will be teacher / friend-my the good
 ‘Dani will be a teacher / my good friend.’
- c. *Dani more / xaver-i ha tov.*
 D. teacher / friend-mine the good
 ‘Dani is a teacher / my good friend.’

It is conceivable that ‘bare’ copular sentences contain a phonetically null (suppletive) variant of ‘be’. Standard Arabic copular sentences provide a *prima facie* reason to doubt this.

Like Hebrew, Standard Arabic present-tense copular sentences lack a copula. Unlike Hebrew, Standard Arabic has morphological case suffixes. In the copulaless, present tense (21a), both terms of the copular construction bear a nominative suffix. In (21b), with an (overt) past-tense copula, the subject bears a nominative suffix and the predicate nominal an accusative suffix. If present-tense copular sentences have an unpronounced copula, one has to explain why its presence correlates with the absence of accusative Case, presumably assigned or checked

not by the lexical verb itself but by a functional head such as *v*. If bare copular sentences literally lack a copular verb, the absence of accusative follows from the absence of *v*. The appearance of nominative case on the predicate nominals can then be attributed to the fact that nominative is the default case in Arabic and is suffixed onto nouns in the absence of a (structural) Case environment.

- (21) a. *al- rajul -u mudarris -un.*
 the- man- NOM teacher- NOM
 ‘The man is a teacher.’
 b. *kaana al- rajul -u mudarris -an.*
 was the- man- NOM teacher- ACC
 ‘The man is a teacher.’

With Doron (1983), Rapoport (1987), Rothstein (1995) and Shlonsky (2000), we surmise that present tense, ‘bare’ copular sentences such as (20c) implicate no verb and no *vP* structure. Since ‘bare’ copular sentences constitute independent tense domains, we take it for granted that they contain a *T* head. *T* is ‘defective’, though, in that it doesn’t take a verbal complement (and hence lacks ‘verbal’ features). We do not attempt a theoretical articulation of this property – see Doron (1983) for a proposal – and henceforth assume that in sentences such as (20c), the complement of *T* is, minimally, a *PredP*, that is, a small clause that articulates the basic subject-predicate relation.

Following the discussion in section 2, since the subject in (20c) is not in a complement position, it must be occupying a halting spec position, that is, either a small-clause related subject position as in English/Romance small clauses (see (12)), or some higher subject position in the main clause.

In contrast to bare copular sentences like (20c), there are types of copular sentences that cannot be bare. For such sentences to be grammatical, some functional material must appear between the two terms of the copular sentence (Shlonsky (2000)). Examples of such sentences appear in (22) and (23). In the grammatical (a) examples, the negative particle *lo*, the emphatic affirmation particle *ken* or adverbs meaning ‘of course’, or ‘certainly’ appear between the two terms of the copular sentences. The (b) cases show that as ‘bare’ sentences, such copular sentences are ungrammatical. The first pair illustrates generic statements with a bare plural subject and the second a sentence with a type-referring bare singular subject.

- (22) a. *’orvim lo/ken/bevaday/betax šxorim.*
 ravens neg/yes/of course/certainly black
 ‘Ravens are not/ARE/of course/certainly black.’

- b. **orvim šxorim.*
 ravens black
 ‘Ravens are black.’ (Greenberg 1998)

- (23) a. *namer lo/ken/bevaday/betax nadir be arc-enu.*
 tiger neg/yes/of course/certainly rare in country-ours
 ‘Tigers are not/ARE/of course/certainly rare in our country.’
 b. **namer nadir be arc-enu*
 tiger rare in country-ours
 ‘Tigers are rare in our country.’ (Doron 2003)

There are many bones of contention in the literature concerning the semantic treatment of genericity and related phenomena. One fairly consensual idea, though, is that subjects of such sentences are barred from ‘low’ positions in the clause, positions that are accessible to subjects in non-generic propositions. It seems natural, therefore, to assume that subjects of such sentences cannot appear in the low, small-clause-related Subj position but only in a higher one, above negation/affirmation and adverbs such as ‘of course’ and ‘certainly’. We assume, following in essence Cinque (1999 ch. 3), that these functional elements make available ‘DP-related’ projections.

In the presence of negation and emphatic affirmation (perhaps alternate values of a polarity head – Pol), it seems that a high subject position is obligatorily merged and must be occupied. Thus, subjects of negative/emphatically affirmed non-generic copular sentences obligatorily raise to the left of Pol, even if such movement is not associated with a particular interpretative property (apart, again, from “pure aboutness”, which we take to be sufficient to define a criterial position, hence a possible halting site for A-movement). (24a) is the negative/emphatically affirmed variant of (20c) with the subject raised above negation; the contrast between (24a) and (24b) shows that the subject must raise above Pol.

- (24) a. *Dani lo /ken more/ xaver-i ha tov.*
 Dani not IS teacher / friend-my the good
 ‘Dani is not/IS a teacher /my good friend.’
 b. **lo/ken Dani more / xaver-i ha tov.*

An interim conclusion that we can draw at this point is that Hebrew makes available two halting specs in copular constructions, a low position akin to or perhaps identical to the small-clause-related subject position found in English and Romance small clauses, and a higher position in the clausal skeleton.

5 Inverse copular constructions and PRON

Assuming, then, that (20c) is derived by moving *Dani* from Spec/Pred to either Spec/Subj or to a higher subject position, we now ask why (25), which superficially involves a reversal of the position of the two constituents of the small clause, is ungrammatical. The question arises because we typically find in languages both direct and inverse copular constructions (in the sense of Moro (1997): *John is my best friend, My best friend is John*). Clearly, if the underlying structure of (25) were as in (26), with Pred merged with *Dani* and *xaver-i ha tov* ‘my good friend’ merged with the resulting structure, there would be no obvious way to rule out (25). But (26) is plausibly excluded, as an initial representation generated by external merge, because the proper name does not qualify as a possible predicative DP.⁶

(25) **xaver-i ha tov Dani*
 friend-my the good Dani
 ‘My good friend is Dani.’

(26) [*xaver-i ha tov [Pred Dani]*]
 friend-my the good Dani

Suppose, alternatively, that the PredP configuration underlying (20c) also underlies inverse copular constructions, which involve the predicate nominal *xaver-i ha tov* ‘my good friend’ raising over the subject *Dani*. The order in (25) is ungrammatical, so we have to rule out this particular instance of the inverse construction. With den Dikken (2006), we can exploit Relativized Minimality (Rizzi 1990 and subsequent work) to rule this sentence out, as movement of the predicate nominal across the c-commanding subject yields an ill-formed A-chain. (An indefinite predicate nominal such as *more* ‘(a) teacher’ cannot appear as an inverted predicate, for reasons discussed in section 5.)

But inverse copular constructions do exist across languages, e.g., in English and Italian:

⁶ Under certain circumstances, names can be interpreted predicatively, in which case even so-called identity statements harbor an asymmetry between the two DPs making up the small clause. Thus, Percus & Sharvit (2014), who develop this idea, cite the perfectly coherent (i) from Cumming (2008), which shows that (ii) cannot be correct, at least under the scope of *think*.

- (i) Mary thinks that Jessica is Sam, but she doesn’t think that Sam is Jessica.
- (ii) [[A is B]] = [[B is A]]

See note 8 for further discussion.

- (27) a. John is my best friend.
 b. My best friend is John.
- (28) a. *Gianni è il mio miglior amico.*
 Gianni is the my best friend
 ‘Gianni is my best friend.’
 b. *Il mio miglior amico è Gianni.*
 the my best friend is Gianni
 ‘My best friend is Gianni.’

On the face of it, it appears that English and Italian allow a violation of Relativized Minimality (RM) while Hebrew does not (in examples like (25)). In what follows, we attempt to resolve this problem by providing a unified analysis of inverse copular constructions, based on Rizzi (2015b). Our proposal explains both why no violation of RM is incurred in the derivation of (27b) and (28b) and why Hebrew is (apparently) different. We begin with a discussion of Hebrew.

The first observation that needs to be made is that inverse copular sentences do exist in Hebrew, but they require the presence of a third person pronoun in a position between the two terms of the copular construction and higher than Pol. There are two variants of this pronominal copula. It can either be identical to the different number and gender forms of the personal pronoun, namely *hu* ‘he’, *hi* ‘she’ *hem* ‘they.m’ or *hen* ‘they.f’, or to the impersonal pronoun *ze*, which only partially and optionally alternates in phi features (Danon 2012; Greenberg 2008; Heller 1999, Sichel 1997, 2001; Spector Shirtz 2014). In this contribution, we limit ourselves to a study of the personal pronominal copula, labeled PRON by Doron (1983) and illustrated in (29a). (29b) shows that PRON must be higher than Pol.

- (29) a. *xaver-i ha tov *(hu) Dani.*
 friend-my the good PRON.ms Dani
 ‘My good friend is Dani.’
 b. *xaver-i ha tov *(hu) (lo/ken) Dani.*
 friend-my the good PRON.ms neg/yes Dani
 ‘My good friend is not /IS Dani.’

PRON must be merged above Pol (compare (29b) and (30)), while inflected verbs, (31), including the verbal copula, (32), obligatorily follow Pol.⁷

⁷ The (b) sentences in (31) and (32) are acceptable with (contrastive) constituent negation/emphatic affirmation.

(30) *xaver-i ha tov lo/ken hu Dani.

- (31) a. *Dani lo/ken ohev xacilim.*
 D. neg/yes likes eggplants
 ‘Dani doesn’t/does like eggplants.’
 b. *Dani ohev lo/ken xacilim.

- (32) a. *Dani lo/ken haya more / xaver-i ha tov.*
 D. neg/yes was teacher / friend-my the good
 ‘Dani was not/WAS a teacher / my good friend.’
 b. *Dani haya lo/ken more / xaver-i ha tov.
 D. was neg/yes teacher / friend-my the good

Adapting Doron’s (1983) idea that PRON is a bundle of “unattached agreement features in INFL”, we suggest (33), where uppercase SUBJ is used to distinguish the higher subject position from the lower subject position of small clauses in (16). We argue that the fronted predicate nominal in the inverse copular sentence in (30) is in Spec/SUBJ.

(33) PRON lexicalizes SUBJ.

There is a further element of complexity. We concluded section 4 with the suggestion that Hebrew makes available not only a low subject position, in the periphery of PredP, but also a higher position, above Pol and certain adverbs. This higher position is not spelled out as PRON, as we have seen. So, we must postulate two distinct SUBJ positions higher than Pol, the highest of which is spelled out as PRON. This global cartography is summarized in (34) for the relevant part. SUBJ1 is the lower of the two high subject heads; it is phonologically null. SUBJ2 is the highest of the two and is lexicalized by PRON; subj (in lower case) is the PredP-peripheral subject head.

(34) ...DP SUBJ2 ...DP SUBJ1 ...Pol ...DP subj PredP
 | |
 PRON ∅

In bare copular sentences, the subject nominal is in Spec/subj. In some environments, it cannot remain so low and must raise to Spec/SUBJ1 – in the generic and type-construed sentences exemplified by the (a) examples of (22) and (23). (In such

sentences, Pol appears to permit and impose the projection of SUBJ1). We continue to assume that subjects in Spec/SUBJ1 are pure ‘aboutness’ subjects, in the sense of Rizzi (2005; 2006).⁸

Subjects in Spec/SUBJ2 are interpretatively more constrained. Doron (1983) observes that wh-movement of a lexically bare subject *mi* ‘who’ is incompatible with PRON, while wh-movement of a lexically-restricted, D-linked subject like *eize baxur* ‘which guy’ is possible with PRON; compare (35a) and (35b).⁹

8 If Cumming’s (2008) and Percus & Sharvit’s (2014) *Jessica is Sam* sentences involve predication of some sort, see note 6, it is predicted that they could appear without PRON, as a reviewer points out. This prediction is borne out, although the subject of such sentences must minimally access SUBJ1, (and can raise to SUBJ2 optionally.)

- (i) a. *Jessica (hi) lo/ken Sam.*
 J. (PRON-fs) neg/yes S.
 ‘Jessica isn’t/IS Sam.’
 b. *Sam (hu) lo/ken Jessica.*
 S. (PRON-ms) neg/yes J.
 ‘Sam isn’t/IS Jessica.’

Both are canonical copular sentences (derived from [Jessica PRED Sam] in (ia) and from [Sam PRED Jessica.] in (ib)) When one of the two names is more easily construed as a property than the other, for example, when it is a family name, one order constitutes a canonical copular sentence and the other an inverse one, requiring PRON.

- (ii) a. *Ur (hu) lo/ken mar Shlonsky.*
 Ur (PRON-ms) neg/yes Mr. Shlonsky
 ‘Ur is Mr. Shlonsky.’
 b. *Mar Shlonsky *(hu) lo/ken Ur.*
 Mr. Shlonsky PRON-ms neg/yes Ur
 ‘Mr Shlonsky is Ur.’

As noted in Doron (1983), the only case where two names can occur in the ‘bare’ copular construction is in role-playing contexts.

- (iii) *Hayom Dani Hamlet ve Rina Ophelia.*
 Today Dani Hamlet and Rina Ophelia
 Today, Dani is Hamlet and Rina is Ophelia.’

9 Doron also notes that long wh-movement of the subject actually requires PRON, a fact which we believe should be linked to other differences between short vs. long subject wh-movement and which lie beyond the scope of this contribution.

- (35) a. *mi (*hu) more?*
 who PRON-ms teacher
 ‘Who is a teacher?’
 b. *eize baxur ?(hu) more?*
 which guy PRON-ms teacher
 ‘Which guy is a teacher?’

Our suggestion is that in addition to the ‘aboutness’ property, Spec/SUBJ2 can only host subjects that are presuppositional, like ‘which guy’, and eschews non-presuppositional subjects like ‘who’.

It has, likewise, often been noted (e.g., in Heycock 2012), that indefinite subjects of inverse copular constructions must be strong, or presuppositional. Semantically weak, existentially-interpreted (bare) indefinites are ruled out as ‘inverted’ predicate nominals, although they are fine in the postcopular, canonical position, as well as in regular clauses. Contrast non-presuppositional ‘a problem’ with presuppositional ‘one problem’ in (36).¹⁰

- (36) a. *ba’aya *(axat) hi Dani.*
 problem (one) PRON-fs Dani
 ‘One/*a problem is Dani.’
 b. *Dani hu ba’aya (axat).*
 Dani PRON-ms problem (one)
 ‘Dani is one/a problem.’
 c. *ba’aya (axat) omedet be-dark-enu*
 problem (one) stands in-way-our
 ‘One/a problem stands in our way.’

Finally, note that an existentially-quantified subject is most saliently interpreted specifically (i.e., presuppositionally) when followed by PRON but as a weak existential in its absence.

10 The original English examples from Heycock (2012) in (i) illustrate the same point.

- (i) a. One/*a problem is John.
 b. John is one/a problem.
 c. One/a problem stands in our way.

Note that Heycock exploits the presuppositional property of the inverted DP in her argument that inverted predicates are, in fact, *not* predicates.

- (37) a. *mišehu hu xaver šel Dani.*
 someone PRON-ms friend of Dani
 ‘Someone (specific) is Dani’s friend.’
 b. *mišehu xaver šel Dani.*
 someone friend of Dani
 ‘Someone or another is Dani’s friend.’

Hebrew PRON only appears with a defective T and cannot occur with a T that selects the copula. Thus, the co-occurrence of PRON and a verbal copula is strictly ungrammatical.¹¹

- (38) **xaver-i ha tov hu haya /yhye Dani.*
 friend-my the good PRON.ms was/will be Dani
 ‘My good friend was/will be Dani.’

Selectional restrictions by functional heads, however, vary crosslinguistically, at least to some extent, and there is no *principled* reason for which an element merged as SUBJ should resist co-occurrence with a tensed copula.

The option of merging both PRON and a tensed copula is apparently found in Polish, where SUBJ is lexicalized with an invariant element, *to*. Citko (2008) characterizes *to* as a ‘pronominal copula’, glossing it PRON, and provides the following paradigm (her (4) and (5)). As (39c) shows, PRON can co-occur with a verbal copula (a ‘dual copula sentence’, in Citko’s terms). Moreover, *to* can co-occur with ‘be’ in all tenses in Polish.

11 Berman and Grosu (1976) note that (38) is grammatical when *hu* is a resumptive pronoun and ‘my good friend’ is a topic. Not only does such a sentence manifest the particular intonational contour of topicalization – a pause between the topic and the following phrase – but it resists a quantificational subject, a typical property of topics, contrast (ia) with PRON and (ib) with *hu* as a resumptive pronoun.

- (i) a. *af student hu lo ga'on.*
 no student PRON-ms neg genius
 ‘No student is a genius.’
 b. **af student hu lo haya ga'on.*
 No student he neg was genius
 lit. ‘No student, he was a genius.’

- (39) a. *Jan jest moim najlepszym przyjacielem.* *jest*: verbal copula
 Jan is my best friend
 ‘Jan is my best friend.’
- b. *Jan to mój najlepszy przyjaciel.* *to*: pronominal copula
 Jan PRON my best friend
 ‘Jan is my best friend.’
- c. *Jan to jest mój najlepszy przyjaciel.* *to and jest*
 Jan PRON is my best friend
 ‘Jan is my best friend.’

We have here a state of affairs typically arising in cartographic studies. In Hebrew, Pron and a verbal copula never co-occur, but transitivity arguments (their respective ordering with negative/affirmative markers) lead to the conclusion that the ordering is Pron > verbal copula. In Polish, the ban against co-occurrence is lifted, and we directly observe this ordering constraint. Comparative considerations thus validate the legitimacy of transitivity arguments.

While PRON is optional in canonical copular constructions, as (39) shows (as well as in *John is a doctor* -type examples (Citko’s (33) and (34)), Citko demonstrates that it is obligatory in inverse copular ones (see her (30).)

Polish, like English, does not exploit the ‘low’ subj position in unselected copular clauses and the lowest halting position for the subject is Spec/SUBJ1, the ‘aboutness’ position that, in this language, precedes the overt copula (and follows *to*). The subject appears in Spec/SUBJ2 in basically the same environment as it does in Hebrew, obligatorily so in inverse copula sentences.

Having argued for two ‘high’ subject positions in copular sentences, two questions must now be addressed: Why must inverted predicate nominals target Spec/SUBJ2 (and not simply move to Spec/SUBJ1) and how is this movement compatible with RM, on the assumption, made explicit at the beginning of this section, that the predicate nominal moves over the subject.

We now argue that there are additional steps in the derivation of inverse copular constructions that serve to circumvent the RM configuration. Our derivational hypothesis, based on Rizzi’s (2015b) analysis of Italian inverse copular constructions, is constructed in several steps: We first argue that the subject in an inverse copular sentence is moved to a low focus position in the clause. Then, the remnant PredP is moved (smuggled) over it and finally, the predicate nominal is extracted out of the remnant PredP and merged with SUBJ.

6 The derivation of inverse copular sentences

6.1 Focus in inverted copular sentences

It has often been observed that the post-copular nominal in an inverse copular sentence is focalized (Heycock (2012), and references cited therein).

Heycock (2012) provides an argument from English, which we transpose to Hebrew.

First, we see that the same predicative copular sentence can be used felicitously in both (40) and (41):

(40) A: *mi haya ha ašem?* (*Dani o Bill?*)
‘Who was the culprit? (Dani or Bill?)’

B: *DANI haya ha ašem.*
DANI was the culprit.

(41) A: *sapri li ‘al Dani. hu haya ha ašem o ha qorban?*
‘Tell me about Dani. He was the culprit or the victim?’

B: *Dani haya ha AŠEM.*
Dani was the CULPRIT.

In contrast, the inverted sentence is good in only one of these two contexts, where the focal stress falls on the postcopular constituent.¹²

(42) A: *Mi haya ha ašem?* (*Dani o Bill?*)
‘Who was the culprit?’ (Dani or Bill?)

B: *ha ašem haya DANI.*
The culprit was DANI.

(43) A: *sapri li ‘al Dani. hu haya ha ašem o ha qorban?*
‘Tell me about Dani. He was the culprit or the victim?’

B: **ha AŠEM haya Dani.*
‘The CULPRIT was Dani.’

¹² Along similar lines, Rizzi (2015b) provides evidence of the obligatorily focal character of the postcopular constituent in Romance based on backward pronominalization, which typically is not allowed with a focal antecedent (Chomsky 1976). In fact, backward pronominalization is systematically excluded in inverse copular constructions.

We adopt a cartographic analysis of focalization in inverted copular sentences. Belletti (2004) argues in favor of a low focus phrase in the vP/VP periphery. So, one possibility is that the focused subject of the small clause is moved to a focus position on the left periphery of the VP of the copula. Belletti’s proposal can be straightforwardly adapted to (40)-(43), to the English equivalents that Heycock discusses, and indeed, to inverted copular sentences in general.

Extending it to inverted copular sentences without a copula, as in (29), requires an extension of Belletti’s concept of a low focus phrase from vP to non-verbal predicative structures. Suppose, then, that a FocusP can be merged in the immediate or less immediate periphery of the small clause across languages.

The question that has occupied researchers faced with the patterns just described is why the postcopular subject *must* be in focus. Following Rizzi, (2015b), we conjecture


- (44) The necessarily focal character of the subject in inverse copular constructions can be made to follow from locality (Relativized Minimality).

6.2 Smuggling of PredP in the derivation of the inverted order: Romance

We have been assuming that the direct, or canonical order of copular constructions in Italian is derived by internal merge of the small clause subject to a SUBJ position in the higher part of the IP:




- (45) Gianni SUBJ è [~~Gianni~~ [Pred [il direttore]]]
 Gianni is the director

Given a uniform underlying representation for both direct and inverse copular constructions, the inverted one, we have argued, cannot be directly derived because movement of the predicate nominal *il direttore* to Spec/Subj crossing *Gianni*, would violate RM.

- (46) SUBJ è [[Gianni] [Pred [il direttore]]]
 is Gianni the director
- 

In terms of the proposal in Rizzi (2015b), the derivation of inverted copular constructions proceeds as follows. First, the subject of the small clause must be moved

to the low Focus position of Belletti (2004); PredP is then “smuggled” past it, (in the sense of Collins 2005) and then the predicative DP is extracted out of the smuggled PredP and moved to the main clause or high Spec/SUBJ (Cardinaletti 2004):

- (47) a. SUBJ è [Gianni Foc [sc __ [Pred [il direttore]]]]

- b. SUBJ è [sc __ [Pred [il direttore]]] [Gianni Foc __]

- c. Il direttore SUBJ è [sc __ [Pred __]] [Gianni Foc __]


The smuggling of the sc should be viewed as a member of a family of movements of predicative structures within the IP: Collins' (2005) vP movement to Voice in passive; the reordering giving rise to superficial violations of the adverbial hierarchy according to Cinque (1999) (*John doesn't any longer [often win] → John doesn't [often win] any longer __*); the analysis of psych-verbs (Belletti & Rizzi 2012), and of the causative construction (Belletti 2015).

The three movement steps diagrammed in (47) make it possible for the predicate nominal to be moved across the subject without violating RM. Focalization of *Gianni* removes the subject of the small clause, then the remnant of the small clause is smuggled, as in (47b), and at this point the predicative DP can be moved without incurring a violation of locality.

It may be observed here that, once the small clause is smuggled, the trace of the subject is still present, as representation (47c) indicates. Why doesn't the subject trace still determine a RM effect, blocking extraction of predicative DP? Krapova & Cinque (2008), in the context of their analysis of multiple wh-movement in Bulgarian, argue for an interpretation of RM according to which an element Z counts as an intervener between X and Y in the configuration X...Z...Y only when all the occurrences of Z actually intervene between X and Y (within a particular phase). In (47b), after *Gianni* has been moved to Spec/Foc, only one occurrence of *Gianni* intervenes between *il direttore* and its trace, the other occurrence occupying the lower Spec/Foc position. Under the Krapova-Cinque interpretation, the trace of the subject does not count as an intervener for RM in (47c). Therefore, previous movement of the subject has the effect of liberating further movement of the predicative DP, as desired. Thus, the possibility

of obtaining an inverted copular construction without violating locality is made contingent on the previous focalization of the subject. This captures an otherwise surprising property of the inverted construction, the necessarily focal character of the subject.

6.3 Smuggling of PredP: Hebrew

The analysis of the Italian construction leaves open the question of where the smuggling step takes place. Hebrew offers an additional element that directly bears on this question. Recall that in inverted copular sentences, PRON is obligatory:

- (48) a. *ha more *(hu) Dani.*
 the teacher PRON.ms Dani
 ‘The teacher is Dani.’
 b. *Dani (hu) ha more.*
 Dani PRON.ms the teacher
 ‘Dani is the teacher.’

Consider the clausal map we have been assuming, repeated here for ease of reference, and for the relevant part:

- (49) SUBJ2 ... SUBJ1 ... Foc ... [DP_a [Pred DP_b]]
 | |
 PRON ∅

In the direct construction in (48b) the subject DP, namely DP_a of (49), may stop in any of the Subj positions, and only if it reaches the highest one, SUBJ2, does *hu* appear.¹³

The obligatoriness of *hu* in inverted sentences such as (48a) shows that the inverted predicative DP necessarily reaches the highest subject position. Extending to the Hebrew paradigm the analysis of Italian in (47), the question arises of why Spec/SUBJ1 could not be used as the landing site of the moved

13 How can the subject criterion be simultaneously satisfied in SUBJ1 and SUBJ2 in cases like (48b)? We assume that SUBJ1 can be head-moved to SUBJ2 so that the complex head SUBJ1 +SUBJ2 is created, and the nominal element in its Spec simultaneously satisfies both criterial requirements. See Rizzi (2011), Shlonsky (2014a) for other cases of simultaneous criterial satisfaction, made possible by incorporation of one criterial head into another.

predicative DP (in which case the absence of *hu* would be expected). A way to force the use of SUBJ2 in the inverse construction (hence the obligatory appearance of *hu*) is to assume that the landing site of (the relevant case of) smuggling is higher than the SUBJ1 layer.

Adapting the analysis of Italian to Hebrew, we thus have, as the initial step, the focalization of the subject of the small clause, DPa:

(50) ... SUBJ2... SUBJ1... DPa Foc ... [__ [Pred DPb]]
 | |
 PRON ∅

After merger of the relevant functional structure, the remnant of the small clause is smuggled to a position in between SUBJ1 and SUBJ2:

(51) ... SUBJ2 ... [__ [Pred DPb]] ... SUBJ1 ... DPa Foc __ ...
 | |
 PRON ∅

At this point, the predicative DP, DPb of (49), can be moved to Spec/SUBJ2, yielding the inverted order. As SUBJ2 is necessarily activated here to provide a landing site for the predicative DP, PRON is obligatorily present.

This analysis raises the question of why smuggling necessarily targets a position higher than SUBJ1 as in (51). As mentioned in 6.2, the occurrence of smuggling postulated here may be considered one instance of a family of such processes, moving verbal chunks and other predicative structures in the IP configuration. The process may target spots at different heights in the IP spine, depending on the characteristics of the particular construction (we assume that different attractors for a verbal or predicative structural chunk may be available at different heights of the IP spine). If so, why couldn't smuggling target a position lower than SUBJ1 in the inverted copular construction, as in (52), with subsequent movement of DPb to Spec SUBJ1?

(52) ... SUBJ1 ... [__ [Pred DPb]] ... DPa Foc __ ...
 |
 ∅

We know that this derivation must be excluded, because if it were possible, the obligatory appearance of *hu* (= SUBJ2) would not be captured. Why is it excluded? We assume that SUBJ1 is intimately related to the case-agreement

system, and in particular it is responsible for case-licensing of the DP it probes (see the next section for the consequences of this hypothesis for the agreement pattern).

We continue to assume, with standard approaches to case, that case-licensing is assured by a head-DP probing relation. In case of the predicative DPb, case-licensing is plausibly determined by the Pred head (which may assign a special case to DPb, or license assignment of the default case, depending on other properties of the construction; see the discussion preceding (21)), so SUBJ1 could not enter into a probe-goal relation with DPb in (52) (the competing and closer case licensing Pred head would give rise to a minimality effect). Hence, if probing by a given head is a prerequisite for movement to its Spec, DPb could not be attracted to Spec SUBJ1 and the inverted order could not be derived from (52). The inverted construction requires the higher probe SUBJ2, which we assume not to be directly linked to the case-agreement system, and capable of probing DPb (for the sake of the current discussion, we may simply assume that SUBJ2 probes a +N element, irrespective of its case properties, much as in Rizzi & Shlonsky 2007).

7 The agreement pattern

Hebrew provides direct evidence, through the obligatory presence of *hu*, that the highest part of the IP structure must be involved in the derivation of inverted copular constructions. But can this analysis generalize to other languages? The peculiar agreement pattern in the inverted construction in languages like Italian supports a generalization of the proposed analysis.

As is well known, in cases in which the two DP's do not match in Phi features, the copular verb in Italian agrees with the pre-copular nominal in canonically-ordered copular constructions and with the postcopular one in inversely-ordered ones (examples from Moro 1997:28).

- (53) a. *le foto del muro furono/*fu la causa della rivolta.*
the pictures of the wall were/was the cause of the riot
b. *la causa della rivolta furono/*fu le foto del muro.*
the cause of the riot were/was the pictures of the wall

The generalization is that the copula agrees in Phi features with the subject (DPa in (51)), irrespective of the surface direct or inverted order.

English expresses another major pattern: Agreement in copular constructions is always with the pre-copular and not with the post-copular DP, no matter whether the construction is direct or inverted.

- (54) a. The pictures on the wall were/*was the cause of the riot.
 b. The cause of the riot *were/was the pictures on the wall.

Let us look at the Italian pattern first, focusing on the agreement in the inverted construction. It follows directly from the proposed analysis if indeed the smuggling step is higher than SUBJ1 also in this language. Consider the initial representation, by assuming an analysis fully parallel to (51) (except that SUBJ2 is not spelled-out in Italian).

- (55) ...SUBJ2 ... SUBJ1 ... Foc ... [[*le foto del muro*] [Pred [*la causa della rivolta*]]
 The pictures of the wall the cause of the riot

The subject of the small clause gets moved to Spec/Foc, yielding

- (56) SUBJ2 ... SUBJ1 ...[*le foto del muro*] Foc ...[___ [Pred [*la causa della rivolta*]]
 The pictures of the wall the cause of the riot

We continue to assume that SUBJ1 is the functional head responsible for the case-agreement system, and, in particular, for the agreement specification on the verb. So, a probing relation is established between SUBJ1 and *le foto del muro*, in the low focus position; this relation ultimately manifests itself in the plural agreement morphology on the copular verb. At this point, smuggling of the sc takes place. Assuming the same landing site for smuggling hypothesized for the Hebrew case, i.e., in-between SUBJ2 and SUBJ1, the following is produced:

- (57) SUBJ2...[___ [Pred [*la causa della rivolta*]] SUBJ1 ...[*le foto del muro*] Foc ..._
 the cause of the riot the pictures of the wall

From here, the predicative DP, DPb, can be attracted to the Spec of SUBJ2. Since SUBJ1 is the head ultimately responsible for the morphological agreement of the lexical verb, agreement is already determined at the point at which the predicative DP is moved. Consequently, movement of *la causa della rivolta* to Spec SUBJ2 has no impact on verbal agreement. Notice that

this analysis requires smuggling to take place to a position higher than SUBJ1 much as in the Hebrew case: if smuggling could take place to a lower position, yielding

- (58) ...SUBJ1 [___[Pred [*la causa della rivolta*]]... [*le foto del muro*] Foc...___
 the cause of the riot the pictures of the wall

SUBJ1 could not probe the predicative DPb *la causa della rivolta* because of the intervention of the case-licensing Pred head. Hence, DPb could not be attracted to Spec SUBJ1, and the inverse construction could not be derived. For the derivation of the inverted construction to take place, then, it is necessary that smuggling target a higher point, and that a second attractor SUBJ2 comes to the fore, as in (56), much as in the Hebrew case.

Consider now the agreement pattern illustrated by English in (54): here, agreement always is with the initial DP, both in the direct and in the inverted construction. Why is this so, if a structure and derivation analogous to the Hebrew and the Italian one is assumed? Notice that Italian and English differ in the agreement pattern in that “rightward” agreement is possible in Italian but not in English:

- (59) a. *sono io*
 Am I
 b. It is me /*It am I

Guasti & Rizzi (2002) argue for a parametric difference between Italian and English such that Italian permits morphological verbal agreement on the basis of a simple agree (probing) relation between the relevant inflectional head and a nominal element in its c-command domain, whereas English requires the establishment of both an agree and a Spec-head relation between the two (a difference possibly related to the Null Subject Parameter; see also Franck et al. (2006) for discussion and Roy and Shlonsky (in press) for a relevant extension to French).

So, in English, at the point at which the equivalent of a representation like (56) is reached, agreement of the copula with the focalized subject cannot be implemented, as the agreement probe (SUBJ1) and its target (the focalized subject) are not in the requisite spec-head configuration. Copular agreement cannot be determined at this stage. Then, smuggling takes place and the predicative DP is moved to Spec SUBJ2. Suppose that, as assumed in note 13, SUBJ1 can move to SUBJ2 via head movement. At this point, the

structure has a Spec-head configuration between a nominal, in this case the predicative DP, and SUBJ1 (the head responsible for the case-agreement system, moved and incorporated into SUBJ2.). The language-specific requirement for verbal agreement is now met, and the copular verb agrees with the predicative DP in English inverse copular constructions.¹⁴ The generalization observed in English (the copula agrees with the first DP both in direct and inverse copular constructions) thus follows from the fact that the first DP is the only one that satisfies, in both the direct and inverse constructions, the language specific condition for verbal agreement, namely the establishment of a Spec-head configuration.¹⁵

14 Two anonymous reviewers observe that if the predicative DP is already case-licensed by Pred, it is surprising that it may move to spec SUBJ2 and enter into a case-agreement relation with SUBJ1 (moved and incorporated into SUBJ2). But it should be noticed that in the system proposed here, attraction to SUBJ2 is determined by +N, not by agreement features (see the last paragraph of section 6.3), so that attraction should not be affected by the fact that the DP has already been case-licensed; the fact that incorporation of SUBJ1 into SUBJ2 permits agreement in a spec-head configuration suggests a mechanism of “parasitic” agreement, possibly along the lines of van Urk (2015), which we will not try to work out here (nor will we address the question of what case the predicative DP actually bears, and if the construction requires a mechanism of case overwriting).

15 In the canonical construction, agreement in Hebrew is like in English and Italian, as illustrated by (ia). Judgments concerning the inverted construction, however, are extremely variable. For Shlonsky, agreement to the left or to the right are both possible in (ib), but this judgment is unstable and varies with the choice of lexical elements and tense. This instability is related, we believe, to the instability of judgments concerning null subjects (in referentially-dependent contexts; see Shlonsky 2009; 2014b). If the Italian strategy of agreement without movement to the specifier of the probe is related to the setting of the null subject parameter (cf. Roy and Shlonsky in press), then the agreement variation in Hebrew can be taken to reflect the availability of both the Italian strategy of Search without Move or the English one that requires Move.

- (i) a. *ha tmunot 'al ha kir hayu/*hayta ha siba la hitkomemut.*
 the pictures on the wall were/was the cause of-the uprising
 b. *ha siba la hitkomemut #hayu/#hayta ha tmunot 'al ha kir.*
 the cause of-the uprising were/was the pictures of the wall

Significant variability in agreement in copular constructions in Germanic is documented in Hartmann & Heycock (2014) and Heycock (2012) and attributed to additional forms of parameterization. Our understanding of the Hebrew patterns would benefit significantly from studies like theirs.

8 Evidence for Criteria Freezing in the low FocusP

Let us now go back to freezing effects. A salient property of the inverse copular construction, well described in the literature (Longobardi 1985; Moro 1997; 2000) is that the postverbal subject is unmovable. Compare direct and inverted copular constructions:

- (60) a. *Chi credi che sia il direttore?* direct
 ‘Who do you think that is the director?’
 b. **Chi credi che il direttore sia ___?* inverted
 ‘Who do you think that the director is?’
- (61) a. *Ecco l’uomo che credo che sia il direttore* direct
 ‘Here is the man who I believe that is the director’
 b. **Ecco l’uomo che credo che il direttore sia ___* inverted
 ‘Here is the man who I believe that the director is’

The freezing of the postcopular subject in inverted copular constructions is naturally interpretable as a case of criterial freezing arising in the low Foc position, (Rizzi 2015b), reducible, as before, to labeling and maximality.¹⁶

(62) Il direttore SUBJ è [___ [Pred ___]] [_β Gianni_{+Foc} Foc ___]

Here, *Gianni* is in a criterial configuration, and it shares the +Foc feature with the criterial head Foc. We thus expect the freezing effect illustrated in (60)-(61): In terms of labeling and maximality, constituent β is labeled by the criterial feature Foc; at this point, *Gianni* is not maximal with respect to the Foc feature, hence it cannot be moved under maximality (see Rizzi 2015b for the reasons why the whole FocP can’t move either).

A parallel pattern of freezing emerges in Hebrew, in both present tense inverse copular constructions, with PRON, and in past tense sentences with *be*. (63) illustrates interrogative wh-movement and (64) relativization.

¹⁶ Moro (1997: 58) observes some cases in which a bare wh-element is extractable from the inverse copula construction, as in *What do you think a picture of the wall was?* He argues that in these cases *what* does not stand for the whole postcopular DP, but rather is extracted from it, an analysis consistent with our account.

- (63) a. *mi ata xošev še hu/haya ha mnahel?*
 who you think that PRON/was the director
 b. **mi ata xošev še ha mnahel hu/haya?*
 who you think that the director PRON/was
- (64) a. *hine ha iš še ani ma'amin še hu/haya ha mnahel.*
 here the man that I believe that PRON/was the director
 b. **hine ha iš še ani ma'amin še ha mnahel hu/haya.*
 here the man that I believe that the director PRON/was

The same analysis in terms of freezing, and ultimately of labeling and maximality, can be adopted here.

9 Another freezing effect in direct copular constructions

Note, now, that if the wh operator in (63b) is *ma* ‘what’, rather than *mi* ‘who’, movement is grammatical in the variant with the copula (in the past tense) but remains ungrammatical with PRON.

- (65) a. *ma ata xošev še ha mnahel haya?*
 what you think that the director was
 ‘What do you think that the director was?’
 b. **ma ata xošev še ha mnahel hu?*
 what you think that the director PRON
 ‘What do you think that the director is?’

It is natural to interpret (65a) as a direct copular sentence with ‘the director’ as subject and ‘what’ questioning a predicate nominal rather than an (inverted) subject. For example, the sentence can elicit a response such as ‘an idiot’. Under this interpretation, the extracted wh word is the object of Pred, which is not a freezing position.

The ungrammaticality of (65b) is surprising, since it has the same subject-predicate format as (65a), modulo tense. In fact, any extraction of a post-PRON NP/DP is ungrammatical, independently of whether it is the inverted subject or the canonical predicate of a copular construction, an observation due to Doron (1983).

In a canonical copular sentence, for example, there is a sharp contrast between extraction of the predicate nominal in a bare sentence or one with a copula (grammatical) and in a sentence with PRON (ungrammatical).

- (66) a. *mi/ma ata xošev še Dani (haya)?*
 who/what you think that Dani (was)
 ‘Who/what do you think that Dani is/was?’
 b. **mi/*ma ata xošev še Dani hu?*
 who/what you think that Dani PRON.3ms
 ‘Who/what do you think that Dani is?’

Interestingly, when negation or emphatic affirmation follow PRON, the ungrammaticality of (65b) and, similarly, of (66b), disappears:

- (67) a. *mi/ma ata xošev še Dani hu lo/ken?*
 who/what you think that Dani PRON.3ms not/yes
 ‘Who/what do you think that Dani is not /IS?’
 b. *ma ata xošev še ha mnahel hu lo/ken?*
 what you think that the director pron not/yes
 ‘What do you think that the director is not /IS?’

The pattern may be connected to our account of freezing effects in terms of labeling and maximality. In case the copula is verbal, the predicative constituent questioned by *mi/ma*, nominal in nature, is maximal, hence extractable (unless other constraints are violated). If the structure involves a nominal predicate in the immediate context of a pronominal copula, the structure is well formed, but PRON and the predicate share a nominal feature, so that the predicate is non-maximal w.r.t. the nominal feature.

- (68) ... hu mi/ma...
 +N +N

Under maximality, the nominal predicate cannot be extracted in this configuration, e.g., in (66b).

Notice that representation (68) oversimplifies the problem. Under the analysis introduced in section 5, *hu* is not structurally adjacent to the nominal predicate, as the configuration includes phonetically null functional structure, a Pred head selecting *mi/ma*, a defective T head, etc.; so, a maximality approach would require that Pred and all the intervening projections in the stretch from *mi/ma* to *hu* are +N. How can this be achieved?

We have assumed so far that *hu* is externally merged in SUBJ2. We now tentatively consider an alternative to the effect that *hu* is in fact merged as a (nominal) lexicalization of Pred and is subsequently moved head to head to SUBJ2. Such movement would have the consequence of attributing +N to all the (null) heads in its path. As a result, the predicate *mi/ma* (and all the projections in the path) would become non-maximal with respect to this feature and could not be extracted.

No maximality problem arises in case of a verbal copula, as in (66a). As for copular sentences without the copula – (66a) with the parentheses activated – it is sufficient to assume that, in the absence of *hu*, Pred would not be +N, so that the extracted predicate nominal *mi/ma* would be maximal.

In (67), an overt negative or positive polarity phrase intervenes between *hu* and the nominal predicate. By hypothesis, these heads would interrupt head movement of *hu* above them. If head movement from Pred is barred, the only option here would be to merge *hu* directly in SUBJ2. As a result, the predicate phrase *mi/ma* would be maximal, as the selecting Pred head would not be specified +N. Extraction would then be possible, under maximality.¹⁷

17 Unlike ‘yes’ and ‘not’, *betax* ‘certainly’ does not salvage (66b), (i).

- (i) a. **mi/ma ata xošev še Dani hu betax?*
 who/what you think that Dani PRON.3ms certainly
 ‘Who/what do you think that Dani certainly is?’
 b. **ma ata xošev še ha mnahel hu betax?*
 what you think that the director pron certainly
 ‘What do you think that the director certainly is?’

While it signals the presence of functional structure (SUBJ1; see (22) and (23)), this adverbial, unlike ‘yes’ and ‘not’, does not block head movement through its associated head, as evidenced by the fact that it can both precede and follow a tensed verb, which presumably moves above the adverb optionally (cf. Cinque 1999).

- (ii) a. *Dani betax yikne sefer.*
 Dani certainly buy-FUT book
 ‘Dani will certainly buy a book.’
 b. ?*Dani yikne betax sefer.*
 Dani buy-FUT certainly book
 ‘Dani will certainly buy a book.’

This line of thinking is consistent with the view that movement (here of *hu* from PRED to SUBJ2) is more economical than external-merge (here of *hu* directly in SUBJ2): the latter is appealed to only when movement is blocked, and suggests that, more generally, Move preempts Merge (cf. Deal 2009, a.o.)

Traditionally, the contrast in (66) could have been analyzed in terms of the ECP and proper government (provided by the verbal copula in (66a), but not by the nominal copula in (66b) and echos of this analysis can be found in Doron (1983). Labeling and maximality offer an alternative to an ECP-based analysis here as well.

10 Conclusion

We have argued that the basic merge pattern of copular sentences is asymmetric: The predicate is merged as the complement of Pred and its subject is merged with this category. Labeling requires that the subject move. In copular sentences manifesting the canonical subject-predicate order, the subject moves to some higher position in the clause (subject of the finite clause or some A' position). In order to render small clauses, in the traditional sense, compatible with labeling, we adopted Rizzi's (2015b) idea to the effect that the subject moves minimally to a position in the periphery of the small clause. We called this position subj.

In Hebrew, small clauses with subj can appear in unselected contexts. We argued that this is due to the absence of a copular verb, a vP and ultimately rooted in a language-specific property of T.

Hebrew also shows that certain subject-predicate articulations cannot be satisfied in such a minimal structure. Generic statements and type-referring subjects require a larger structure in which the subject is raised higher than subj. We identified two such positions: The higher one, SUBJ2, is lexicalized by PRON in Hebrew present-tense copula-less sentences. The lower position, SUBJ1, is not lexicalized but its presence can be indirectly discerned by the presence of functional material in between the subject and the predicate. SUBJ1 is the seat of clausal Phi – the probe for subject-verb agreement.

Inverted copular constructions, which manifest the order predicate-subject, are derived in three steps. First, the PredP subject is moved to a low focus position. Second, the remnant PredP is raised above SUBJ1. Third, the predicate

By extension, *hu*, merged in PRED, can move to SUBJ2 through the head associated with 'certainly'. This means that either this head is also marked +N or that it is transparent to this feature. In either case, the complement of this head remains non-maximal and hence inextractable.

is extracted from the smuggled constituent and merged with SUBJ2. This derivation is consistent with Relativized Minimality. As the movement of the subject to Spec/Foc is an essential step to avoid a violation of RM, the analysis explains the obligatoriness of subject focalization in inverse copular constructions in Italian, English and Hebrew. This analysis involves an application of the smuggling step in between SUBJ1 and SUBJ2. We showed that this assumption on the landing site of smuggling naturally captures the different patterns of verbal agreement in Italian and English inverse constructions, under plausible independent forms of parameterization of the verbal agreement system.

Finally, we addressed freezing effects in copular constructions. The post-copular subject is frozen in clause-final position by criterial freezing (ultimately, labeling and maximality) in both Italian and Hebrew. Hebrew also shows a freezing effect of the predicative DP in direct copular constructions involving *hu*, an effect that, through auxiliary assumptions, is also amenable to a consequence of the maximality principle.

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Ángel J. Gallego

Freezing Effects in a free-Merge System

A configurational approach

Abstract: This paper reconsiders so-called freezing effects within Chomsky's (2004 and sub.) Phase Theory. I argue that freezing (or halting) should not be seen as the consequence of an exocentric {XP,YP} structure in which the heads of XP and YP share some feature (cf. Chomsky 2013, 2015) or as the invisibility of X' projections (cf. Rizzi 2015). Instead, I submit that A-freezing (Chomsky's 2000, 2001 *Activity Condition*) and A-bar freezing (Rizzi's 2006 *Criterionial Freezing*) should be dealt with by different principles: the former follows from an independently motivated rule of efficient computation (the application of cyclic Transfer; cf. Chomsky 2000, Uriagereka 1999), coupled with Labeling Theory (cf. Chomsky 2013, 2015), whereas the latter is simply syntactically vacuous. In line with previous proposals (cf. Gallego 2009; Epstein, Kitahara & Seely 2016), I claim that XPs in edge positions are not frozen in the narrow syntax (they can always move, unless affected by cyclic Transfer). Nevertheless, such XPs may be part of a configuration and thus receive an interpretation at the semantic component (cf. Chomsky 2001, 2004). Therefore, if they move *from an edge*, the relevant interpretation *at that edge* (be it topic, focus, etc.) will be lost, as interpretations of the relevant kind (theta-roles, criterial-roles, etc.) cannot accumulate, which I ultimately attribute to a *Principle of Interface Freezing*, whose effects can be subsumed under the *Principle of Full Interpretation* (cf. Chomsky 1986a).

Keywords: freezing, halting, interface conditions, labeling, Merge, Transfer

1 Introduction

A long-noted fact about context-sensitive transformations is that they cannot apply under certain conditions. The relevant conditions vary and the literature has offered different approaches to such locality constraints under well-known labels, like island, freezing, minimality, or anti-locality effects (cf. Ross 1967, Chomsky 1964, 1973, 1986a, 2000, 2008, Grohmann 2003, Huang 1982, Lasnik & Saito 1992, Rizzi 1996, 2006, 2007, 2015, Uriagereka 1999, Stepanov 2001; cf. Freidin 1999, Lasnik 2006, and Uriagereka 2011, for overviews). Consider, for instance, the impossibility to A-move subjects from inflected (φ -complete, *sensu* Chomsky 2001) clauses, or A-bar move them across an overt C (that), or extract from within them in (1):

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- (1) a. *_{[CP Trump seems [_{TP} t_{Trump} was supported t by many people]]}
 b. *_{[CP Who did you say [_{CP} that t_{Who} supported Trump]]?}
 c. *_{[CP Who do you think [_{CP} that [[the supporters of t_{Who}] had serious doubts]]?}

Similar effects hold of wh-phrases more generally. They cannot stop-and-go from a [+Q] C, nor move from another wh-phrase in [Spec, CP], nor undergo topicalization after having reached the CP, as shown in (2):

- (2) a. *_{[CP Which supporters do you wonder [_{CP} t_{Which supporters} Trump convinced t_{Which supporters}]]?}
 b. *_{[CP Which city do you wonder [_{CP} [which supporters of t_{Which city}] Trump convinced t_{Which supporters of which city}]]?}
 c. *_{[CP Who did [_{TP} many supporters have doubts about t_{Who}]]?}

The facts in (1) and (2), and many more, have been studied by most approaches to locality conditions, and although the empirical basis is well described, a unitary explanation is missing.¹ Part of these conditions on transformations fall within what has been recently referred to as “freezing” (or “halting”) effects. The gist behind the notion of freezing within minimalism goes back to Chomsky (2000) (although the notion itself was already used before; Epstein 1992 was an important precursor of it, as well as an early economy-based attempt to deal with freezing phenomena), where it is argued that subjects in a ϕ -complete [Spec, TP] become inactive (that is, frozen) after having checked their Case feature: they cannot move, and they also block movement from any XP within them.

In the recent literature, freezing effects have been the focus of situations where a dislocated XP (*dXP*, from now on) reaches a position in the Left Periphery (a criterial position, in Rizzi’s 2006, 2007 terms) and stops there. The effect is typically regarded as the A-bar version of A-freezing, so by parity of reasoning the *dXP* can no longer move nor allow extraction from within. Importantly, the effect is related to a last-resort logic: some feature F triggers movement of *dXP*, and once it is checked, *dXP* becomes inert. Though popular in the literature, this approach becomes implausible once Move is actually a variant of Merge (Internal

¹ A reviewer notes, rightly, that the examples in (1) do not belong, strictly speaking, to the same paradigm, at least historically. The same holds for the data in (2). All I want to emphasize is that both A and A-bar transformations are subject to similar constraints, all of which seem to be restatable in freezing terms.

Merge, as Chomsky 2004 argued), an operation that is feature-free (Chomsky 2005 and sub.).² Here I will assume this streamlined view of Merge, which I take to be subject to principles of computational efficiency alone, the *No Tampering Condition* (NTC; cf. Chomsky 2000) and the *Phase Impenetrability Condition* (PIC; cf. Chomsky 2000).

Following Gallego (2009), I assume that *d*XP's in criterial positions are not syntactically frozen (*pace* Rizzi 2006, 2007, 2015; Bošković 2008). If they are in the edge of a phase, some special UG-enriching device would be required to make sure that *d*XP's cannot move. Movement (IM) will thus be granted (as it always is from a phase edge), but the interpretation will be lost. I will thus submit that *d*XP's cannot leave the position they occupy under the assumption that such position (such configuration) is mandatory for them to receive an interpretation at the semantic component. To be specific, I will explore the consequences of (3), which I regard as an instantiation from Chomsky's (1986b) *Principle of Full Interpretation* (PFI, henceforth) that also assumes ideas in Chomsky (2001, 2004) about interpretive principles applying at phase edges.³

(3) Principle of Interface Freezing (PIF)

A *d*XP is assigned INT at SEM if *d*XP occupies a phase edge

[INT = an interpretation, SEM = semantic component]

The PIF entails that the relevant interpretation of *d*XP's is lost if these move, destroying the surface configuration, an option that cannot be prevented. This conclusion is similar to Epstein, Kitahara & Seely's (2016) claim that halting effects can be derived from morphological or semantic principles, but not syntactic ones. Consequently, the fact that which incident can stop in the matrix and embedded [Spec, CP] positions, yielding different interpretations, falls into place (I use bold letters to signal the wh-phrases that freeze):

- (4) a. [_{CP} **Which incident** C [did the media say [_{CP} t_{which incident} that Trump was involved in t_{which incident}]]] ?
 b. [_{CP} The media said [**which incident** C [_{CP} Trump was involved in t_{which incident}]]] ?

² See Pesetsky & Torrego (2006) for the possibility that every application of Merge is parasitic on feature checking.

³ An anonymous reviewer wants me to clarify what the principle (3) is and to explain what INT is supposed to convey. As noted, I take (3) to be nothing but a specific formulation of the PFI. The label INT is left vague (on purpose), but in the case at hand it should be taken to cover interpretive aspects related to information structure and discourse-related notions.

The logic above carries over to customary freezing situations studied by Rizzi (2006, 2007), like that in (5):

- (5) *_{[CP Which book does Bill wonder [_{CP} t_{Which book} C [_{TP} she read t_{Which book}]]]? [from Rizzi 2006: 112]}

Here, the wh-phrase *which book* cannot move once it has landed in the [Spec, CP] of an interrogative clause. Rizzi (2006, 2007) attributes this effect to an A-bar version of Chomsky's (2000, 2001) A-freezing (the *Activity Condition*, AC), hence invoking feature checking. In the approach adopted here, the problem in (5) follows from the PIF, and is not syntactic in nature. As we will see, an analysis based on the PIF accounts for most A-bar movement cases (including dislocation) and ECP effects, to which I return in section 4.1.⁴

The paper is organized as follows: section 2 introduces the technical assumptions that this paper will make concerning the structure building operation Merge, Labeling Theory, and Phase Theory; section 3 reviews Chomsky's (2013, 2015) approach to labeling and how it can be used to deal with freezing effects; section 4 puts forward a feature-free approach to freezing effects that will be largely based on conditions playing a role at SEM interface (labeling and the PIF); section 5 summarizes the main conclusions.

2 Perspectives on Merge and Labels

This section reviews the main developments of the basic structure-operation, Merge, and its relation with features and labeling. With Chomsky (2004 and sub.), I take Merge to be feature-free, a hypothesis I ground on the idea that its duality (EM and IM) is correlated with interpretive properties of the Conceptual-Intentional systems.

2.1 Feature-free Merge

Following Chomsky (cf. 1995 and sub.), I assume here that a computational system (a Narrow Syntax, NS) of discrete infinity must assume both a mechanism of combination (Merge) and a list of atomic elements (lexical items, LIs) to which such mechanism applies. Merge can thus be conceived of as an operation that takes two syntactic objects (SOs), X and Y, and

⁴ In this paper I put aside the possibility that dislocation is analyzed as involving a hidden biclausal structure (cf. Ott 2014).

creates the set $\{X, Y\}$ – what Epstein, Kitahara, and Seely (2014) call “simplest Merge.” Since there is no set-theoretical condition requiring labels (non-terminal symbols), these entities can only be added by stipulation (going beyond Merge, as Collins 2002 noted). Although much current literature on phrase structure still assumes labels in one form or another, notice that this seems to be a residue of X-bar theory, which endorsed a restrictive view of compositionality: endocentric compositionality (i.e., composition regarded as successive attachment to a head, yielding endocentricity, distinction between complements and specifiers, etc.). Once X-bar theory is dispensed with, there is no reason why Merge should impose such constraint. The simplest formulation just says that two SOs can be merged, with no additional symbols or features being added or projected, in accord with the NTC (cf. Chomsky 2001, 2005, 2008), which subsumes the *Inclusiveness Condition* of Chomsky (1995):

A natural requirement for efficient computation is a “no-tampering condition” (NTC): Merge of X and Y leaves the two SOs unchanged. If so, then Merge of X and Y can be taken to yield the set $\{X, Y\}$, the simplest possibility worth considering. Merge cannot break up X or Y, or add new features to them. Therefore Merge is invariably “to the edge” and we also try to establish the “inclusiveness principle,” dispensing with bar levels, traces, indices, and similar descriptive technology introduced in the course of derivation of an expression. It seems that this desideratum of efficient computation can also be met within narrow syntax at least. [from Chomsky 2008: 138]

Although labels in the X-bar-theoretic sense are dispensed with, already Chomsky (2004) hinted at the possibility that efficient computation requires for the nature of SOs to be determined somehow. The idea is developed in Chomsky (2008) and further sharpened in Chomsky (2013), where a label algorithm (LA) is put forward. For Chomsky (2013), LA operates through “Minimal Search,” hence locating the most accessible (i.e., minimal) SOs: Heads.

Projection is a theory-internal notion, part of the computational process [Generative Procedure]. For a syntactic object SO to be interpreted, some information is necessary about it: what kind of object is it? Labeling is the process of providing that information. Under [Phrase Structure Grammar] and its offshoots, labeling is part of the process of forming a syntactic object SO. But that is no longer true when the stipulations of these systems are eliminated in the simpler Merge-based conception of UG. We assume, then, that there is a fixed labeling algorithm LA that licenses SOs so that they can be interpreted at the interfaces, operating at the phase level along with other operations. The simplest assumption is that LA is just minimal search, presumably appropriating a third factor principle, as in Agree and other operations. In the best case, the relevant information about SO will be provided by a single designated element within it: a computational atom, to first approximation a lexical item LI, a head. This LI should provide the label found by LA, when the algorithm can apply. [from Chomsky 2013: 43]

Operating without bounds, Merge applies as indicated in (6) to construct a derivation: X and Y are selected to construct a new object, which we can call Z for expository purposes. Subsequent applications of Merge target Z , which is the only object in the derivation (Chomsky 1995:243), to yield Z' , and then Z'' , and so on^{5,6}:

- (6) a. Merge $(X, Y) = Z = \{X, Y\}$
 b. Merge $(W, Z) = Z' = \{W, Z\}$
 c. Merge $(K, Z') = Z'' = \{K, Z'\}$

Let us concentrate on (6a). After the application of Merge, the workspace contains Z and nothing else. At this point, we may want to merge W and Z . W is either internal to Z or external to Z . If W is external, then W must be taken from the lexicon. This is External Merge (EM). If W is internal (suppose $W = X$), then it is a term of Z ; if the NTC applies, then Z must be unchanged, so still $\{X, Y\}$, yielding $\{X, \{X, Y\}\}$ two copies (occurrences) of X . This is Internal Merge (IM, previously Move). A question arises about how copies are obtained. Many approaches assume an additional operation, Copy, which duplicates the relevant element. As Noam Chomsky observes through personal communication, “duplication” (copying) is not needed with IM, just like it is not with EM: In particular, suppose we select Z from the workspace, then select X to merge it to Z . If X is external to Y (so, taken from the lexicon), we don’t have to first copy X in order to merge it to Z .⁷ The same holds for IM.

⁵ That X and Y are no longer available was expressed in the following passage: “Applied to two objects α and β , Merge forms the new object K , *eliminating α and β* ” (Chomsky 1995:243, my emphasis). For further discussion, I refer the reader to Chomsky et al. (2018).

⁶ Chomsky (2007:11, 2008:139) assumes that the free nature of Merge follows from LIs having an edge feature (EF) that is undeletable and can thus give rise to an unbounded application of Merge – the term “edge” is used to capture the fact that the operation always adds structure to the already assembled SO, on its root / edge. I will put EFs aside in this paper, as I regard them as a purely theory internal device. This will allow me to dispense with the technical problems discussed in Narita (2014) (related to the lack of EF percolation).

⁷ The problem is more general if X and Y remained in the workspace, along with Z , in (6). As Noam Chomsky (p.c.) points out, it has always been assumed that they do not, for the generative procedure constructs a single object, not a multiplicity of objects. Changing that convention would mean that instead of a generative process for expressions, we would be designing a generative process for an arbitrarily large collection of expressions, unrelated to each other, and it would cause more specific problems. For instance, suppose that we hold that after EM $(X, Y) = Z = \{X, Y\}$, the workspace contains X , Y , Z . We then have a new question: what’s the relation between X in the workspace (call it X_1) and X in $Z = \{X, Y\}$ (call it X_2). They are either copies or repetitions. If they are copies, everything goes haywire. Thus, if we continue to Merge to X_1 finally yielding the finite clause FC , and to Z yielding the finite clause FC' , then the two clauses would contain the two copies X_1 and X_2 , so one should be deleted, and if one enters into some

Before concluding this section, I would like to discuss another assumption of the derivational approach developed in Chomsky (2000 and sub.). For reasons attributed to computational complexity (reduction of computational load), Chomsky (2000) assumes that SOs assembled by Merge are handed over to the external components at some point. The relevant Transfer-units are called “phases” and are defined as the loci of uninterpretable φ -features and structural Case.⁸ These features are encoded in the lexicon in dedicated functional heads (C and v), which act as Probes seeking a matching Goal within its complement. This is illustrated in (7), where H is a phase head (a Probe), and α and β correspond to the complement and specifier respectively.

(7) [β [H (Probe) [α ... XP (Goal) ...]]]

For empirical reasons, Chomsky (2004) assumes that Transfer only affects the complement of H, leaving H itself and β visible for subsequent X and XP movement. The combination of H and β is dubbed edge.⁹ The main effect of cyclic Transfer concerns the periodic forgetting of phase complements, hence rendered inaccessible in subsequent stages of the derivation.¹⁰ This makes it possible to capture strict cyclicity and some version of compositionality. Chomsky (2000)

relation (say anaphora) then the other does, etc. Things get much worse if, as this proposal allows, we construct simultaneously indefinitely many finite clauses. This is not only dubious, and in fact makes the notion of “copy” collapse.

8 This is the assumption made in Chomsky (2008:155), although the kind of SOs that qualify as phases is subject to debate (cf. Gallego 2012 for discussion).

9 Chomsky (2004) points out that Transfer of phases in full is limited to root clauses.

10 Chomsky (2008:143) suggests that Agree can search the domain of an already transferred complement domain, thus accounting for DAT-NOM constructions like (i), where T φ -agrees with the internal argument after Transfer:

- (i) A Trump le gustan las murallas (Spanish)
 to Trump CL-dat.sg like-e.pl the walls
 ‘Trump likes walls’

This raises the possibility that the SOs created by Merge are not literally ‘expunged’ from the computation, but kept in some form (as expected, under NTC). Independent evidence shows that this is in fact needed. Thus, α in (ii) is spelled out with the wh-phrase *which book*, although it must have been transferred at an earlier stage of the derivation:

- (ii) [[Which book [α that John bought]] did you read t] ?

formulates a *Phase Impenetrability Condition* (PIC) to capture the idea that only the complement of H is transferred.¹¹

(8) Phase Impenetrability Condition (PIC)

In phase α with head H, the domain of H is not accessible to operations outside α ; Only H and its edge are accessible to such operations.

[from Chomsky 2000: 108]

Applied to (7), the PIC renders α no longer accessible:

(9) [β [H (Probe) [α ... **XP (Goal)** ...]]]

Having considered how Merge and Transfer work, let us now discuss the possibility that the two variants of the former (EM and IM) can be given a principled explanation – ideally if they follow from interface conditions. The proposal to be developed below departs in serious respects from feature-bound approaches to IM and, consequently, to the idea that A-bar dependents participate in Spec-Head agreement, a hallmark of “criteria” (cf. Rizzi 2006).

2.2 The duality of Merge: C-I conditions and types of freezing

We have just seen that, under the NTC, Merge can apply in two ways, a possibility that Chomsky (2004 and sub.) relates to conditions imposed by the Conceptual-Intentional systems.

In a well-designed FL, lacking arbitrary stipulations, both EM and IM should be permitted, and the two kinds of Merge should be expected to yield different interface properties. That is obviously true at the SM interface – the ubiquitous property of “displacement” – and appears to be true at CI as well. The two types of Merge correlate well with the duality of semantics that has been studied from various points of view over the years. EM yields

11 Noam Chomsky (p.c.) observes that the PIC has a stronger and a weaker version: what has been processed is either totally inaccessible or alternatively cannot be changed. Given the evidence in the previous footnote, what is inaccessible cannot be completely deleted, so it must be retained in some form. One possibility is that it is simply retained without any change at all, and further computation is constrained by the PIC. Another possibility, expressed as Transfer, is that it is retained as a pair $\langle X, Y \rangle$, where X is in a form accessible only to S-M [SensoriMotor] and Y only to C-I [Conceptual-Intentional].

generalized argument structure, and IM all other semantic properties: discourse-related and scopal properties. [from Chomsky 2007: 19]

The hypothesis is that C-I incorporates a dual semantics, with generalized argument structure as one component, the other being discourse-related and scopal properties. Language seeks to satisfy the duality in the optimal way, EM serving one function and IM the other, avoiding additional means to express these properties. [from Chomsky 2008: 141]

To be fair, the correlation is far from clear (especially in the case of discourse-related properties, where IM can give rise to different types of interpretations, left open in the syntax by Chomsky 2001 and Uriagereka 1995), but it does provide a rationale for the EM/IM divide. Assuming well-established ideas of the GB framework, most approaches to movement have built on the hypothesis that this is a *Last Resort* (LR) operation, hence morphologically driven (cf. Chomsky 1986a). It is important to bear in mind that the questions LR was designed to address are: (i) why the DP *Trump* must move to [Spec, TP] in (10a) (the EPP position) and (ii) why, once there, it cannot move further, as (10b) shows.

- (10) a. *_{[TP T was [_{vP} v nominated Trump]]}
 b. *_{[TP Trump_i T seems [_{CP} (that) t_i was nominated t_i]]}

Chomsky (1995: 256–257) answered both questions by arguing that movement is compulsory due to morphological (checking) reasons: *Trump* moves to [Spec, TP] to check nominative Case, and once there, it needs no further checking – thus, since checking is not necessary, it is not allowed.

The idea that features and the operation Move (nowadays IM) go hand in hand quickly became popular within minimalism, giving rise to the assumption that all movements were triggered to satisfy morphological needs. Some years later this picture became more general, after Chomsky (2004) claimed that Move and Merge were variants of the same structure-building operation: External Merge and Internal Merge, as we have seen in section 2.1. The moment IM was postulated (and even before, cf. already Contreras & Masullo 2000), each and every instance of Merge was taken to obey LR, and thus involve feature checking. Consequently, along with Case and φ -features, authors postulated Θ -features (cf. Bošković 1994; Hornstein 2001; Lasnik 1999), selectional features (cf. Chomsky 1965), criterial features (cf. Rizzi 1997, 2004, 2006, 2007), operator features (cf. Bošković 2008), linearization features (cf. Biberauer et al. 2010), pragmatic features (cf. Haegeman & Hill 2010; Speas & Tenny 2003), and so on and so forth, making every application of Merge legitimate.

Although this approach may be helpful in circumstances where Merge-mates share some inflectional feature, it is easy to see that pushing it to every application of Merge forces one to postulate new features, some more *ad hoc* than others

(cf. Adger & Svenonius 2011; Šimík 2011). Departing from this widespread reasoning, nowadays hegemonic in the field, Chomsky proposed to turn the argument upside down: If EM is free (involving no feature checking whatsoever), then IM should be free too.¹²

It has always been presupposed without comment that EM comes free: no one has postulated an “EPP property” for EM or stipulated that it satisfies the [No Tampering Condition]. IM, in contrast, has been regarded (by me, in particular) as a problematic operation, an “imperfection” of language that has to be postulated as an unexplained property of UG unless it can be motivated in some principled way [through feature checking] [...]. A few years ago, it became clear that this is a misunderstanding. IM [...] is as free as EM. [...] It follows that any alternative device [feature checking] to deal with the displacement property and the duality of semantics requires double stipulation: to ban IM, and to justify the new device.
[from Chomsky 2008: 140–141]

In the same breath, Chomsky (2008:141) conjectures that “we thus expect language to use IM rather than other mechanisms that can be devised [features, feature checking, etc.] to express semantic properties apart from generalized argument structure”. This brings us directly to the controversial notion of feature checking and LR, and their relevance for freezing effects. In the GB framework, feature checking was understood as a dependency between two SOs in a Spec-Head configuration, which required making use of a broad version of c-command, namely m-command.¹³ Chomsky (2000, 2001) refines the notion of checking, defining it as a valuation procedure that can operate at a distance: Agree. A central assumption of this take on feature checking is that some functional heads are drawn from the lexicon with their φ -features unvalued. Since they do not have a value, features act as a seeker (a Probe) that looks for a value-inducing element (a Goal) in its c-command domain (cf. section 2.1.).

Under an Agree-based approach to agreement, two problems emerge for GB-rooted Spec-Head checking: (i) some features (typically, semantic/pragmatic ones; e.g., [+topic], [+focus], [+Q]) cannot be treated as “attributes with values,” and (ii) feature checking does not always need displacement. Examples like (11a,b) reveal that checking of φ -features is independent of movement (cf. Chomsky 2000, 2001):

12 The hypothesis that Merge is free does not of course mean that ‘anything goes.’ What Chomsky (2004, 2007) suggests is that Merge applies freely during the computation, conditions of the C-I interface being interpretive filters. Consequently, the system can overgenerate. I will remain indifferent as to whether this is the right scenario, for such decision largely depends on how computational works in the mind, a matter that is admittedly murky (cf. Gallistel & King 2010, Murphy 2015, and references therein for discussion).

13 There are clear examples of this approach to agreement, especially Chomsky (1986a) and Kayne (1989). For more thorough discussion, see Hiraiwa (2005).

- (11) a. {*Embistieron / Embistió} a los molinos Don Quijote (Spanish)
 charge-3.{PL / SG} to the mills Don Quixote
 ‘Don Quixote charged at the mills’
- b. Mér {*virðist / virðast} Þeir vera skemmtilegir (Icelandic)
 me-DAT seem-3.{SG / PL} they-NOM be-INF interesting
 ‘It seems to me that they are interesting’

Data like these, where Probe and Goal are not in a Spec-Head configuration, are pervasive, both with subjects and objects, and provide support to Chomsky’s (2000, 2001) Agree.¹⁴ An important consequence of this system is that after a Goal agrees it is rendered inactive (frozen), unable to agree again or be IM-ed, but capable of giving rise to intervention effects (cf. Chomsky 2000, 2001). This is what explains the facts in (12), where *the athletes* cannot long-distance agree with matrix T nor raise to it¹⁵:

- (12) a. *It seem [_{CP} that **the athletes** won the gold]
 b. ***The athletes** seem [_{CP} that t_{the athletes} won the gold]

The idea behind “freezing” has a long and manifold tradition, going back to Chain Uniformity, Anti-Locality, Subjacency, Barriers, Minimality, and CED effects (cf. Wexler & Culicover 1981; Chomsky 1986b, 2001; Chomsky & Lasnik 1995; Rizzi 1990; Takahashi 1994; Uriagereka 1999; Stepanov 2001; Starke 2001, Grohmann 2003; Bošković 2008). These approaches do not agree about what freezing actually amounts to, but all of them share the intuition that ‘too much’ movement or ‘too much’ checking yields locality problems.

Consider now how the overall scenario has been interpreted within the Cartographic Project, where LR is invoked in order to account for a generalized approach to criteria. More specifically, a *dXP* must be licensed by satisfying a P-Criterion, where P is a shorthand for criterial features (cf. Rizzi 2006, 2007): topic, focus, relative, Q, and the like.¹⁶ At the heart of the criterial approach to

¹⁴ The Agree perspective is not unanimously entertained (cf. Hornstein 2009, and references therein). Descriptively at least, data like those in (11) suggest that some cases of checking do not involve a Spec-Head configuration. For additional discussion, see Bošković (2007) and Zeijlstra (2012).

¹⁵ Chomsky (2007:23 fn.31, 2008:150) subsumes the AC under the PIC.

¹⁶ For the purposes of presentation, I use the labels “topic” and “focus” in a restricted sense, simply to convey the syntactic processes of topicalization and focalization to the Left Periphery of the clause, as in (i) and (ii).

checking is the idea that IM to the Left Periphery must be motivated. In this system, the C head is split into different functional heads endowed with a dedicated interpretive feature that must be checked with a *dXP*.

As for Chomsky's scope-discourse positions, I will assume that they are determined by a family of principles, the criteria, which require specifier-head agreement with respect to features of the relevant class: Q, Top, Foc, R for questions, topic, focus, relatives, and so on (see Rizzi 1996 for an early formulation of this approach) [from Rizzi 2006:101–102]

Rizzi (2006) goes on to argue that the format of the criteria is as in (13):

(13) [*dXP*]_F and [*P*]_F must be in a specifier-head configuration, for F = Q, Top, Foc, R, ...

[from Rizzi 2006: 102]

Rizzi (2006:111) discusses if IM can apply after a *dXP* has reached its criterial position. In the case of EM (argument structure), the answer is trivially negative: XPs cannot be EM-ed more than once, by definition. Things are different in the case of IM, though. Borrowing data from Lasnik & Saito (1992), this author provides the data in (14) to defend that *dXPs* are frozen in place upon hitting a criterion-satisfying specifier (as above, I use bold to indicate frozen *dXPs*):

(14) a. Bill wonders [_{CP} **which book** C_Q [she read t_{which book}]]
 b. *Which book C_Q does Bill wonder [_{CP} t_{which book} C_Q [she read t_{which book}]]?

Although the effects in (14) are clear, Rizzi (2007) ends up offering a weakened version of criterial freezing in order to account for the fact that criterial Goals allow from some of its terms to be extracted. The examples that motivated this weakened version were first discussed in Torrego (1985). As (15) reveals, the *wh*-phrase *de qué autora* (Eng. 'of which author') is subextracted out of the larger *qué traducciones de qué autora* (Eng. 'which translations by which author'). This is unexpected, if the latter is frozen (inactive) after IM applies.

-
- (i) The books, I read t_{the books}
 (ii) THE BOOKS I read t_{the books} ! (... not the newspapers)

Therefore I will not discuss the intricacies of the different types of foci / topics that have been studied in the literature (presentational focus, verum focus, contrastive focus, etc.). Cf. Benincà & Munaro (2010), Rubio (2014), and references therein.

- (15) [_{CP} De qué autora_i C [no sabes [_{CP} [qué traducciones t_i]_j
Of what author not know-2.SG what translations
[_{TP} t_j ganaron premios]]]? (Spanish)
won-3.PL awards
'Which author don't you know what translated books have won awards?'

To accommodate data like (15), Rizzi (2007) postulates (16), which is extended so that it can cover Subject Condition effects (cf. Huang 1982):

(16) Criterial Freezing

In a criterial configuration, the Criterial Goal is frozen in place

[from Rizzi 2007: 149]

Given (16), only the head of the bigger wh-XP, called "criterial Goal," is frozen, while the wh-internal remnant remains accessible. Although certainly consistent with the facts, the analysis raises some doubts – the most pressing one, how come the internal part of an XP doesn't freeze if the latter does.¹⁷

Let us stop here. In this section we have seen that the EM/IM cut can follow from C-I conditions, assuming that the semantics require for each variant to be associated with a specific type of interpretation. I have emphasized that, precisely for Chomsky's (2004) simplification, neither EM nor IM can be feature-driven. This is not saying that features do not exist or that they play no role in the grammar, but it does entail that features with a construction-like flavor (all 'relational' or 'syntagmatic' notions, like theta-roles, syntactic functions, and discourse-related notions) cannot be regarded as LIs, let alone features that drive derivations (cf. Chomsky 2001: 6, 2008: 151; López 2009). If features of the A-bar type are not features in the technical sense (an attribute with a value), then the entire feature-freezing logic of Chomsky's (2001) AC and Rizzi's (2006, 2007) Criterial Freezing go away. Before exploring the PIF I introduced in section 1, I would like to consider a couple of more recent, feature-free, alternatives to freezing.

¹⁷ These data were also discussed by Lasnik & Saito (1992:102):

- (i) ??[_{CP} Who_i C do you wonder [_{CP} [which picture of t_i]_j C Mary bought t_j]]?
(ii) ??[_{CP} Who_i C do you wonder [_{CP} [which picture of t_i]_j C t_j is on sale]]?

As discussed in Gallego (2009), the facts are misleading, since subextraction does not take place from the [Spec, CP] (criterial) position. In fact, these data may involve a process of reanalysis applying at the VP level, as Bosque & Gallego (2014) discuss, following original ideas of Bach & Horn (1976), also developed by Broekhuis (2006).

3 The POP+ approach to freezing

This section discusses two alternative views on freezing effects based on Labeling Theory (cf. Chomsky 2013, 2015). 3.1. introduces the basics of Chomsky’s (2013, 2015) analysis of labeling. Then 3.2. explores different ways to make specifiers stable. Finally, in 3.3. I turn my attention to Rizzi’s (2015) proposal, which is also different from his previous proposals.

3.1 Labeling Theory: the POP+ framework of Chomsky (2013, 2015)

As noted in section 2.1., Chomsky’s (2004 and sub.) formulation of Bare Phrase Structure dispenses with X-bar-theoretic machinery, including labels. Thus, departing from the original proposal (cf. Chomsky 1995), the combination of X and Y, yields (17), not (18) (where K is a label, an actual “projection” of either X or Y).

(17) Merge (X,Y) \rightarrow Z = {K,{X,Y}} (Chomsky 1995, 2000, 2001)

(18) Merge (X,Y) \rightarrow Z = {X,Y} (Chomsky 2004 and sub.)

Chomsky (1995:244) took K to be identical to X or Y, not its union ($\alpha \cup \beta$) or its intersection ($\alpha \cap \beta$). Departing from this (still partially X-bar reminiscent) formulation, Chomsky (2004 and sub.) puts forward a label-free analysis in the spirit of Collins (2002). In Chomsky (2013), labels are not projected, but determined by LA, which renders SOs interpretable at the interfaces.¹⁸ The first formulation of the LA was (19):

(19) Labeling Algorithm

- a. In {H, α }, H an LI, H is the label
- b. If α is internally merged to β , forming { α , β }, then the label of β is the label of { α , β }

[from Chomsky 2008: 145]

¹⁸ Note that this tacitly assumes that (compositional) interpretation is endocentric. Cf. Narita (2014) for additional discussion.

Chomsky (2013: 43) argues that LA operates under Minimal Search (MS), a third-factor principle present in other computational operations.¹⁹ MS locates the most accessible element within a given domain *D*: a minimal unit – an LI (X^{\min}). MS operates unproblematically in {H,XP} structures (where H is the label), but it does not in {XP,YP}, where MS leads to an ambiguous result. Chomsky (2013:43) argues that this unwanted situation can be tackled in two ways: (i) either XP or YP moves, or else (ii) X and Y share some feature that can be interpreted as the label of {XP,YP}. Under the assumption that copies are invisible to computation (cf. Chomsky 2000: 131, 2001: 16, 23–24), (i) makes it possible for MS to determine the label in {XP,YP}, after XP raising.

- (20) a. {XP,YP} MS: ambiguous
 b. {YP,{XP, t_{YP} }} MS: X labels {XP,YP} (YP's copy is invisible)

After YP raises, the computation sees “{XP, t_{YP} },” so the head of XP is accessible to MS. Empirically, the benefits of this approach cover successive cyclic A-bar movement (which is just a case of labeling failure in {XP,YP}; cf. Blümel 2014) and subject raising to [Spec, TP] from [Spec, v^*P] (and other small clauses; cf. Moro 2000).²⁰

Consider next option (ii), which directly concern conditions under which *d*XP's freeze (or halt). Chomsky (2013:45) argues that the final position of a *d*XP in (21a,b) is identified through the features the heads X and Y are endowed with: ϕ -features in (21a), and Q features in (21b).^{21,22}

¹⁹ It is not clear that the MS operating in LA is the one that operates in regular Probe-Goal dependencies (Agree). As Sam Epstein (p.c.) notes, MS in {H, XP} finds H and stops. By contrast, when a Probe is located in {H,XP}, MS does not find H and stops – rather, MS continues to search for another head (the Goal) within XP. Although the distinction may follow from the nature of the elements involved (technically, a Probe contains uFF, which forces MS to locate a Goal), it is certainly odd for MS to both stop (in labeling) and not stop (in Probe-Goal) at H.

²⁰ Here Chomsky (2013, 2015) departs from previous approaches to labeling in {XP,YP} created via IM. So, in Chomsky (2007:23), it is pointed out that “questions arise about labeling only for XP-YP constructions. For IM, with XP raised from YP with head Y, Y is the probe, and the simplest assumption is that it remains the probe, so that XP need not be searched for a new Probe.” This view is consistent with previous discussion on the impossibility that *d*XP's label (as already argued for in Chomsky 1995:256). See Donati (2006) for discussion that IM of heads can have that effect, which is adopted in Chomsky (2008:145), but reconsidered in Chomsky (2013:46).

²¹ For an early version of this approach to sublexical features (called “sublabels” in Chomsky 1995) and their role in agreement, the reader is referred to Chomsky (1995:268 and ff.). The agreement analysis of Chomsky (2013, 2015) suggests that the “intersection” option of Chomsky (1995) should not have been discarded. It is unclear, however, how to implement “feature

- (21) a. $\{\{A, \text{student}_{\varphi}\}, \{T_{\varphi}, \{\dots t_A \text{ student} \dots\}\}\}$ MS: φ features
 \uparrow (Agree)
 b. $\{\{\text{which}_Q, \text{books}\}, \{C_Q, \{\dots t_{\text{which books}} \dots\}\}\}$ MS: Q features
 \uparrow (Agree)

Chomsky (2015) pushes the labeling analysis in (21) to ECP effects, which fall within what Rizzi (2006, 2007) calls “Subject Criterion” (a subcase ofriterial Freeing for him). In (22) below, extraction of *who* yields a *that-t* effect, which Chomsky (2015:9–11) relates to a de-labeling process. More specifically, Chomsky (2015) assumes that subjects must stay in [Spec, TP], as that is the only way for the TP to be labeled – hence interpretable at the semantic component. The key assumption for this to work is Chomsky’s (2015) claim that T is like roots (as already suggested in Chomsky 2001): from that it follows that T is too weak to label by itself, which is what makes the subject stay in [Spec, TP].

- (22) $*[{}_{CP} \text{Who do you think } [{}_{CP} \text{that } t_{\text{who}} \text{ read the book }]]?$
 [from Chomsky 2015: 10]

The labeling analysis of ECP effects is carried over to A-bar freezing effects. Consider (23) to see this.

- (23) $*[{}_{CP} \text{Which book do they wonder } [{}_{CP} t_{\text{which book}} C_Q [\text{he read } t_{\text{which book}}]]]?$
 [adapted from Chomsky 2015: 12]

In agreement-based accounts (see section 2.2.), the problem with (23) is that *which book* is frozen after it agrees with the Q feature C is endowed with. In Chomsky (2015), the problem is that the embedded CP cannot be labeled Q after *which book* leaves the embedded [Spec, CP] position: IM leaves a copy, which is invisible, so the embedded clause is labeled by the Q feature of C alone, which yields a yes-no question interpretation that results in gibberish.

intersection” in a system where Merge does not manipulate features, but only LIs (an option that was entertained for Move-F; cf. Chomsky 1995:262, 270–271, 383 fn.27 for relevant discussion).

22 Chomsky (2013, 2015) assumes that the Q feature on *which books* is unvalued, and must be valued by the Q feature on C. This idea was also adopted in Chomsky (2000:107), where it was suggested that “the wh-phrase has an uninterpretable feature analogous to structural Case for nouns, which requires it to move to its final position in an appropriate C.” It is not clear that uninterpretability makes sense for features outside of the Case / Agreement systems, including Q, topic, focus, etc. (cf. Rizzi 1997, 2004, 2006, 2007). In fact, postulation of such construction-specific features does not seem explanatory (cf. Chomsky 2001:6, Chomsky 2008:151 for discussion).

Although I will adopt a version of Chomsky’s (2015) approach to A-freezing, I believe the specifics suffer from shortcomings inherited from agreement-based accounts. Chomsky (2013, 2015) makes two crucial assumptions: first, the features that X and Y are endowed with must be “the most prominent” ones, and the relevant dependency between them must be “Agree, not Match” (Chomsky 2013:45).²³ Both assumptions make the tacit claim that LA can see the internal structure of LIs (their lexical syntax; cf. Hale & Keyser 1993, 1997, 1998, 2002), which is by no means obvious, given that LIs are “atoms of computation” – that is, units whose internal part is invisible to syntactic operations (cf. Chomsky 2007:6, 2008:135, 2013:41,46).

A second problem for Chomsky’s (2013, 2015) analysis concerns the very idea that the prominent features of X and Y must agree for the label of {XP,YP} to be determined. It is unclear how this works if Agree requires c-command (another instantiation of MS) between Probe and Goal (Chomsky 2007:9, 2008:146). To be specific, suppose we have constructed the syntactic object {XP,YP}, depicted in (24) (taking XP to be a *d*XP, raised from within YP).

(24) {{X,ZP}, {Y,WP}}

Suppose now that X and Y are replaced by a structure built up of features, *x* and *y* being the most prominent ones:

(25) {{{x, {...}}, ZP}, {{y, {...}}, WP}}

↑ ↑ (Agree)

As the reader can see, the problem is straightforward: *x* and *y* cannot establish any structural dependency under MS – they are simply unable to communicate, unless we resort to additional devices (sisterhood, X-bar projections, feature percolation, etc.) or else we modify the definition of Agree. In fact, not only the feature *x* does not c-command the feature *y*: X does not c-command Y either. In a nutshell, Chomsky’s (2013, 2015) analysis of feature agreement requires

²³ The reason why Match is not enough is empirical. If Match sufficed, small clauses such as (i) (where agreement can show up in languages of the Italian type), would be labelable.

- (i) *Is [α the picture the cause of the riot]
 (ii) The picture is [α _{t_{The picture}} the cause of the riot]

However, (i) is out, and IM is needed, a fact Chomsky (2008 and sub.) takes to indicate that LA fails to label α . An anonymous reviewer points out that small clauses can be headed (endocentric), but notes that this does not affect the overall reasoning.

something that goes beyond a dependency between a Probe and a Goal in its c-command domain: it requires a broad notion of c-command, namely m-command (Chomsky 2007: 9), which displays all the objections Spec-Head agreement suffered from.²⁴

Taking stock, Chomsky's (2013, 2015) updated analysis requires a reformulation of LA along the lines of (26):

(26) Labeling Algorithm (POP/POP+ version)

- a. In $\{H, \alpha\}$, H an LI, H is the label
- b. If α is internally merged to β forming K ($\alpha = XP$ and $\beta = YP$), the label of K is the most prominent feature shared by α and β

Though elegant and in the very spirit of minimalist desiderata, the second clause of (26) raises theoretical and empirical problems. True, formation of $\{XP, YP\}$ structures, either by EM or IM, yields an ambiguous SO, so something is required to stabilize (freeze, halt) the structure. In EM scenarios, IM of one of the Merge-mates kicks in, and this is also what motivates successive cyclic movement. But in IM scenarios, freezing is technically trickier. In the following section I discuss other options to make dXP stop.

3.2 Other ways to stabilize (freeze, halt) SPECS

This section explores three technical ways in which LA could account for the fact that dXP stop in derived positions, putting aside Chomsky's (2013, 2015) revamping of Spec-Head agreement. As we will see, some fare better than others (requiring less stipulations).

3.2.1 Structure elimination via Transfer

A first option would be to assume that one of the SOs in $\{XP, YP\}$ (say, XP) is subject to Transfer, so it becomes X , allowing the LA to apply. This option has been explored in Uriagereka (2004), Obata (2010), Ott (2011), and Narita (2014),

²⁴ An anonymous reviewer points out that the configurations we are considering do require Agree, but as he/she acknowledges, this is before IM takes place. Notice, however, that this pre-IM Probe-Goal dependency is orthogonal for labeling purposes, as MS relies on the final configuration – more precisely, it relies on the upmost occurrences of XP and YP , among which no Probe-Goal dependency can be established.

and all assume that NS literally destroys already created structure, making X's complement disappear²⁵:

(27) In {XP,YP}, Transfer X's complement \rightarrow {X,YP} MS: X

This strategy works without involving agreement, but in so doing it violates the NTC (by destroying X's complement) and it also must increase the typology of phases (typically, *d*XP's are DPs or PPs, so D and P would have to count as phase heads). Furthermore, (27) makes unwanted empirical predictions. One was already discussed in fn. 8 and involves examples like (28), where α must have been transferred prior to wh-movement, but it is still pied-piped.

(28) [[Which book [α that John bought]] did you read $t_{\text{Which book}}$] ?

A second problem concerns the outcome of MS in Transfer-reduced {X,YP}. If X is a DP (or a PP), then the head of the entire SO would be D (or P). Although it may have interesting consequences in wh-movement scenarios, it would certainly not in sentences like *John left the room*, where the head would be *John*.

3.2.2 SubMerge/UnderMerge

A second option is that the *d*XP creates a new complement position after IM. The process is indicated in (29):

- (29) a. Merge (Y, { ... XP ... }) = Z = {Y, { ... XP ... }}
 b. Merge (Y,XP) = Z' = {{Y,XP}, { ... t_{XP} ... }}

This analysis has been explored by Pesetsky (2007) and Gallego & Uriagereka (2011) to account for the behavior of raising-to-object and Romance clitics. For reasons that will become clear in a moment, these authors dub the operation UnderMerge and SubMerge respectively.

There are two main problems with (29). The first one comes from the fact that (29) illustrates an operation that is not EM nor IM. Let us take wh-movement to see why.²⁶ Suppose that we have constructed $Z = \{C, \{T, \{ \dots \} \} \}$:

²⁵ I am somewhat summarizing Obata's (2010) discussion. This author explores different options for Transfer, and concludes that it must be weak enough to allow for the relevant material to be available at later derivational stages, even if it has been subject to the relevant mappings.

²⁶ The same would hold for focus fronting, but not dislocation, which may involve a different kind of derivation (cf. Ott 2014).

Z is in the workspace, and we can merge it to W, where W is distinct from Z (EM) or within Z (IM). In either case, the outcome is $Z' = \{W, Z\}$. This would be the case of regular wh-movement. Now, (29) is crucially different, since there is no application of Merge (under NTC) that can form $\{C, XP\}$. IM entails that XP is taken from within Z and merged with Z, but XP in (29) is not merged with Z, but with C. For that to be possible, Merge would have to be ternary, involving Z, XP, and C.²⁷ The second problem for (29) is that, even if feasible, the analysis still brings us to a dead end. This is so because although the $\{Y, XP\}$ chunk can be labeled, the entire SOs is still an $\{XP, YP\}$ structure, and thus unlabelable.

3.2.3 IM of heads

A final alternative is outlined in Kitahara (2016). Details aside, this author suggests that XP moves (creating an ill-fated SPEC position) and then the head Y undergoes IM to label the resulting structure, as shown in (30):

- (30) a. $\{Y, \{ \dots XP \} \}$
 b. $\{XP, \{Y, \{ \dots t_{XP} \} \} \}$
 c. $\{Y, \{XP, \{t_Y, \{ \dots t_{XP} \} \} \} \}$

In (30c), Y labels the structure, and XP becomes part of its complement. This is just like in the UnderMerge/SubMerge option, but without invoking a new type of Merge. Nevertheless, (30) still has the second problem we noted for (29): the outcome is labelable, but the complement of Y is still $\{XP, YP\}$.

Of course, the general question here is what triggers IM of Y in the first place. As I did in section 2.1., I will assume that Merge is not motivated (feature driven). So, by that logic, it is possible that Y does not raise (in successive cyclic scenarios, I assume).²⁸ Notice that (30) is in fact very close to the second clause of the LA in Chomsky (2007, 2008), repeated in (31) for convenience:

²⁷ Similarly, the analysis of subject raising in Chomsky (2007:17, 2008:143,155) is also not binary. The derivation assumed in Chomsky (2008) entails that once T is merged, then C is (before the subject raises), yielding $\{C, \{T, \{EA, v^*P\}\}\}$, and then $\{C, \{EA \{T, \{t_{EA}, v^*P\}\}\}\}$. The key thing here is that, though ternary (since TP is substituted by $\{EA, TP\}$), subject raising does qualify as IM: EA is a term of TP, to which it merges.

²⁸ As Hisa Kitahara (p.c.) tells me, Chomsky (1995) was assuming something like this. In his original, projection-based, proposal, merger of XP and YP yields $\{H, \{XP, YP\}\}$, where H is the head of XP or YP.

- (31) If α is internally merged to β , forming $\{\alpha,\beta\}$, then the label of β is the label of $\{\alpha,\beta\}$

In Chomsky (2007, 2008), the intended outcome is not what we obtain, which is an $\{XP,YP\}$ configuration under the NTC. But Kitahara (2016) offers a way to have the cake and eat it too.

3.3 Rizzi's (2015) reformulation of Criterial Freezing

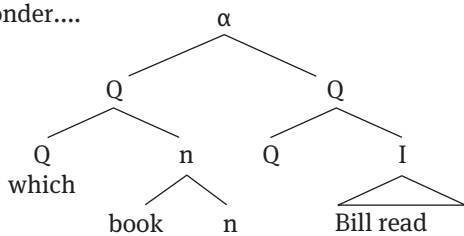
In this final section, I would like to sketch the most recent account of Criterial Freezing put forward by Rizzi (2015), who follows Chomsky in taking the problem to have a labeling basis. Reviewing data like (23), Rizzi (2015: 21–22) argues that XP movement can only involve maximal projections, but not intermediate (X') projections, a condition he expresses as in (32):

- (32) Maximality: Phrasal movement can only involve maximal objects with a given label

[from Rizzi 2015: 22]

Rizzi (2015:22) further argues that maximality of a given SO is determined “by the label of its immediately superordinate node δ : if the label of δ is different from the label of γ , then γ is maximal; otherwise it is not.” Taking (23) as the case study, Rizzi (2015) provides the structure in (33), where he argues that *which book* has ceased to be a maximal object, as the mother node is also Q:

- (33) I wonder....



[from Rizzi 2015: 22]

Rizzi (2015) is thus reducing freezing to a syntactic problem having to do with a constraint on Merge (IM) application. As Epstein, Kitahara, & Seely (2016) (EKS 2016 henceforth) convincingly argue, Rizzi's (2015) solution must at least assume the principles in (34):

- (34) a. Every SO appearing at CI must have a label
 b. Labeling takes place in NS obligatorily and immediately whenever applicable
 c. Only maximal objects with a given label can be moved
 [from Epstein, Kitahara, & Seely 2016: 228]

EKS (2016) note that (34a) and (34b) may well be necessary for independent reasons, but (34c) puts a dedicated syntactic constraint on IM, which looks far-fetched in a system where Merge is free. In addition to that, notice that the prediction embodied in (32) must take labels (*qua* projections) to be created in NS, which again deviates from the most basic form of Merge (cf. Collins 2002; Chomsky 2004).

4 No freezing in the syntax

This section puts forward an approach to freezing (halting) effects that does not resort to a Spec-Head agreement logic. I argue that *d*XP's in A-bar/criterial positions are not frozen in the syntax – given unbounded free Merge, this would simply require a specific stipulation on IM (*pace* Rizzi 2015). Instead, I will argue that freezing is subject to two independently needed principles: (i) the PIC, which is a direct consequence of cyclic Transfer and renders SOs in the complement domain of phase heads inaccessible and (ii) the PIF. With respect to the latter, I will follow Gallego (2009) in assuming that *d*XP's can skip a criterial position, but if they do, the relevant discourse-oriented interpretation will be lost under a configurational approach (cf. Hale & Keyser 1993 and sub.; Chomsky 2001, 2008; Uriagereka 1995). As advanced in section 1, I will endorse (3), repeated below as (35), which I take to follow from Chomsky's (1986a) PFI:

- (35) Principle of Interface Freezing (PIF)
 A *d*XP is assigned INT at SEM if *d*XP occupies a phase edge

The PIF is to be related both to the duality of semantics that Chomsky (2004) relates to the two variants of Merge (EM and IM) and to the idea that *d*XP's in phase edges give rise to discourse-related and scopal properties. The latter proposal played an important role in Chomsky's (2001) discussion of operations of the object shift sort, which was formalized as in (36):

- (36) The EPP position of a phase Ph is assigned Int
 [from Chomsky 2001: 33]

The PIF, as well as (36), is consistent with EKS's (2016) claim that halting effects can be derived from morphological or semantic principles, but not syntactic ones. If something like the PIF is entertained, then it will be necessary to assume that some {XP,YP} structures must in fact be generated and stay that way. Differently put, not all structures must be of the {X,YP} form, unless we know of some C-I principle imposing endocentricity. I do not. Recall that Chomsky (2013: 43) reasonably conjectures that the LA must be satisfied so that C-I can determine the nature of SOs generated by Merge: "For a syntactic object SO to be interpreted, some information is necessary about it: what kind of object is it? Labeling is the process of providing that information." What this is saying is that {X,YP} structures may be required by some C-I principle when the relevant information involves determining whether a SO is verbal, nominal, etc. However, there is nothing in this logic, in and of itself, that precludes {XP,YP} insofar as this structure provides the right kind of interpretation at C-I. For the most part, {XP,YP} structures illustrate discourse-related constructions: questions, relative clauses, and phenomena involving new-old information. Under the reasonable assumption that a "construction" is complex, whereas the "type" of an SO is not necessarily so, I explore the hypothesis that {XP,YP} can be generated – and perhaps must, if we want C-I to convey interpretations that go beyond the type of an SO. In this vein, I will suggest that, for the most part, {XP,YP} structures emerge in root structures, for which there are independent reasons to assume that they are unlabeled (see fn. 7).

In what follows, I will first explain how Transfer and Labeling Theory can account for A-cases of freezing, and then I will consider the A-bar cases, which are those corresponding to Rizzi's (2006, 2007) Criterial Freezing.

4.1 A-Freezing: C and T as a discontinuous element

In section 2.1., I introduced a design trait of Chomsky's (2000 and sub.) derivational model, namely the idea that there is a periodic forgetting of the structure that Merge builds. Assuming the general phase-based architecture, the operation Transfer cashes out the complement domain of a phase head H, leaving the head itself and its specifier (the edge) for subsequent operations in the next phase. This is shown in (37), where α is the complement of H.

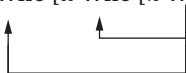
(37) [β [H (Probe) [α ... XP (Goal) ...]]]

The consequence of this is that Transfer renders α (and all it contains) no longer accessible. Although this does not correspond to standard derived-island effects, it does have the desired effect without additional stipulations: it covers the Subject Criterion, the Activity Condition, etc. Let us consider subject freezing (EPP, ECP, *that-t* effects, etc.) in more detail and how it can be accounted for under a non Spec-Head-agreement based approach. To do this, let us go back to Chomsky's (2015) suggestion that subjects halt in [Spec, TP] because T is too weak to label the TP. Before going ahead, a question that immediately arises is how a question like (38) can be formed:

(38) Who voted for Trump?

The relevant aspect of (38) is that "TP" cannot be labeled, given the logic of Chomsky (2015). If *Who* is in [Spec, CP], and T cannot label on its own, TP should remain label-less and yield deviance. But (38) is fine. The problem does not arise with non-subject wh-questions (where the subject must move to [Spec, TP] and stay there), so (38) qualifies as an ECP effect. Notice that (38) is also problematic under Chomsky's (2008) analysis of parallel movement, whereby the wh-phrase moves from the vP to [Spec, TP] and [Spec, CP] in parallel, as depicted in (39) – this is so as the A-bar occurrence is pronounced in [Spec, CP] (where labeling takes place, unproblematically), but the A occurrence in the [Spec, TP] is not pronounced, which should render it invisible.

(39) [_{CP} Who [_{TP} Who [_{VP} Who [v [voted for Trump]]]]]?



In a sense, Chomsky (1986b) already considered the problem in (38) when accounting for the asymmetry in (40):

- (40) a. Who likes John?
 b. Who does John like?

[from Chomsky 1986b: 48]

Chomsky (1986b) assumed that wh-movement to the CP does not take place in the case of subjects, so *Who* moves to [Spec, TP], but not to [Spec, CP], in (40a), which would also explain the fact that non-subject wh-phrases can circumvent wh-island effects, as (41) reveals:

(41) What do you wonder [_{CP} who saw *t*] ?

[from Chomsky 1986b: 48]

Chomsky's (1986b) analysis made it possible for *What* to move to [Spec, CP], since this position is not occupied by *who*. Interesting as this is, it does not immediately solve the problem in (38), as [Spec, TP] is indeed occupied, but by a copy. In order to solve this puzzle, and extend the solution to other ECP cases, I would like to argue that, in structures like (38), C and T are the same category in the lexicon of English. Let me elaborate. C and T are typically analyzed as distinct functional items, but much research has shown that the interaction between C and T is manifold, both syntactically and morphologically (cf. Pesetsky & Torrego 2001 and references therein). In Chomsky (2004), it is argued that nominative is actually assigned by the C-T configuration (not T alone), which Chomsky (2007) elaborates on to suggest that φ -features are generated in C and then passed down to T through a process of feature inheritance.

Gallego (2014) assumes this much and suggests that T is actually a copy of C in languages like English. In other words, Gallego (2014) suggests that what is usually regarded as two independent heads should be conceived of as a non-trivial chain.²⁹ The proposal nicely recasts Chomsky's (2004) claim that C and T work together to assign nominative Case and, at the same time, dispenses with feature-inheritance (simply because the features that are in C must also be in all its copies). With this in mind, the representation of (38) should actually be as in (42):

(42) [_{CP} Who [C [_{vP} *t*_{Who} v [voted for Trump]]]]?

In this analysis, *Who* raises directly to the specifier of C (taking T and C to be one and the same). Under Chomsky's (2013, 2015) approach, we could argue that the TP (CP, for us) is labeled because the φ -features of the overt DP can be used to match those of T (C), but in the present account this is not necessary: *Who* raises from [Spec, vP] for labeling reasons, and the first available position is [Spec, CP]. The question now is why (42) is not out, given that the final SO is {XP, YP}. But notice that the problem is more general: Why isn't (43) out?

(43) Many people voted for Trump.

²⁹ This takes both heads, though not identical on conceptual grounds, to be one and the same in the lexicon. Similar ideas have been explored in the vP domain, where certain heads have been said to 'bundle' (cf. Pylkänen 2008; Harley 2017).

One way in which (43) could be licensed is by making C undergo IM so that it creates a discontinuous object. This is in accord with the proposal in 3.2.3. and should be seen as the clause-typing strategy by default, when no discourse-related or scopal properties are involved. The analysis can be invoked in order to account for (38), as shown in (44):

(44) [C [Who [t_C [t_{vP} t_{Who} v [voted for Trump]]]]]?

Notice that this analysis opens the door to understand EPP and ECP effects as two sides of the same coin. When C moves, it leaves a copy, which is invisible to LA. Because of that, the DP must stay in [Spec, TP], or else TP would be unlabeled. Notice that this departs from Chomsky's (2015) analysis, which argues that English T is too weak to label. What I suggest is that this labeling inertness does not come from feature-strength (in the sense of Chomsky 1993), but from T being a copy.³⁰

Let us consider next ECP effects involving subject extraction across C. Suppose we have generated (45):

(45) Someone says [C [many people t_C [t_{many people} voted for Trump]]]

Again, *many people* must remain in [Spec, CP], and C, which can be realized as *that*, may or may not attract the subject to the phase edge. This would wrongly predict that *many people* can be extracted across *that*, contrary to fact. Therefore, *that*-less clauses must involve a different derivation. Let us suppose that C movement is followed by an optional PF insertion rule that is sensitive to the root/embedded distinction. Thus, if C moves in a root clause, it cannot be spelled-out as *that*, but it can in an embedded domain. Following this reasoning, suppose C does not move in embedded *that*-less clauses. This predicts the absence of *that* and the fact that the subject can abandon the [Spec, TP] position: since C stays in-situ (the C-T discontinuous object is not created), it labels the structure.

This analysis covers the Romance facts discussed in the literature, which are ECP-free (Gallego 2010 and references therein). Thus, following Gallego's (2014) reasoning, if C and T are in fact different lexical items in, say, Spanish, then T will never count as a copy. This explains why the EPP does not hold in Romance (subjects move to [Spec, TP] optionally, giving rise to a discourse-related

³⁰ A prediction made by this analysis is that {t_{XP}, t_{YP}} structures cannot be generated. As Chomsky (2008, 2013), the standard cases require for either XP or YP to move, but not both. I leave open what this might follow from.

interpretation, discussed by Rizzi 2006, 2007; Uriagereka 2008) and, therefore, why subjects can be extracted.³¹

Summarizing so far, I have argued that, in a system adopting some version of Phase Theory, the most natural way to account for why SOs occupying the complement domain of phase heads is by invoking cyclic Transfer. This said, nothing in the current system precludes that a *dXP* in [Spec, TP] raises to [Spec, CP], so cyclic Transfer does not provide an ultimate answer. In order to account for the fact that a *dXP* cannot abandon [Spec, TP], I have argued that C and T are the same element in the lexicon of certain languages (English), and that what we call T is actually a copy of C. Chomsky (2015) argues that English T is weak to label, so that the subject must stay there to label. I have kept the basics of his analysis, but without invoking feature strength. Instead, I have proposed that T's copy status is what makes it unable to label. If nothing else, the alternative I am suggesting does not need assumptions beyond Merge and the copy theory of movement.

4.2 Criterial Freezing: Principle of Interface Freezing

So far, I have not discussed A-bar freezing much. Let us go back to the representative case in (5), repeated here:

- (46) *Which book does Bill wonder [_{CP} t_{Which book} C [she read t_{Which book}]]?
[from Rizzi 2006: 112]

We have already seen how standard approaches to freezing tackle (46) and similar facts (see sections 2.2. and 3.3.). Here I argue that there can be no syntactic freezing (halting): like any other case of IM, wh-movement in (46) is allowed to apply in NS, so if a problem emerges it must be due to independent S-M or C-I requirements. Gallego (2009) outlines such an approach by

31 An anonymous reviewer asks what head movement boils down to in this account, and refers to EKS (2016) for a specific formulation of head movement in Internal Pair-Merge terms. The proposal in Gallego (2014) presupposes that head movement is just an instance of standard IM, with no need to resort to Pair-Merge, whose dependency-specific nature (adjunction) raises concerns. Space limitations prevent me from going into details, but as Chomsky et al. (2018) suggest, the label “head movement” probably covers different empirical scenarios, and thus require different technical implementations. In any event, and just to address the reviewer's concerns, head movement of C should be regarded here as any other instance of IM.

capitalizing on Chomsky's (2001) analysis of discourse-oriented interpretations emerging in phase edges, which was phrased as follows:

(47) The EPP position of a phase Ph is assigned Int
[from Chomsky 2001: 33]

If one endorses (47), *d*XPs in the specifier of a phase head are assigned a discourse-oriented interpretation – not because of feature checking, but simply because of their position. In brief, (47) amounts to *d*XPs being interpreted as Q-operators, Rel-operators, focus-operator, etc. for the same sort of reason an XP receives a theta-role in Hale & Keyser's (1993 and sub.) framework, namely because of the structure they are part of. Clearly, things cannot be so simple, for the specific “discourse-oriented” and “thematic” interpretation are not easy to determine. Thus, for instance, the interpretation of *Horatius* is not the same in (48a), (48b), and (48c), although the positions this DP occupies plausibly qualify as a specifier in a {XP,YP} configuration:

- (48) a. Horatius held the bridge against a whole army
b. Horatius did not fear the army at the bridge
c. There was Horatius at the bridge against a whole army

As noted in the literature (cf. Acedo-Matellán & Mateu 2014 and references therein), the interpretation of a given XP depends on the nature of its Merge-mate: AGENT is assigned to XP if it is merged with a vP headed by v_{CAUSE} or v_{DO} . GOAL is assigned to XP if it is first merged with a terminal-coincidence preposition, and so on and so forth. The same is trivially true in the CP domain, where the interpretations assigned to *X Roman* in (49) are all different:

- (49) a. Which Roman defended the bridge?
b. THIS ROMAN defended the bridge, not THAT ONE
c. The Roman who defended the bridge

However the interpretations at the vP and CP levels obtain, I assume that this happens in the interpretive components. That is to say, NS is not sensitive to notions like topic, focus, agent, theme, subject, object, and the like: there is a computational system that can take elements from a lexicon to yield SOs. Interestingly, these notions are traditionally regarded as “syntagmatic,” as they only appear once the syntactic computation has generated some structure – a lexicon does not contain LIs that are inherently themes or foci,

let alone features that collapse those notions. The point was already made in Chomsky (1965):

The notion “Subject,” as distinct from the notion “NP,” designates a *grammatical function* rather than a *grammatical category*. It is, in other words, an inherently relational notion. We say, in traditional terms, that in (1) *sincerity* is an NP (not that it is the NP of the sentence), and that it is a (functions as) the *Subject-of* the sentence (not that it is a Subject). Functional notions like “Subject,” “Predicate” are to be sharply distinguished from categorial notions such as “Noun Phrase,” “Verb,” a distinction that is not to be obscured by the occasional use of the same term for notions of both kinds. [from Chomsky 1965: 68]

From this perspective, criterial freezing can be seen as a ban on *d*XP_s receiving multiple interpretations.³² That is to say, just like an XP does not receive more than one theta-role, a *d*XP does not receive more than one discourse-oriented interpretation. This makes sense in the case of thematic interpretations, as XP_s are EM-ed only once – which would be a way to recast the Theta Criterion (cf. Chomsky 1981). However, in the case of discourse-related interpretations, things are different, as IM can apply more than once. It is at this point that the Deep Structure/Surface Structure distinction becomes relevant: a discourse-oriented interpretation piggy-backs on the final surface position of *d*XP (the one feeding the S-M systems).³³

All of this is compatible with a rather conservative view of the PFI. As already advanced, in the case that concerns us, I would like to approach the data from the PIF, a subcase of the PFI:

32 Gallego (2009) discusses the possibility that both PF and LF may impose some uniqueness constraint, requiring that XP_s are interpreted at both components only once: at PF, only one copy is pronounced, and at LF, chains contain only one EM-interpretation and one IM-interpretation. Cf. Rizzi (2006: 128) for discussion of situations where multiple interpretations of the criterial type are allowed through a process of head movement that creates a cluster of criterial heads.

33 An anonymous reviewer alludes to Rizzi’s (2006) reasoning about there being a lower bound below which no argument can be merged, from which he derives the lack of movement into theta-positions. Rizzi (2006) further suggests that a similar constraint applies in the upper domain of a clause (the criterial positions), beyond which movement cannot take place. The reviewer wants to know if I adopt a similar position. The answer is negative. As just pointed out, to the extent that Chomsky’s (2004) duality of interpretation conjecture is on track, then it follows that theta-roles are restricted in the same manner EM is: It can only apply once, which provides a clear way to recast the Theta Criterion. The case of IM is murkier, as its application is potentially unbounded. What this paper argues is that discourse-oriented (scopal, etc.) interpretations are restricted as there must be a final application of IM (one affecting the upmost copy of the chain) that feeds Transfer.

(50) Principle of Interface Freezing (PIF)

A *dXP* is assigned INT at SEM if *dXP* occupies a phase edge

The PIF is an interface condition, not a constraint on derivations. Such constraints are in fact unstatable in a free-Merge system, unless we introduce additional stuff (features, projections, indices, etc.). Rizzi (2006) provides one empirical argument to defend that (46) is not ruled out by interpretive principles. For him the problem is syntactic. Rizzi (2006) thus shows that Italian allows for contrastive focus to be assigned either in-situ or ex-situ, in the Left Periphery (which is possible Spanish too). Rizzi (2006) offers the pair in (51) to claim that criterial freezing cannot be reduced to interpretive matters:

- (51) a. Mi domandavo [_{CP} quale RAGAZZA_i C avessero scelto t_i],
 CL-me wonder-1.SG which GIRL had-3.PL chosen
 non quale ragazzo (Italian)
 not which boy
 ‘I wonder which GIRL they had chosen, not which boy.’
- b. * [_{CP} Quale RAGAZZA_i C mi domandavo [_{CP} t_i avessero scelto t_i],
 Which GIRL CL-me wonder-1.SG had-3.PL chosen
 non quale ragazzo (Italian)
 not which boy
 ‘Which GIRL do I wonder had chosen, not which boy?’
 [from Rizzi 2006: 113]

Rizzi (2006: 113) argues that “a wh-phrase in an embedded question can be contrastively focused in its criterial position, in the embedded C system, but it cannot be moved to the left periphery of the main clause [...] as contrastive focus is clearly compatible with a wh-phrase (see [51a]), it does not seem plausible to assume that [51b] is ruled out for interpretive reasons.” As Gallego (2009) argues, the point is well-taken, but not conclusive. Rather, the specific status of sentences like (46) follows from the fact that the lexical intricacies of *wonder*, which is unique in selecting interrogative clauses. In Spanish, only two verbs display such behavior (cf. Suárez 1999:2154), and their meaning is that of *wonder/ask*. To see how this is relevant, compare (51) with (52):

- (52) a. María ha dicho [_{CP} qué CHICA_i C han elegido t_i],
 María have-3.SG said which GIRL have-3.PL chosen
 no qué chico? (Spanish)
 not which boy
 ‘María has said which girl they have chosen, not which boy’

- b. [_{CP} Qué CHICA_i C ha dicho María [_{CP} que t_i han
 which GIRL have-3.SG said María that have-3.PL
 elegido t_i], no qué chico? (Spanish)
 chosen not which boy
 ‘Which girl has María said that they have chosen, not which boy?’

To my mind, (51) and (52) are analogous in the relevant respect. The only difference concerns the matrix verb: unlike *wonder* and *ask*, *say* does not necessarily take a [+Q] complement. Consider next (53), from Gallego (2009), which is ungrammatical in Spanish:

- (53) *Me pregunto [_{CP} han elegido a qué CHICA], no
 CL-me wonder-1.SG have-3.PL chosen to what girl not
 a qué chico (Spanish)
 to what boy
 ‘I wonder what GIRL they have chosen, not what boy’
 [from Gallego 2009: 47]

Here, the *wh*-phrase with the focused NP *CHICA* (Eng. ‘girl’) stays in-situ. Taking Rizzi’s (2006) view on freezing at face value, it is not immediately obvious what the problem in (53) is – the NP has not raised to a criterial position, and Spanish can have both *wh*-phrases and contrastive focused XPs in-situ. Again, this suggests that the problem has to do with the idiosyncratic nature of *preguntarse* (Eng. ‘wonder’), not with a general constraint on derivations.

Interestingly, EKS (2016) provide an explanation of the facts that is along the lines of the PIF. They start by making the following assumptions about the C of interrogative sentences like that *wonder* selects:

- (54) a. There is only one C_Q in the (English) lexicon, appearing in both yes/no and *wh*-interrogatives,
 b. every syntactic object must be labeled at CI,
 c. a CP with the label C_Q, unaccompanied by a *wh*-specifier, is interpreted as a yes/no -question at CI; and
 d. a CP with the label Q, when Q is shared by the two heads C_Q and WH_Q is interpreted as a *wh*-question at CI.

[from EKS 2016: 229]

They thus assume that a yes/no-question has the underlying representation of (55):

- (55) [α C_Q [_{TP} Horatius held the bridge]]

EKS (2016) argue that the label of α is C, but the S-M representation of (55) is ruled out if it has a neutral or falling intonation. In English, matrix yes/no-questions require either T-to-C movement or rising (question) sentential prosody, as in (56) (intonation is signaled in square brackets):

- (56) a. Did Horatius hold the bridge?
 b. Horatius held the bridge [$\uparrow\uparrow$]?

Consider, for the punch line, what happens if α is embedded. In those cases, EKS (2016) argue that since C does not contain a wh-specifier, α must be interpreted as a yes/no-question.

- (57) *I wonder [α C_Q [_{TP} Horatius held the bridge]]

The problem, for these authors, is also interface-rooted: (57) is out for reasons ultimately rooted in the S-M systems, since both T-to-C movement and rising intonation in English embedded clauses are not possible. EKS (2016) reason that α in (57) is also ruled out for C-I reasons, since the composed representation of the matrix clause and embedded α yields gibberish. In their own words:³⁴

One possibility regarding its status as gibberish is as follows: The CP headed by C Q is itself interpreted as a yes/no- question and so would be interpreted as: “Answer me this: Does John like this dog?” that is, a performative request made of the speaker’s interlocutor for a specific kind of information As such, embedding it, as in I wonder John left yields an interpretation like: “I wonder, ‘Answer me this, Did John leave?’” This is anomalous to the extent that one cannot wonder a request for information. [from EKS 2016: 236, fn.18]

Turning now to (46), EKS (2016) follow Chomsky (2013, 2015) in taking it to be a C-I (labeling) problem: the copy of the wh-phrase is invisible to LA. Consequently, the label of α is C_Q, which satisfies selection by *wonder*, but cannot be interpreted as a wh-question, given the assumptions in (54).³⁵

³⁴ EKS (2016) suggestion is sensible, but the alleged C-I problem could also be attributed to an S-M constraint requiring that, when embedded, the C_Q of yes / no-questions needs to be occupied by an overt Q element.

³⁵ If the CP selected by *wonder* is actually not embedded, but paratactic in nature (like all indicative dependents in Romance, for instance), then we could explore the possibility that dXPs only stop in root contexts, even if they appear to be embedded in the surface. True embedding (subjunctive in Romance) precludes embedded wh-sentences and also restricts the availability of contrastive focus, as pointed out in the literature (cf. Torrego & Uriagereka 1992). Topics are different (they can be embedded), but this may be a welcome result if topicalization involves a different derivation. As Noam Chomsky indicates through personal communication, in

In sum, the line of reasoning EKS (2016) advocate for is, though technically different, consistent with the PIF in taking the relevant problem of sentences like (46) to be found at the interfaces, not in the syntax.

5 Conclusions

This paper has discussed the nature of freezing (halting) effects. I have argued that freezing (especially A-bar/criterial freezing) should be regarded as an interface issue, not a syntactic one. If unbounded free Merge is adopted (cf. Chomsky 2004 and sub.), then its application is unconstrained as long as it adheres to efficiency principles, such as NTC, cyclic Transfer, and the like. From this, it follows that, if a *dXP* occupies a phase edge, then it can be subject to further applications of Merge. Notice that this is not to say that the criterial facts are wrong, but that the problem is not syntactic, unless we enrich syntax (and thus UG) with features, Spec-Head agreement, projections, and similar devices that raise technical qualms. The relevant trouble-making (freezing) IM configurations can indeed be created, and I assume they yield discourse-related interpretations at the semantic component (cf. Chomsky 2004, 2007, 2008), in the same way EM configurations yield thematic ones. This has been formalized as the PIF:

(58) Principle of Interface Freezing (PIF)

A *dXP* is assigned INT at SEM if *dXP* occupies a phase edge.

To repeat, the PIF is not constraining the way Merge applies. Under (58), alleged freezing effects should be deducible from the more general demands imposed by the C-I systems, not by Spec-Head agreement mechanisms or constraints on Merge that go beyond principles of computational efficiency. As I have shown, this naturally covers situations in which a *dXP* is removed from an edge (causing the absence of the relevant discourse-interpretation at that edge) and those where a *dXP* cannot leave a given edge (an effect I have attributed to lexical intricacies, not syntactic ones).

The interface-based solution explored in this paper opens the door to a configurational approach to cartographies. As pointed out in passing, standard lexical categories (N, V, P, etc.) and inflectional affixes (Asp, T, C, etc.)

expressions like *I think that [[that books like that], John will never read]*, the internal bracketed phrase is set off prosodically and behaves almost like a root sentence, suggesting that internal topicalization and left dislocation are both quite different from successive-cyclic movement. I leave the exploration of this possibility for future research.

are paradigmatic, whereas topic, focus, and the like are syntagmatic – they only show up in the syntax. This very issue was brought up by Chomsky (1995:349 and ff.) in order to dispense with agreement projections, and although the literature has emphasized Chomsky's objections with the uninterpretable status of these categories, it is important to recall that he also questioned them because of their theory internal flavor: AgrP is inherently relational (paradigmatic).

We have seen that Chomsky (1965) made this point very explicitly. And the point is, at the relevant level of abstraction, the one Hale & Keyser (1993) make in their approach to theta-roles, which are also relational entities: “there *are* no thematic roles. Instead, there are just the relations determined by the categories and their projections, and these are limited by the small inventory of lexical categories and by Unambiguous Projection” (p.68). Technically, there is nothing wrong with lexicalizing grammatical functions,³⁶ pragmatic notions, or thematic roles (this is in fact common practice; cf. Cardinaletti 2004; Haegeman & Hill 2010; Speas & Tenny 2003; Ramchand 2008; cf. Bruening 2010 for some criticism), the point is that all these categories are emergent: they only appear in a syntactic environment, so recycling them as LIs blurs the paradigmatic/syntagmatic cut, and raises non-trivial questions concerning the architecture of the Faculty of Language (cf. Uriagereka 2008 for much relevant discussion). Further research is certainly needed to clarify these matters and to achieve an account that, taking advantage of the impressive results provided by cartographic work, offers a principled explanation of the facts described.

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³⁶ Notice that I do not claim that these notions are not ‘grammaticalized’. There can be dedicated morphemes associated to these phenomena. What I argue against is the idea that inherently relational notions can be analyzed as LIs.

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Gereon Müller

Freezing in complex prefields

Abstract: The main goal of this paper is to provide an analysis of a hitherto undetected freezing effect as it shows up with extraction in complex prefield constructions in German that is compatible with (i) the more general strictly derivational approach to freezing developed in Müller (2014), and (ii) the arguments brought forward in Fanselow (1992), Müller, St. (2005) according to which complex prefields involve single VP constituents rather than multiple movement (and freezing is therefore a priori unexpected).

Keywords: Condition on Extraction Domain, derivation, structure removal, freezing, complex prefield, Williams Cycle

1 Introduction

A well-established generalization concerning German clause structure is that there can only be one constituent preceding the finite verb in main clauses –, i.e., that German main clauses are verb-second clauses. However, in the complex prefield construction, it looks as though two (or more) items can show up in front of the moved finite verb (which, following the standard analysis, I assume to have undergone movement to C). Some typical examples illustrating the complex prefield construction (which is widespread in German sports broadcasts, e.g., in bike race reports) are given in (1).¹

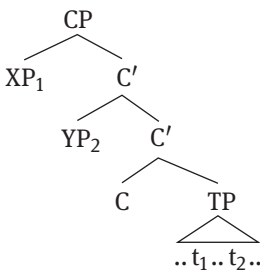
- (1) a. [DP Den Fahrer] [PP zur Dopingkontrolle] begleitete ein
the rider_{acc} to the doping test accompanied a
Chaperon
chaperon_{nom}

¹ In the present paper, I will have nothing to say about the marked nature of the construction, and its apparent confinement to certain contexts and registers. The examples in (1) are taken from sports broadcasts and internet reports; most of the examples that follow (including the core data in (6), (7), and (8)) are based on native speakers' introspective judgements.

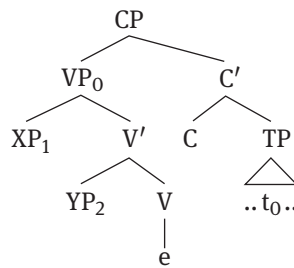
- b. [_{DP} Fast alles] [_{PP} im Sitzen] bewältigte Joaquim
 almost everything_{acc} seated managed Joaquim
 Rodriguez auf dem Weg zum Gipfel
 Rodriguez on the way to the peak
- c. [_{PP} Mit dem Hauptfeld] [_{PP} ins Ziel] kamen auch
 with the peloton into the finish came also
 Fernando Escartin und Aitor Garmendia
 Fernando Escartin and Aitor Garmendia
- d. [_{PP} Mit ihm] [_{PP} in der Spitzengruppe] fuhren Martin
 with him in the first group rode Martin
 Elmiger (IAM), Bryan Nauleau (Europcar) und Serge
 Elmiger Bryan Nauleau and Serge
 Pauwels (MTN-Qhubeka)
 Pauwels

There are two competing analyses for this construction in the literature. According to one view, prefields can be truly complex under certain circumstances. There are thus two (or more) separate constituents in the prefield in (1), as a consequence of an option of multiple fronting (cf. Lötscher 1985; Eisenberg 1999; Speyer 2008; and Wurmbrand 2004); see (2). According to the other view, prefield complexity is only apparent. There is a single constituent in the prefield in (1), viz., a fronted VP with an empty head; see (3). This empty head may be a trace resulting from prior head movement (cf. Fanselow 1991, Müller 1998), or it may be a separate empty head that does not (directly) participate in a displacement configuration (cf. Fanselow 1992; St. Müller 2005, 2015).

(2)



(3)



Fanselow (1992) and Müller, St. (2005) present convincing evidence in favour of the analysis in (3). For instance, there is a clause-mate condition on complex prefields which is expected if the construction involves topicalization of a VP with an empty head, and which is entirely unexpected if separate topicalization operations affecting XP_1 and YP_2 are involved; see (4a) vs. (4b), and note that

long-distance topicalization from an embedded clause as in (4c) is possible as such (for most speakers).

- (4) a. [_{CP} [_{VP} Kindern₁ Bonbons₁]₁ [_{C'} sollte man nie t₁ geben]]
 children_{dat} sweets_{acc} should one never give
- b. *[[_{CP} Kindern₁ Bonbons₂ [_{C'} sollte man nie t₁ sagen
 children_{dat} sweets_{acc} should one_{nom} never say
 [_{CP} dass sie t₂ essen dürfen]]]
 that they_{nom} eat may
- c. [_{CP} Bonbons₂ [_{C'} sollte man Kindern₁ nie sagen [_{CP} dass
 Sweets_{acc} should one children_{dat} never say that
 sie t₂ essen dürfen]]]
 they eat may

Note next that against the background of the analysis in (3), a freezing effect with extraction from YP₂ to a position within CP is not predicted (in contrast, such a freezing effect would be expected to show up under the analysis in (2)). Freezing effects occur if movement takes place out of an item that has itself undergone movement, as in (5) in German (where *wh*-movement applies from a topicalized VP, yielding illformedness).

- (5) *Was₁ denkst du [_{VP₂} t₁ gelesen] hat keiner t₂ ?
 what think you read has no-one

Given that YP₂ is in its *in situ* position in (3) (where, by assumption, a single VP is topicalized), and given that the analysis in (2) (with multiple topicalization) is at variance with the clause-mate restriction (and other pieces of evidence brought forward by Fanselow (1992) and Müller, St. (2005)), the obvious prediction will be that there is no freezing effect with extraction from YP₂ in complex prefield constructions, provided that the landing site is not external to the clause. Crucially, however, this prediction is not borne out – there is what looks like a clear freezing effect with complex prefield constructions in German. Consider the sentences in (6). In (6a), DP₁ and PP₂ participate in a complex prefield construction. In (6b), extraction of the R-pronoun *da*₁ from PP₂ has taken place to a position in front of DP₁, which gives rise to ungrammaticality. Given the analysis in (3), this instantiates an instance of postposition stranding by scrambling to VP, and it is difficult to see what should be wrong with it: Note that both topicalization (see (6c)) and scrambling (see (6d)) of the R-pronoun are possible as such (in varieties of German that allow postposition stranding to begin with); what is more, a minimally different sentence with an uncontroversial case of VP topicalization is fully well formed (see (6e)).

Finally, if the R-pronoun is not scrambled to VP but remains in situ, the complex prefield construction is generally unproblematic; cf. (6b) with (6f).²

- (6) a. [CP [DP₁ Dem Team] [PP₂ zum Erfolg] [C_r gratulierte
the team_{dat} to the success congratulated
Bernard Hinault]]
Bernard Hinault_{nom}
- b. *[CP Da₃ [DP₁ dem Team] [PP₂ t₃ zu] [C_r gratulierte Bernard
there the team_{dat} to congratulated Bernard
Hinault]]
Hinault_{nom}
- c. [CP Da₃ [C_r gratulierte Bernard Hinault dem Team
there congratulated Bernard Hinault_{nom} the team_{dat}
[PP t₃ zu]]]
to
- d. dass Bernard Hinault da₃ dem Team [PP t₃ zu]
that Bernard Hinault there the team_{dat} to
gratulierte
congratulated_{nom}
- e. [CP Da₃ [DP₁ dem Team] [PP₂ t₃ zu] gratuliert [C_r hat
there the team_{dat} to congratulated has
Bernard Hinault]]
Bernard Hinault_{nom}
- f. [CP [DP₁ Dem Team] [PP₂ da₃-zu] [C_r gratulierte Bernard
the team_{dat} there-to congratulated Bernard
Hinault]]
Hinault_{nom}

The clear difference between (6b) and (6e) is unexpected if the structures underlying these sentences are virtually identical in all relevant respects (i.e., if they both involve a topicalized VP, as in (3)): How can (6b) give rise to a freezing effect if PP₂ has not undergone any movement?³

² Some speakers perceive (6f) as more marked than the structurally analogous (6a). However, (6f) can easily be further improved by modulating intonation; and there remains a clear contrast to the freezing effect in (6b) throughout.

³ It would not help to adopt a more liberal concept of freezing (cf., e.g., Ross (1967), Wexler & Culicover (1980) for different options), such that an incompatibility of VP-internal scrambling and VP movement could be derived; this would also not discriminate between (6b) and (6e), wrongly predicting ungrammaticality in both cases.

A second set of examples illustrating the same pattern is presented in (7). (7a) is a complex prefield construction with two PPs, and (7b) instantiates a freezing effect with R-pronoun scrambling from PP₂. As shown by (7c,d), topicalization and scrambling of the R-pronoun are perfectly acceptable in this context if PP shows up in the middle field; and, most importantly, (7e) shows that a clear case of VP topicalization permits a simultaneous occurrence of R-pronoun scrambling in the prefield. Again, the contrast between (7b) and (7e) poses a puzzle. (As before, (7f) shows that the R-pronoun can stay in situ in the complex prefield construction.)

- (7) a. [_{CP} [_{PP₁} Zum letzten Mal] [_{PP₂} mit Funk] [_{C'} wurde das
for the last time with radios was the
Rennen “Rund um die Braunkohle” ausgetragen]]
race “Rund um die Braunkohle” held
- b. * [_{CP} Da₃ [_{PP₁} zum letzten Mal] [_{PP₂} t₃ mit] [_{C'} wurde das
there for the last time with was the
Rennen “Rund um die Braunkohle” ausgetragen
race “Rund um die Braunkohle” held
- c. [_{CP} Da₃ [_{C'} wurde das Rennen “Rund um die Braunkohle”
there was the race “Rund um die Braunkohle”
zum letzten Mal [_{PP} t₃ mit] ausgetragen
for the last time with held
- d. dass das Rennen “Rund um die Braunkohle” da₃ zum letzten
that the race “Rund um die Braunkohle” there for the last
Mal [_{PP} t₃ mit] ausgetragen wurde
time with held was
- e. [_{CP} Da₃ [_{PP₁} zum letzten Mal] [_{PP₂} t₃ mit] ausgetragen
there for the last time with held
[_{C'} wurde das Rennen “Rund um die Braunkohle”
was the race “Rund um die Braunkohle”
- f. [_{CP} [_{PP₁} Zum letzten Mal] [_{PP₂} da₃-mit] [_{C'} wurde das
for the last time there-with was the
Rennen “Rund um die Braunkohle” ausgetragen]]
race “Rund um die Braunkohle” held

As a third and final set of examples, consider (8), where two DPs occupy the complex prefield, and the second one (DP₂) includes a PP with an R-pronoun in it (see (8a)). As before, P stranding via fronting of the R-pronoun is completely impossible (see (8b), vs. the R-pronoun in situ in (8f)), even though movement of the R-pronoun (both with topicalization and with scrambling) is fine if the DP occurs

in its in situ position; and as before, uncontroversial cases of VP topicalization (i.e., those where a lexical V shows up) also permit fronting of the R-pronoun (see (8e)). Thus, again, the apparent freezing effect in (8b) (vs. (8e)) a priori qualifies as a mystery, given the structure of complex prefields in (3).

- (8) a. [_{CP} [_{DP₁} Seinen Sprintern] [_{DP₂} einen Tipp dafür] [_{C'} hat
his sprinters_{dat} a hint_{acc} there-for has
der sportliche Leiter von Rabobank gegeben]]
the team manager_{acc} of Rabobank given
- b. * [_{CP} Da₃ [_{DP₁} seinen Sprintern] [_{DP₂} einen Tipp [_{PP} t₃ für]]
there his sprinters_{dat} a hint_{acc} for
[_{C'} hat der sportliche Leiter von Rabobank gegeben]]
has the team manager_{nom} of Rabobank given
- c. [_{CP} Da₁ [_{C'} hat der sportliche Leiter von Rabobank
there has the team manager_{nom} of Rabobank
seinen Sprintern [_{DP} einen Tipp [_{PP} t₁ für]] gegeben]]
his sprinters_{dat} a hint_{acc} for given
- d. dass der sportliche Leiter von Rabobank da₁ seinen
that the team manager_{nom} of Rabobank there his
Sprintern [_{DP} einen Tipp [_{PP} t₁ für]] gegeben hat
sprinters_{dat} a hint_{acc} for given has
- e. [_{CP} Da₁ seinen Sprintern [_{DP} einen Tipp [_{PP} t₁ für]]
there his sprinters_{dat} a hint_{acc} for
gegeben [_{C'} hat der sportliche Leiter von Rabobank]]
given has the team manager_{nom} of Rabobank
- f. [_{CP} [_{DP₁} Seinen Sprintern] [_{DP₂} einen Tipp [_{PP} da₃-für]] [_{C'}
his sprinters_{dat} a hint_{acc} there-for
hat der sportliche Leiter von Rabobank gegeben]]
has the team manager_{nom} of Rabobank given

This, then, constitutes the problem I would like to focus on in the present paper: How can the freezing effect in (6b), (7b), and (8b) follow from a general syntactic theory of freezing, given that there is evidence for a structure of complex prefields in German that looks as in (3) (which in turn implies that whereas a VP with an empty head has undergone topicalization, XP₂ itself would still seem to be in its in situ position)? To answer this question, I will proceed as follows. In section 2, I will first lay out a derivational approach to freezing effects that also covers anti-freezing effects as they arise with remnant movement, and that is compatible with standard assumptions about phases and intermediate movement steps in the minimalist program; the discussion will be based on Müller (2014). After that, I

will return to complex prefields in section 3, and develop an approach to these construction types that makes it possible to maintain that *both (2) and (3)* are correct structures, with the former derived from the latter by an operation Remove that acts as the mirror image of Merge in that it removes (rather than builds) syntactic structure (see Müller 2017). Finally, in section 4 I put the two strands of research together and show how the freezing effect with extraction in complex prefields in German can be accounted for.

2 Freezing

2.1 The phenomenon

As noted above, movement out of a moved item typically gives rise to a *freezing* effect in German. Thus, in (9a) (= (5)), VP topicalization is combined with wh-extraction from VP, which produces an ungrammatical output; in (9b), VP scrambling (which requires a certain intonational pattern and is somewhat marked to begin with) co-occurs with wh-movement from VP, again yielding ungrammaticality.

- (9) a. *Was₁ denkst du [_{VP₂} t₁ gelesen] hat keiner t₂ ?
 what think you read has no-one
 b. *Was₁ hat [_{VP₂} t₁ gelesen] keiner t₂ ?
 What has read no-one

In contrast, there is an *anti-freezing* effect with remnant movement, i.e., with configurations where the item that has undergone movement out of a moved XP eventually comes to occupy a lower position (giving rise to an unbound trace, according to traditional assumptions; see Thiersch (1985), den Besten & Webelhuth (1987)). In (10a), scrambling of DP from VP to (an outer) Specv (with the subject DP staying in situ, in the inner Specv position) is combined with VP topicalization; in (10b), scrambling to Specv co-occurs with long-distance VP topicalization; and in (10c), wh-movement of DP out of VP in the embedded clause is accompanied by long-distance VP topicalization, which produces a weak wh-island effect but not severe ungrammaticality as with freezing effects as in (9).

- (10) a. [_{VP₂} t₁ Gelesen] hat das Buch₁ keiner t₂
 read has the book no-one

- b. [_{VP} t₁ Zu lesen]₂ glaubt sie [_{CP} t'₂ hat [_{DP} das Buch]₁
 to read believes she has the book
 keiner t₂ versucht]
 no-one tried
- c. ??[_{VP} t₁ Zu lesen]₂ weiß ich nicht [_{CP} was₁ sie t₂
 to read know I not what she
 versucht hat]
 tried has

Finally, remnant movement becomes impossible again (thereby instantiating what one might call an *anti-anti-freezing* effect) if the two moved items that are in a dominance relation before movement takes place end up targetting the same type of position; this restriction has sometimes been referred to as the *Müller-Takano generalization* (see, e.g., Pesetsky 2012); it goes back to Müller (1993), Takano (1994). (11a,b) show this effect for a co-occurrence of DP scrambling from VP and VP scrambling.

- (11) a. *dass [_{VP} t₁ zu lesen]₂ keiner [_{DP} das Buch]₁ t₂ versucht hat
 that to read no-one the book_{acc} tried has
- b. *dass [_{VP} t₁ zu lesen]₂ [_{DP} das Buch]₁ keiner t₂ versucht that
 That to read the book_{acc} no-one tried has

Taken together, the generalizations emerging from the data in the previous subsection are the following. First, a trace in a moved item leads to illformedness when its antecedent is outside of the moved item and c-commands the trace; this is the *freezing* effect (an instance of slightly more general concepts in Ross 1967, Wexler & Culicover 1980). Second, a trace in a moved item does not have to lead to illformedness when its antecedent is outside of the moved item and does not c-command the trace; this is the *anti-freezing* effect with remnant movement. Third, remnant XP_s cannot undergo Y-movement if the antecedent of the unbound trace has also undergone Y-movement (where Y stands for movement-related features – [wh] for wh-movement, [top] for topicalization, [Σ] for scrambling, etc.); this is the *Müller-Takano generalization*. Let us now see how these generalizations can be derived.

2.2 A standard approach

From the perspective of rule interaction (see Pullum 1979), freezing configurations involve the transparent interaction of *bleeding*. This implies that by looking

at the output representation, it is clear why the representation has the properties that it exhibits (more specifically, why it is ungrammatical: XP_2 movement bleeds XP_1 movement). In contrast, anti-freezing configurations involve the opaque interaction of counter-bleeding (see Chomsky 1951, 1975; Kiparsky 1973). In this case, by just looking at the output representation, it is not clear why the representation has the properties that it exhibits (in particular, why it can be grammatical, given that well-established rules of grammar seem to be violated: XP_2 movement counter-bleeds XP_1 movement). As is well known, opaque interactions of grammatical operations generally favour derivational analyses over representational ones. In line with this, a main conclusion of Müller (1998) is that the freezing (bleeding) and anti-freezing (counter-bleeding) patterns at hand strongly argue for a derivational approach that relies on the two constraints in (12) and (13).

(12) *Condition on Extraction Domain* (CED; Huang 1982; Chomsky 1986):

- a. Movement must not cross a barrier.
- b. An XP is a barrier iff it is not a complement.

(13) *Strict Cycle Condition* (SCC; Chomsky 1973; Perlmutter & Soames 1979):

Within the current cyclic node α , a syntactic operation may not target a position that is included within another cyclic node β that is dominated by α .

Given the CED in (12) and the SCC in (13), the freezing effect is derived as follows. In a structure... [XP_2 ... XP_1 ...],..., movement of XP_2 must precede movement of XP_1 (which targets a higher position), given the SCC. However, this violates the CED because there is no movement to complement position, and XP_2 therefore has invariably become a barrier when XP_1 extraction from XP_2 takes place. In contrast, no CED violation is required in anti-freezing contexts. Here, given a pre-movement structure ... [XP_2 ... XP_1 ...],..., movement of XP_2 must follow movement of XP_1 (which targets a lower position), given the SCC. Extraction of XP_1 from XP_2 can therefore respect the CED, provided that XP_2 is not a barrier in its complement position. Finally, it has been observed that the Müller-Takano generalization can be made to follow from the Minimal Link Condition (MLC); see Kitahara (1994, 1997), Fox (1995), Koizumi (1995), Müller (1998): If movement of XP_2 and XP_1 is triggered by the same feature, XP_2 is closer to the attracting head than XP_1 (since XP_2 dominates XP_1), and must therefore move first: Early movement of the lower XP_1 would give rise to a violation of a version of the MLC that is sensitive to domination in the same way that it is sensitive to c-command (as an instance of a *relativized A-over-A* principle as it has been proposed in Chomsky 1973, Bresnan 1976, Fitzpatrick 2002). Therefore, a CED effect is unavoidable if

two identical movement-related features are involved (e.g., two $[\Sigma]$ features for scrambling, or two $[\text{wh}]$ features for wh-movement).

Clearly, this analysis crucially relies on the order of operations (regulated by the SCC) to determine whether a moved XP_2 blocks extraction of XP_1 from it; XP_1 movement is legitimate only if XP_2 is in a complement position *at the point where XP_1 extraction takes place*. In the final output representation, XP_2 is in a specifier position throughout, both in freezing and anti-freezing contexts. Consequently, whereas the transparent bleeding configuration with freezing effects is unproblematic for a representational approach (see Browning 1987), the opaque counter-bleeding configuration with anti-freezing effects poses a challenge for purely representational approaches to constraints on movement.

Against this background, one can ask whether there are possible ways out for purely representational approaches. It would seem that there are two main strategies that can be pursued. The first one consists in calling into question the correctness of the empirical generalizations I have adopted here (freezing, anti-freezing, Müller-Takano effects). The second one relies on enriching representations and modifying the CED appropriately. Interestingly, it seems that virtually all existing approaches adopt the former strategy. Thus, it has been claimed that there is in fact no general anti-freezing effect with remnant movement because there is no remnant movement to begin with (see De Kuthy & Meurers 2001; Fanselow 2002; Hale & Legendre 2004; and Thoms & Walkden 2013). Alternatively, it has been suggested that there is remnant movement, but the generalizations that hold of remnant movement are slightly different ones (see Grewendorf 2003, 2004; Abels 2008). On the other hand, it has been argued that there is in fact no syntactic freezing effect – on this view, all freezing effects can be traced back to processing difficulties, and they can typically be improved “with context and prosody” (see Culicover & Winkler 2010). I will not discuss these proposals here; see Müller (2014: 99-122) for detailed arguments against all these approaches. The second way out under a representational approach could mimic what Barss (1984, 1986) has suggested for the interaction of movement and reflexivization, as in (14).

- (14) a. $[_{DP_1} \text{Himself}]$, John₁ does not really like t_1
 b. $[_{DP_2} \text{Books about herself}_1]$, Mary₁ would never read t_2

The problem with (14a,b) is that as a consequence of movement, the reflexive pronoun is not c-commanded by its antecedent anymore, and should thus be expected to violate Principle A, contrary to fact. In a derivational approach where Principle A (or whatever ultimately replaces it; cf. Reuland 2011) is an Anywhere Principle (see Belletti & Rizzi 1988; and Sabel 2011 for

an interesting modification), (14a,b) are unproblematic: These derivations involve counter-bleeding (of Principle A satisfaction by movement): Movement would bleed Principle A satisfaction but comes too late to do this. In order to account for the counter-bleeding effect in a representational approach, Barss (1984) suggests the concept of *chain-binding* as relevant for Principle A (also see Barss's 1986 notion of *chain accessibility sequences*), such that a reflexive pronoun can satisfy Principle A if it is either c-commanded by its antecedent, or its antecedent c-commands a trace of a category that either is (as in (14a)), or contains (as in (14b)), the reflexive pronoun. Something similar can also be assumed for the CED in order to distinguish the anti-freezing effect with remnant movement from the freezing effect with other kinds of movement. The version of the CED in (15) bears an obvious similarity to Barss' version of Principle A that relies on chain-binding.

(15) *Condition on Extraction Domain* (CED; representational version):

- a. Two members of a movement chain $\langle \alpha, \beta \rangle$ must not be separated by a barrier.
- b. Two members of a movement chain $\langle \alpha, \beta \rangle$ are not separated by a barrier iff for all XPs Γ such that Γ dominates β but does not dominate α :
 - (i) Γ is in a complement position, or
 - (ii) Γ binds a trace in a complement position, and Γ c-commands α .

The first clause in (15b-ii) ensures that for the purposes of CED satisfaction, remnant movement is ignored in the same way that movement is ignored for the purposes of Principle A satisfaction; and the additional c-command requirement in (15b-ii) accounts for the fact that non-remnant movement cannot be ignored in this way. Although this kind of approach to freezing and anti-freezing would not seem to be a priori inferior to a Barss-type approach to data like those in (14), a version of the CED along these lines has, to the best of my knowledge, never been proposed in the literature. Notwithstanding the question of what this curious asymmetry (with respect to how reconstruction is treated for reflexivization vs. extraction) might be due to, I would like to contend that *both* types of representational approaches (i.e., formulating Principle A via a concept like chain-binding, and formulating the CED as in (15)) are indeed fundamentally flawed. The reason is that the *effects of constraint interaction* are integrated into the *definition of a single constraint*, and this makes this constraint extremely implausible (see Grimshaw 1998, Chomsky 2001, 2008 for this general argument): Principle A should be a constraint on reflexive pronouns and possible

antecedents for them, but in Barss' version, it also “knows” about the existence of movement and can selectively undo some of its effects that would otherwise be expected under a representational approach; similarly, the CED should be a locality constraint on extraction out of non-complements, but in (15), it also “knows” about *other* movement operations and can partially undo the effects that would otherwise be expected under a representational approach.

Summing up so far, it would seem that since anti-freezing effects with remnant movement involve opaque interactions of operations (movement of XP counter-bleeds extraction from XP), a derivational analysis along the lines just sketched is vastly superior to a representational approach. Unfortunately, closer inspection reveals that this simple analysis in terms of bleeding and counter-bleeding can in fact not be maintained if a version of a derivational approach to syntax is adopted that requires all operations to be highly local. The phase-based approach developed in Chomsky (2001, 2008) is of this type. Given the Phase Impenetrability Condition (PIC), all movement from vP and CP must take place via a specifier (of v and C, respectively). This implies that at least *some* of the relevant movement types in the above examples will have their landing sites beyond the minimal phase in which they originate. If more, or all XPs qualify as phases (as I will assume here, following the reasoning in Müller 2014), *most* movement types will have their ultimate landing sites in a higher phase. The problem now is the following. In the legitimate cases (anti-freezing with remnant movement), extraction of XP₁ from XP₂ will have to take place immediately to an intermediate phase edge position, before XP₂ undergoes an intermediate movement step itself, so as to respect the CED. The required derivation is shown in (16), with YP assumed to be a phase whose edge must eventually be targetted by both XP₁ and XP₂, because of the PIC (here and henceforth, superscripts *a* and *b* stand for different movement-related features).

(16) *Anti-freezing, required first intermediate steps:*

- a. [_{Y'} Y [_{XP₂^a} XP₁^b [_{X₂'} X₂ ...]]]
- b. [_{Y'} XP₁^b [_{Y'} Y [_{XP₂^a} t₁ [_{X₂'} X₂ ...]]]]
- c. [_{YP} [_{XP₂^a} t₁ [_{X₂'} X₂ ...]] [_{Y'} XP₁^b [_{Y'} Y t₂]]]

In contrast, in the illegitimate cases (standard freezing effects and anti-anti-freezing effects covered by the Müller-Takano generalization), it looks as though extraction of XP₁ from XP₂ will have to follow the first intermediate movement step of XP₂. The required derivations are illustrated in (17) and (18), respectively (again with YP as a phase whose edge must be targetted by intermediate movement steps).

(17) *Freezing, required first intermediate steps:*

- a. $[_{Y'} Y [_{XP_2^b} XP_1^a [_{X_2'} X_2 \dots]]]$
- b. $[_{Y'} [_{XP_2^b} XP_1^a [_{X_2'} X_2 \dots]] [_{Y'} Y t_2]]$
- c. $*[_{YP} XP_1^a [_{Y'} [_{XP_2^b} t_1 [_{X_2'} X_2 \dots]] [_{Y'} Y t_2]]$

(18) *Müller-Takano generalization, required first intermediate steps:*

- a. $[_{Y'} Y [_{XP_2^a} XP_1^a XP [_{X_2'} X_2 \dots]]]$
- b. $[_{Y'} [_{XP_2^a} XP_1^a [_{X_2'} X_2 \dots]] [_{Y'} Y t_2]]$
- c. $*[_{YP} XP_1^a [_{XP_2^a} t_1 [_{X_2'} X_2 \dots]] [_{Y'} Y t_2]]$

Importantly, the positions reached by XP_1 and XP_2 in (16), (17), and (18) can be (and, in fact, typically are) *intermediate* landing sites; and this creates the problem for the standard approach: If the CED is to be held responsible for the observed asymmetries, the decision whether XP_1 can be extracted before XP_2 undergoes movement (as in (16)) or not (as in (17), (18)) must be made at a point when the relevant information does not yet seem to be present. Thus, a *look-ahead* dilemma arises: The information whether XP_1 will eventually show up in a anti-freezing configuration or in a freezing (or anti-anti-freezing) configuration is typically not yet available after the first intermediate movement step to a phase edge domain.⁴ At this point, two general options present themselves. First, one might attempt to pursue a genuine *look-ahead* analysis on the basis of a phase-based approach. However, no obvious possibility to technically implement such a look-ahead analysis suggests itself. For this reason, I take it that there is every reason to pursue the second option: The task should be reconsidered as a *backtracking* problem, such that the decision about the legitimacy of operations in a derivation where XP_1 is at first included in XP_2 and both need to undergo movement is determined with non-intermediate, i.e., *critical* movement steps, by taking into account earlier information that is nevertheless rendered accessible in a strictly local way (i.e., there is no *actual* backtracking).

⁴ Note incidentally that this dilemma is already foreshadowed in Collins's (1994) discussion of *chain interleaving* effects: Collins shows that an intermediate movement step to a VP-adjoined position (as envisaged in Chomsky's 1986 theory of barriers) would undermine an account of freezing effects in terms of the CED. The solution he offers for this problem is to block such local intermediate movement steps by invoking a trans-derivational economy constraint (Fewest Steps). However, such a constraint cannot be adopted anymore for principled reasons in a minimalist approach; in addition, this way out for the standard CED approach would simply be incompatible with the concept of phases (more specifically, with the PIC). Also cf. Bošković (2016) for essentially the same problem.

2.3 A new approach

Abstractly, the pre-movement configurations discussed so far take the form in (19), with $\alpha = XP_2$ of the earlier derivations, and $\beta = XP_1$.

- (19) *α -over- β configurations:*
 ... [α ... β ...] ...

The main hypothesis now is that movement of β out of α , creating a remnant category α , is in fact per se not completely unproblematic from a theory-internal point of view, even if the CED is respected: I would like to suggest that if some item β moves out of a category α , α is *contaminated* in the sense that β provides a defective value for α 's movement-related feature (e.g., [wh], [top], [Σ]), which invariably brings about a crash of the derivation if it is not removed in time, before a criterial position is reached.⁵ Thus, the movement-related feature acts as a *buffer* that stores minimal aspects of an earlier part of the syntactic derivation. Note that this does not keep α from undergoing movement itself; a temporary contamination of a movement-related feature is unproblematic as long as a criterial position has not yet been reached. Clearly, the analysis requires a way to undo the contamination of a remnant category. Suppose that a moved item β can in principle *decontaminate* a category α again by removing the defective symbol; but this only happens when β reaches a criterial position, under c-command by α . The concepts of contamination and decontamination are defined in (20).

- (20) a. *Contamination:*

Movement of β from a position within α to a position outside of α values a movement-related feature γ on α with β 's index.

- b. *Decontamination:*

Movement of β to a criterial position deletes β 's index on all movement-related features of items that c-command it.⁶

⁵ The assumption that remnant movement as such is not innocuous is incompatible with the view defended in Stabler (1999), Koopman & Szabolcsi (2000). However, Kobele (2010) (in fact elaborating on an earlier conjecture in Stabler 1999) shows that remnant movement increases generative capacity, and I take this to be indicative of the problems with remnant movement presupposed in the main text.

⁶ Removal of a defective value under c-command can be viewed as an instance of Agree, with the feature bearing the defective value on α acting as a probe. Crucially, this only becomes possible when β has reached a criterial position; before that, β 's index does not qualify as a proper goal.

(20a,b) specify the nature of the feature value that turns an XP α from which extraction of β has taken place into an illegitimate item: It is β 's *index*, which uniquely identifies β .⁷ At this point, two issues need to be clarified. First, why is a value of a movement-related feature that is contaminated by an index of another category (as a consequence of (20a)) problematic? And second, how can freezing, anti-freezing, and anti-anti-freezing effects be accounted for on the basis of the concepts of contamination and decontamination? I will address these two questions in turn.

The first question is closely related to a more general issue: What are values of movement-related features? In Müller (2014), it is suggested that the value of a movement-related feature such as [wh] (on wh-phrases), [top] (on phrases that undergo topicalization) or [Σ] (on phrases that undergo scrambling) is not just [+] or [-], as is standardly assumed; rather, the value is an initially empty list of category symbols that are picked up by a moved item as a consequence of edge feature checking in intermediate phase edge positions. So, when, say, a wh-XP moves to the edge of VP (because of the PIC, assuming that every phrase is a phase), the symbol V is placed on the list that acts as the value of wh: [wh:V]; after the next step to a specifier of vP, v is added: [wh:vV], and so on. As soon as a category symbol is read in that matches an earlier one on the list, the older symbol is deleted from the bottom; so a wh-phrase that has undergone a movement step from SpecC to the matrix SpecV position in the course of long-distance movement will have the information [wh:VCTv] (with a potential earlier V symbol obligatorily deleted) associated with it. This way, values of movement-related features act as buffers that temporarily store information about the recent history of movement. As shown in Müller (2014), this makes it possible to formulate the Williams Cycle as a constraint against improper movement (see Williams 1974, 2003) in a strictly local way: On this view, the Williams Cycle demands that the value of a movement-related feature conforms to *f-seq* (the functional sequence of heads) *in a criterial position*. Thus, [wh:CTvV] respects the Williams Cycle, whereas [wh:vVCT] does not, and the latter consequence implies that an edge domain of a matrix vP can be used as an intermediate position in the course of long-distance movement (given

⁷ Other options are possible; but note that indices do not violate the Inclusiveness Condition or the No Tampering Condition (cf. Chomsky 2008, 2013) given that they are present before the syntactic derivation, and needed anyway for semantic interpretation (Heim & Kratzer 1998). Also note that the concept of index relevant here is essentially that of Chomsky (1981) and related work, which is motivated by movement dependencies of all kinds; somewhat narrower concepts like those pursued in Büring (2005) (for pronouns and binder prefixes only) and Baker (2003, ch. 3) (for nouns only) are not sufficiently general because they do not cover all kinds of β categories in α -over- β configurations.

that the f-seq-violating C and T symbols can eventually be removed by movement to TP and CP edges before a criterial position is reached), but not as a criterial (typically final) landing site for an item from an embedded clause.

From these assumptions, it follows that adding *any* other kind of symbol to the buffer associated with a moved item will invariably lead to a violation of the Williams Cycle if that symbol cannot be removed before the criterial position; as soon as some symbol that is not a category label shows up on a buffer, the list cannot be a proper f-seq anymore. More specifically, if extraction of β from α in (19) establishes β 's index on α , α will violate the Williams Cycle in a criterial position unless the incriminating index has been removed again by then, in accordance with (20b). To simplify exposition, this requirement can be formulated as the Index Filter in (21); but it should be kept in mind that the Index Filter is not a primitive of grammar but rather follows as a theorem from the Williams Cycle.

(21) *Index Filter:*

A movement-related feature (like [wh], [top], [Σ]) must not have an index as part of its value in a criterial position.

As for the second question, the *timing* of movement steps of α and β will be crucial. Criterial remnant movement of α is legitimate if β has been able to remove the fatal symbol from α 's feature list before the criterial movement step; this covers anti-freezing contexts. Otherwise, criterial remnant movement of α is illegitimate (freezing, anti-anti-freezing contexts). Ideally, independently motivated constraints on the timing of syntactic operations correctly predict *feeding* (of decontamination, hence Williams Cycle satisfaction, by movement) in the good cases, and *counter-feeding* (of decontamination by movement) in the bad ones. Consider the two constraints on multiple movement to a phase edge (in cases of an initial indeterminacy) in (22).

(22) *Timing of multiple movement:*

a. *C-command contexts:*

If α c-commands β in the pre-movement structure, then α moves first, and β moves after that, to a *lower* specifier.

b. *Domination contexts:*

If α does not c-command β in the pre-movement structure, the order is not fixed; the second item that moves ends up in a *higher* specifier.

The constraint in (22a) is argued for in Richards (2001) and Branigan (2013), among others (also see Fox & Pesetsky 2005; Stroik 2009; Unger 2010; Heck & Himmelreich 2017 for related concepts). (22a) demands that of two items that

stand in a c-command relation and need to move to the same domain, the higher one moves first, and the lower one moves second, by tucking in. In contrast, (22b) states for two items that are not in a c-command relation (i.e., that are either not subject to any relevant syntactic relation, or – more relevantly for the current discussion – that are in a domination relation before movement) that there are no restrictions as to the order of movement, and each movement operation conservatively extends the tree (i.e., tucking in is not permitted here). Consequently, (22b) permits movement of β to apply first in α -over- β environments (where α , β both initially undergo intermediate movement), which is a precondition for CED satisfaction of any derivation in which this configuration occurs.⁸

Is there any reason why the two constraints in (22a,b) should be the way they are? I believe that there is, because as a whole (22) brings about a *minimization of changes to existing structures*, as required under a (non-categorical) version of the No Tampering Condition (NTC, Chomsky 2007, 2008, 2013) that incorporates Pullum's (1992) assumptions about the origins of (strict) cyclicity. Thus, (22a,b) ensure that once established, c-command relations are preserved throughout the derivation as much as possible (i.e., as long as triggers for movement can be satisfied, etc.), even at the cost of counter-cyclic tucking in operations (cf. (22a)); but such violations are not permitted when maintaining c-command is not an issue (cf. (22b)).

With all the required assumptions in place, let me now turn to the relevant possible derivations on the basis of α -over- β configurations.

2.4 Derivations

It makes sense to approach the derivations by first looking at initial steps, then investigating the options for intermediate steps, and finally turn to criterial movement steps of α and β .

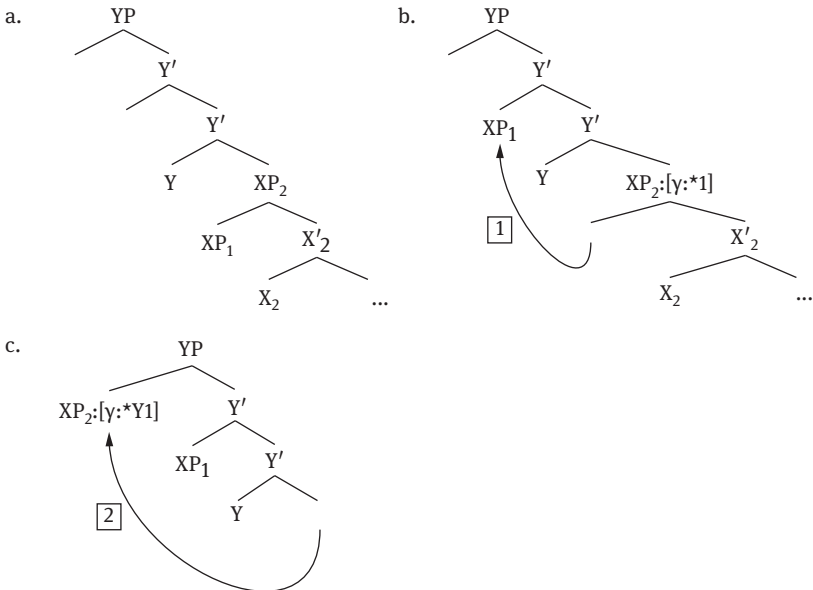
2.4.1 Initial steps

Recall that I assume all XPs to be phases, such that the PIC forces movement through every intervening XP edge domain (this assumption is not in any way crucial for the general mechanics of the approach, but it may make the issues at hand slightly more transparent). Also, whereas the CED

⁸ This presupposes that there can be no MLC, or at least no relativized A-over-A principle as part of it; see Müller (2011) for independent arguments, and for a proposal of how to derive most of the intervention effects that the MLC is supposed to cover.

in (12) and the SCC in (13) hold, the MLC does not (see the last footnote). The first relevant stage of the derivation then looks as in (23a), where XP_2 (= α) and XP_1 (= β) are in an α -over- β configuration, with both of them bearing movement-related features, and both of them required to move to the next higher phase edge (i.e., specifiers of YP), as a consequence of the PIC; XP_1 is in a specifier position of XP_2 either because it is base-generated there, or because it has undergone an intermediate movement step as required by the PIC. At this point, the constraints in (22) become potentially relevant. (22a) applies vacuously since XP_2 and XP_1 are not in a c-command relation; (22b) applies non-vacuously (since XP_2 dominates XP_1 in (23a)) but is compatible with either of the two moving next. In this situation, the CED ensures that XP_1 is moved out of XP_2 first (as long as XP_2 is still in its in situ position), and thereby contaminates XP_2 's movement-related feature (here represented as y) by adding its index to the otherwise empty list; see (23b). After that, XP_2 moves to an outer specifier of YP (because of (22b)); see (23c).

(23) *Initial steps in α -over- β configurations*



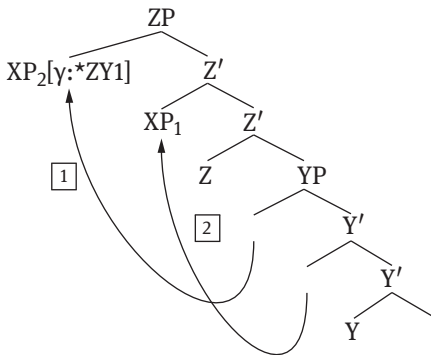
Note that both XP_2 (in (23c)) and XP_1 (in (23b)) obtain the category symbol of the new phase domain (i.e., Y) as a new additional value on the buffer associated with their movement-related features. (Here and in what

follows, this is not shown for XP_1 , to simplify exposition.) Also note that since this first part of the derivation does not discriminate between freezing and anti-freezing configurations yet, and can satisfy the CED across the board, it is clear that the CED cannot be held responsible anymore for the difference between freezing and anti-freezing: It is not violated in the former case either.

2.4.2 Intermediate steps

Multiple initial movement in (23) has created a c-command relation of XP_2 and XP_1 , so at this point, (22a) becomes relevant to determine the order of the next multiple movement steps. Suppose that both XP_1 and XP_2 still fail to reach their criterial landing site in the next domain ZP that they have to move to because of the PIC. Then, the derivation proceeds as in (24), with XP_2 (which c-commands XP_1) moving first to a specifier of Z , and XP_1 subsequently moving to a lower specifier of the same domain, so as to preserve the order on the previous cycle. In addition, the buffers associated with the movement-related features are enriched by Z symbols on top of the list, both with XP_2 and (although this is not shown here) XP_1 . XP_2 's buffer continues to be contaminated by XP_1 's index, due to the original extraction of XP_1 from XP_2 , but this is unproblematic at this stage since XP_2 has not yet reached a criterial position, and the Index Filter (i.e., the Williams Cycle) can therefore not be violated at this point.

(24) Intermediate steps in α -over- β configurations

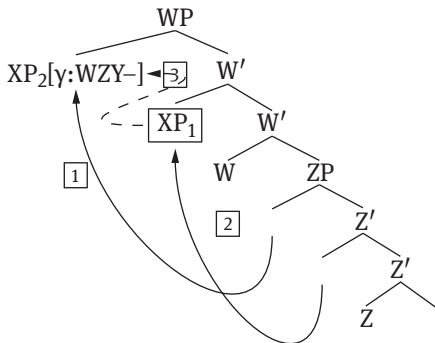


Building on either (23c) or (24), criterial movement steps of either XP_1 (β), XP_2 (α), or both XP_2 and XP_1 can now take place, giving rise to anti-freezing, freezing, and Müller-Takano (anti-anti-freezing) effects.

2.4.3 Anti-Freezing

Suppose that the derivation has reached the stage in (24), with both XP_1 and XP_2 in specifier positions of the same domain, and XP_2 occupying the higher one. Given (22a), XP_2 now needs to move first to the next domain (WP). Suppose that XP_2 does not reach a criterial position yet as a consequence of this movement; i.e., it undergoes another intermediate movement. Subsequently, movement of XP_1 takes place to an inner specifier. Suppose that this is a criterial movement step. According to (20b), this latter operation then removes XP_1 's index from XP_2 . Consequently, XP_2 is free to undergo criterial movement from now on; it can satisfy the Index Filter (hence, the Williams Cycle) once the incriminating index has been removed from its buffer. Thus, there is a feeding interaction of operations: Decontamination feeds criterial remnant movement. All this is shown in (25); and (26) (= (10a)) illustrates a typical case of remnant movement instantiating this derivation.⁹

(25) *Criterial steps in α -over- β configurations: XP_1*



(26) [_{VP} t₁ Gelesen] hat das Buch₁ keiner t₂
 Read has the book no-one

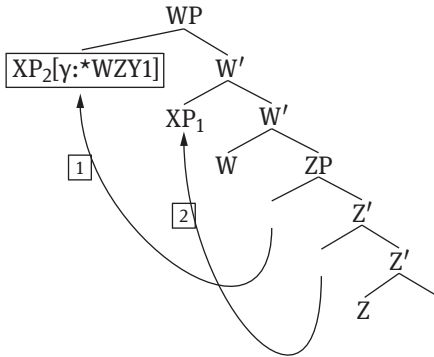
2.4.4 Freezing

In contrast, freezing configurations involve a counter-feeding interaction of operations: Criterial movement of XP_1 comes far too late to remove the fatal index from XP_2 . Let us assume again that the derivation has reached the stage in

⁹ In (25), [1] signals intermediate movement of XP_2 , [2] subsequent criterial movement of XP_1 ; and [3] index removal (while XP_1 is c-commanded by XP_2); a box around a category indicates that the category has reached a criterial position.

(24). As before, XP_2 has to move first, given (22a), and XP_1 moves later, to an inner specifier. However, suppose now that it is XP_2 that reaches a criterial position on this cycle, whereas XP_1 undergoes intermediate movement. As a consequence, the Index Filter (Williams Cycle) will have to be violated: XP_2 undergoes criterial movement when it still has a contaminated value on its buffer; decontamination can only take place once XP_1 has reached a criterial position, which it does not within WP (criterial movement of XP_1 to a higher domain comes much too late – the Index Filter is already fatally violated at this point). This account of the freezing effect is illustrated in (27); and a typical example that can now be derived as ungrammatical in this way is repeated in (28) (= (5)).

(27) *Criterial steps in α -over- β configurations: XP_2*



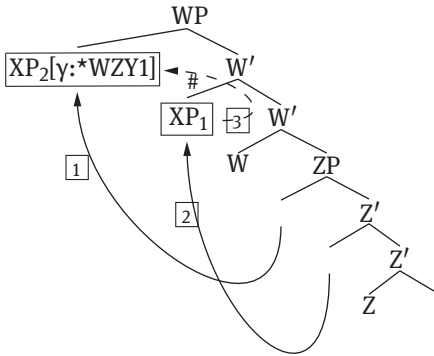
(28) *Was₁ denkst du [_{VP2} t₁ gelesen] hat keiner t₂?
 What think you read has no-one

2.4.5 Müller-Takano Generalization

The third possible continuation of a derivation involving criterial movement on the basis of (24) is that both XP_2 and XP_1 undergo criterial movement to a given specifier domain. This is the situation underlying Müller-Takano effects, and it also involves counter-feeding under present assumptions: This time, criterial movement of XP_1 comes *a bit* too late to be able to remove the fatal index from XP_2 : Given (22a), XP_2 undergoes criterial movement first and thereby violates the Index Filter in (21); cf. (29). Subsequent criterial movement of XP_1 (via tucking in) creates a configuration in which the defective index on XP_2 could be removed (signalled by 3), but at this point of the derivation, it is too late – the derivation has already been classified as ungrammatical as a consequence of the prior, illicit

movement step of XP_2 . A relevant example illustrating the Müller-Takano effect that can be accounted for along these lines is repeated in (30) (= (11b)).

(29) *Criterial steps in α -over- β configurations: XP_1 & XP_2*



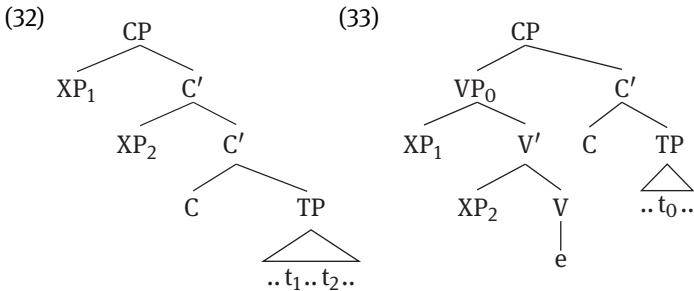
(30) **dass* [_{VP₂} *t*₁ *zu lesen*] [_{DP₁} *das Buch*] *keiner* *t*₂ *versucht hat*
 that to read the book_{acc} no-one tried has

2.4.6 Interim conclusion

This concludes the discussion of standard freezing, anti-freezing, and anti-anti-freezing effects. Needless to say, there are many further aspects of the analysis that would need to be considered (e.g., pertaining to situations where an *initial* movement step as in (23) is already a criterial one, or pertaining to configurations where *three or more* phrases are initially in a dominance relation and need to move to external positions); and there are many consequences that need to be explored (e.g., concerning the scope of Müller-Takano effects, or concerning the expectation that a temporarily deficient XP_2 with a contaminated buffer should behave differently from a minimally different XP_2 without a contaminated buffer, with respect to index-sensitive operations like binding and scope). For all this, see Müller (2014, ch. 3). For present purposes, the main conclusion to be drawn is that if the present account of freezing effects is on the right track, we expect that the freezing effect showing up in the complex prefield construction (as in (6b), (7b), and (8b), with (6b) repeated here as (31)) can be traced back to XP_2 reaching a criterial position with a contaminated buffer (due to prior XP_3 extraction).

(31) *_{[CP} *Da*₃ [_{DP₁} *dem Team*] [_{PP₂} *zu*] [_{C'} *gratulierte*
 there the team_{dat} to congratulated
 Bernard Hinault]]
 Bernard Hinault_{nom}

If complex prefields were derived as in (2) (repeated here as (32)), as argued by Lötscher (1985), Speyer (2008) and others, the freezing effect could be accounted for without further ado: If some item δ is to be extracted from XP_2 , this must happen early, when XP_2 is still in its in situ position (because of the CED), with XP_2 subsequently undergoing an intermediate movement step to a higher specifier. This would establish c-command of δ by XP_2 , and these two phrases would then undergo all further movement steps hand in hand, with XP_2 moving first and δ second, to a lower specifier position, in each domain. Thus, XP_2 would invariably end up in a criterial position *before* δ could itself reach such a position, and a violation of the Index Filter would be unavoidable. However, recall from section 1 that Fanselow (1992) and Müller, St. (2005) present strong evidence against (32), and in favour of an analysis of complex prefields in terms of single VP movement, as in (3) (repeated here as (33)). Here, XP_2 has not undergone movement at all, and assuming that δ can end up in a VP-internal position, it is completely unclear how a freezing effect can be derived – (31) should be well formed for exactly the same reasons as the minimally different example where a VP fronting analysis is uncontroversial (because of an overt V in the prefield), as in (6e) above, repeated here in (34).



- (34) [_{CP} Da₃ [_{DP1} dem Team] [_{PP2} t₃ zu] gratuliert [_{C'} hat
 there the team_{dat} to congratulated has
 Bernard Hinault]]
 Bernard Hinault_{nom}

Given this state of affairs, I will now suggest an analysis that resolves the problem of conflicting structure assignments (cf. (2) vs. (3)) in a principled way.

3 Structure Removal

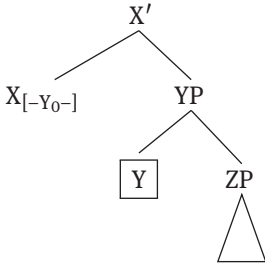
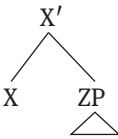
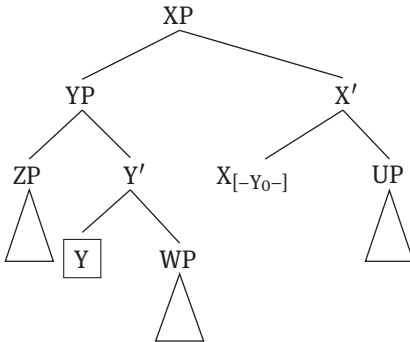
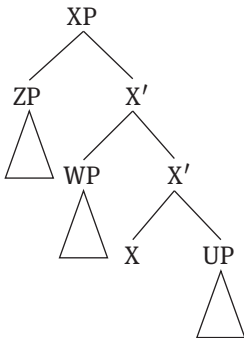
In Müller (2017), a general approach to syntactic phenomena is developed that strongly suggest conflicting structure assignments. The core assumption

is that next to the operation *Merge* that generates syntactic structure (Chomsky 2001), there is also an operation *Remove* in the grammar that removes syntactic structure. These two operations emerge as two sides of the same coin, and they are assumed to be subject to identical restrictions – they both have to respect strict cyclicity in the same way, they are both driven by designated features of some head, and so on. Most importantly in the present context, they can both either apply to phrases or heads. *Remove* applying to phrases eliminates whole subtrees from syntactic representations; this is assumed to underlie cases of argument demotion in passives, applicatives and other diatheses, and certain ellipsis constructions like sluicing. In contrast, *Remove* applying to heads only takes out the head of a projection; given bare phrase structure, this implies that the projection of this head is also removed, but all other XPs in the domain of the removed head’s projection remain accessible, and are reassociated with the original structure in a way that is maximally structure-preserving. Thus, in this latter case, what is removed is just the top-most shell of some complement or specifier, not the complement or specifier as such.¹⁰ *Remove* applying to heads is assumed to underlie constructions for which traditionally a concept of *reanalysis* has been proposed, e.g., restructuring infinitives (which, on this view, result from recursive applications of *Remove* to the heads of the complement clause, triggered by the matrix verb’s features).

(35) and (36) illustrate *Remove* operations applying to heads, for complements and specifiers, respectively; removal of the top-most shell implies that lower material becomes reassociated with the projection of the head that triggers the operation, in a way that preserves c-command and linear order if more than one XP is involved (as it is in (36), which gives rise to two specifiers after structure removal because the head Y affected by the operation takes both a complement and a specifier).¹¹

10 Concepts related to *Remove* applying to heads are *tree-pruning* (see Ross 1967) and *exfoliation* (see Pesetsky 2016).

11 Some remarks on notation. I assume that all *Merge* operations are triggered by designated features: [$\bullet Y_2 \bullet$] on some head X encodes the instruction that X is to be merged with a YP, and the feature is deleted once the operation has been carried out (see Heck & Müller 2007; [$\bullet Y_0 \bullet$] would do the same for a Y head). Similarly, [$-Y_0-$] on X encodes the instruction that X is to remove a head Y ([$-Y_2-$] would do the same for a YP); again, the feature is deleted after the operation has taken place. Furthermore, such features triggering operations are ordered on lexical heads (indicated by \succ), and only the top-most feature on a list can be executed and discharged at any given point.

(35) *Remove applying to heads: complements*a. Merge($X_{[\bullet Y_2 \bullet]} > [-Y_0 -]$, YP):b. Remove($X_{[-Y_0 -]}$, Y):(36) *Remove applying to heads: specifiers*a. Merge($X'_{[\bullet Y_2 \bullet]} > [-Y_0 -]$, YP):b. Remove($X'_{[-Y_0 -]}$, Y):

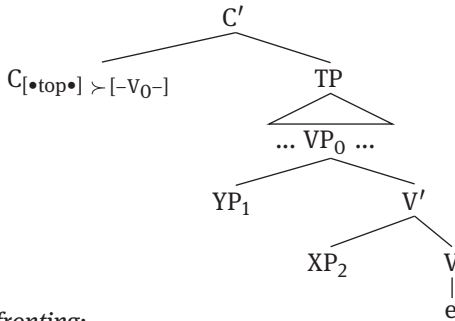
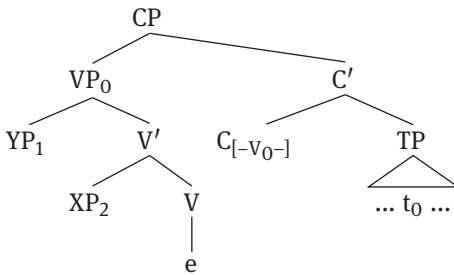
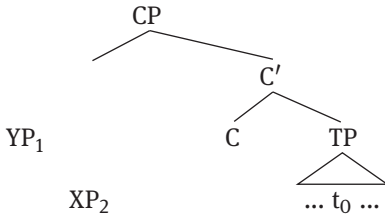
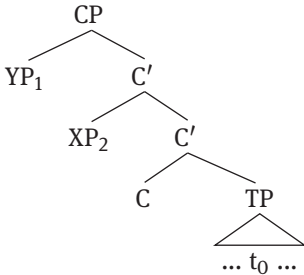
I would like to propose that Remove applying to heads is also responsible for solving the conundrum posed by the need to assign conflicting structure assignments to complex prefield constructions in German.¹² In a nutshell, (32) and (33) can *both* emerge as well-formed structures, but not simultaneously: In effect, (32) is derived from (33) by Remove. As a first step towards such an analysis, it can be noted that structure removal applying to specifiers (as in (36)) does not per se discriminate between base-generated specifiers and specifiers derived by movement; i.e., it is expected that movement (internal Merge) of some item to a specifier position can feed subsequent Remove of this item.¹³ For concreteness, suppose that in complex prefield constructions, remnant VP fronting (triggered by [\bullet top \bullet] on C, or by some other movement-triggering feature on C targeting the VP) feeds removal of the VP shell (triggered by [$-V_0-$] on C). The derivation in (37) shows how structure removal in complex prefields is brought about. The first step is that V has left the VP, thereby creating a remnant VP from which the verb is missing; see (37a).¹⁴ Next, in (37b) VP topicalization takes place. Finally, structure removal is effected, triggered by [$-V_0-$] on C. In (35) and (36) above, I have illustrated this by a single representation. This time, for the sake of clarity, the two steps that are required are indicated in two separate representations, viz., (37c) (where the VP shell is removed as a consequence of C's [$-V_0-$] feature, thereby creating two floating phrases that were part of VP's minimal domain) and (37d) (where the floating daughters YP_1 and XP_2 of the original VP are reassocated with the triggering head's projection in a structure-preserving way).¹⁵

12 Closer inspection reveals that there are actually quite a number of arguments, both for a multiple XP movement approach and for a single VP movement approach to complex prefields, in addition to the two arguments presented in the present paper (viz., clause-mate condition vs. freezing). Among others, arguments for multiple movement are based on evidence from Barss' generalization effects, licensing of bound variable pronouns, licensing of negative polarity items, and idioms; additional arguments for single VP fronting rely on evidence from order preservation and complex long-distance topicalization. Thus, the problem of conflicting structure assignments is indeed a fairly general one; see Müller (2018).

13 Also see Murphy (2014) on such an interaction of movement and structure removal, based on evidence from stacked passives in Turkish. Also, strictly speaking, VP_0 must have undergone intermediate movement steps to Spec v and Spec T before C is merged, given the PIC. I abstract away from these operations to simplify exposition.

14 In (37), I assume that e is the trace of a moved lexical V (and not some base-generated empty category). V may be in C or in a TP-internal right-peripheral position adjoined to some functional head; this must hold irrespective of whether V is finite or non-finite (e.g., a past participle).

15 The two representations in (37c) and (37d) also further highlight the nature of the reassociation operation presupposed by the present approach. It is clear that reassociation cannot be an instance of Merge: It only applies to phrases (not to heads), the external/internal distinction characteristic of Merge does not make sense here, and, perhaps most importantly, reassociation

(37) a. *Pre-movement structure:*b. *VP fronting:*c. *Structure removal:*d. *Reassociation:*

is *not feature-driven*; rather, it is a *last resort* operation triggered by the need to reintegrate material into the present tree that is floating around as a consequence of Remove. See Müller (2018) for more comprehensive discussion of the concept of reassociation; also cf. Pesetsky (2016) for a closely related approach.

One issue that has not yet been addressed concerns the conditions under which structure removal can and must apply. The correct generalization would seem to be that structure removal by C is only possible if the head of VP is empty; and in this context, the operation is also obligatory. Why is it that $[-V_0-]$ shows up on C if and only if V has left a VP that undergoes topicalization? A basic premise is that instantiation of $[-V_0-]$ on C is in principle optional. On this basis, let us consider the combinations that are logically possible. Suppose first that a C that triggers VP topicalization bears $[-V_0-]$, but V has not left the VP. (A C that does not trigger VP topicalization can never remove V because of the SCC.) In this case, recoverability will be violated: There is no way to recover the semantic information associated with V if V is removed. Suppose next that a VP without its overt head has undergone topicalization but $[-V_0-]$ is not instantiated on C. For this case, it can be postulated that there is a general constraint against unbound V traces; see Haider (1993, 2010) and Wurmbrand (2004). However, deviating from Haider and Wurmbrand, I will assume that this constraint does not per se block fronting of V-less VPs; rather, the constraint applies to the final output of a derivation. A derivation creating an unbound V trace after VP topicalization is thus possible as such, but this trace must subsequently be eliminated; and Remove applying to the V trace as a consequence of $[-V_0-]$ on C is the only way to achieve this. In sum, the strict correlation of $[-V_0-]$ on C on the one hand, and topicalization of a VP headed by a V trace on the other hand, is derived in toto.

Returning to the central issue of how evidence for single constituency can be reconciled with conflicting evidence for multiple constituency, the two representations in (32) and (33) are both valid, but at different stages of the derivation (see (37d) vs. (37b)). On this view, those processes that favour (33) take place early in the derivation. For example, the clause-mate condition on complex prefields follows from the fact that matrix C has only one structure-building feature for topicalization; so it is impossible that two (or more) separate constituents move to the specifier domain of this head. On the other hand, those processes that favour (32) take place at a later stage. Clearly, this will hold for the freezing effect.

4 Freezing in complex prefields

The first thing to note is that if the final output representation in (37d) is the one that is relevant for determining the legitimacy of extraction, the freezing effect in complex prefields would directly follow from a purely representational approach (as in Browning 1987): XP_2 in (37d) occupies a specifier position as a consequence of reassociation after VP removal, so it will act as a barrier and block extraction.

However, recall from section 2.2 that the representational approach to freezing is incompatible with the existence of anti-freezing effects with remnant movement; so this solution is not viable.

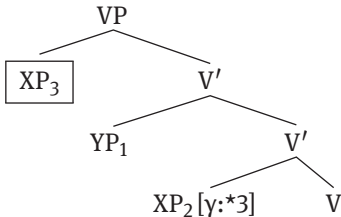
The question then is whether the derivational approach in terms of counterfeeding developed in section 2.3 can account for the freezing effect with complex prefields on the basis of derivations as in (37). For this to work, it has to be ensured that the prefield item from which extraction takes place has a contaminated buffer that then violates the Index Filter (more generally, the Williams Cycle). But does it, in the cases at hand? At no stage of the derivation is either of the multiple specifiers in (37d) actually targetted by a movement operation (only their original VP mother is); these items reach a displaced specifier position by reassociation, *without* undergoing movement. Therefore, if only those XPs have buffers that can be affected by contamination that have a special movement-related feature, such as [top] or [wh] (see (20a)), the items that eventually form multiple specifiers in complex prefields in German cannot be contaminated by extraction, and the freezing effect will remain unaccounted for after all. So, I would like to conclude that *all* XPs are equipped with a movement-related feature; in the absence of a specific instantiation like [top] or [wh], this will be some neutral, multi-purpose feature [y] whose value acts as a buffer. This implies that *in all cases of extraction from XP* (including successive-cyclic movement from vP, TP, CP, etc.), XP has a buffer, and the moved item will contaminate XP's buffer, independently of whether XP itself undergoes movement or not. If an XP from which extraction has taken place does not undergo movement itself, this index will never be removed (due to lack of c-command of the moved item by XP; see (20b)). However, this is unproblematic if nothing happens to XP in the remainder of the derivation, assuming that base positions do not count as criterial positions in the sense of the Index Filter/Williams Cycle. Accordingly, suppose that β qualifies as a criterial position for some item α if β is a derived (non-base) specifier of δ in which α shows up because of some inherent feature of δ (either directly, by virtue of a [\bullet F \bullet] feature triggering Merge, or indirectly, by virtue of a [$-F-$] feature triggering Remove plus reassociation).

Under these assumptions, there is one context where failure of decontamination of a buffer of an XP from which extraction has taken place may be fatal after all even though XP itself does not undergo movement, and that is the configuration where XP comes to occupy a non-base, derived position as a consequence of some operation other than movement: This is what happens with structure removal in complex prefields.

Let us look at the individual steps of the derivation giving rise to freezing effects with complex prefields. First, suppose that a VP is constructed which includes YP_1 and XP_2 , and that some XP_3 has been extracted out of XP_2 (with XP_2 in situ) to higher specifier of VP, via scrambling. XP_3 movement contaminates XP_2 's buffer

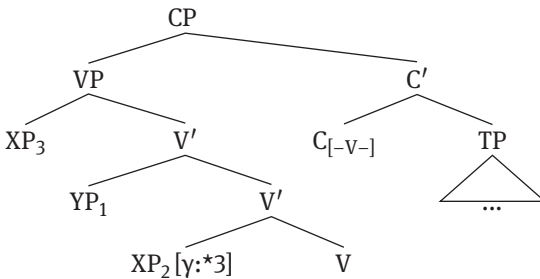
with its index (recall that y is a multi-purpose feature here that is borne by all XPs); see (38). Immediate decontamination cannot take place even though XP_3 has reached a criterial position, due to lack of c-command of XP_3 by XP_2 (see (20b)).

(38) *Scrambling to VP:*



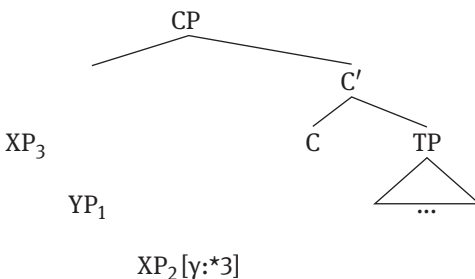
The derivation continues, and on the CP cycle, VP is topicalized; cf. (39).

(39) *VP-topicalization:*



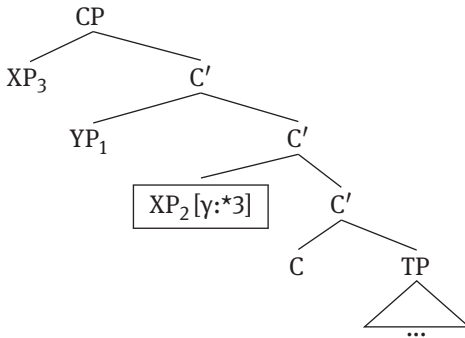
By assumption, C also has a feature [-V-] which brings about removal (see above). As soon as VP has undergone movement to SpecC, this feature becomes active (the feature triggering VP topicalization has been discharged) and triggers removal of the VP shell; see (40). As a consequence of VP shell removal, XP_3 , YP_1 and XP_2 (as specifiers and complement of the original VP) have temporarily lost direct attachment to the clause.

(40) *Structure removal:*



In the next step, reassociation of XP_3 , YP_1 and XP_2 takes place, in a maximally structure-preserving way (i.e., by maintaining the original c-command and precedence relations). Given that only one operation can apply at any given step in a strictly derivational approach to grammar, it is clear that reassociation also needs to apply stepwise, and in a bottom-up fashion, as demanded by strict cyclicity. So, in (41), XP_2 becomes a specifier of C first; this violates the Index Filter (Williams Cycle) because XP_2 now occupies a criterial (i.e., final non-base) position; after that, YP_1 might be reassociated, and then XP_3 ; but by this time, the damage has already, and irrevocably, been done, and the sentence is derived as ungrammatical.

(41) *Reassociation:*



This accounts for the freezing effect in (6b) (= (31)), (7b), and (8b). As with standard cases of freezing, there is an initial α -over- β configuration, and α (= XP_2) eventually reaches a criterial position with illegitimate information on its buffer that can be traced back to prior extraction of β (= XP_3). However, the interesting difference to standard cases of freezing is that with freezing in complex prefields in German, α comes to occupy a derived specifier position without actually being moved to that position.¹⁶

¹⁶ Note incidentally that just as the approach developed here can account for certain instances of freezing without movement, it can in principle also handle cases of movement that do not give rise to freezing. For instance, it has been claimed by Meinunger (1995), Bayer (2004), and Winkler, Radó & Gutschler (2014) that freezing effects in α -over- β configurations often improve or disappear in German if α is (contrastively) focussed; cf. (i) (where focussed material is in italics).

- (i) a. Dass den Minister Journalisten kritisiert haben, weiß ich schon, aber
 that the minister_{acc} journalists_{nom} criticized have, know I _{PRT}, but
 b. ?Was_i haben [_{DP₂} t₁ für Ärzte] denn den Minister kritisiert?
 what have for doctors _{PRT} the minister_{acc} criticized

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This could be accounted for by assuming that a movement-related feature [foc] on α resists the placement of an index of an extracted item β on α 's buffer. If so, α is not contaminated to begin with, and will be able to reach a criterial position before β eventually does without violating the Index Filter. To be sure, there is little explanatory depth to this proposal, but it is worth noting that the system is at least able to express the generalization (if it can indeed be substantiated as such). Also, I would like to contend that stating the generalization does not appear to be in any sense simpler in other (e.g., non-structural) approaches to freezing.

In addition, it is worth pointing out that this option to avoid freezing effects is still highly restricted. To see this, suppose that freezing could be avoided in complex prefields if the scrambled R-pronoun *da* takes part in an I-topicalization construction, with the falling accent on some TP-internal item and all intervening items qualifying as inert with respect to information-structural categories, as in (ii).

- (ii) #Aber _{DA₁} wiederum [_{PP} t₁ mit] wollte überHAUPT keiner zu tun haben
 But there again with wanted at all no-one to do have

Since γ on PP (which does not move) is, by assumption, a multiple-purpose feature, and since PP, by assumption, is information-structurally neutral, one cannot possibly assume that γ resists placement of the R-pronoun's index here. Consequently, if I-topicalization as in (ii) can circumvent freezing effects in complex prefields (as suggested by a reviewer), this is a problem for the present approach. That said, the status of (ii) would seem to be controversial (as indicated by #), with most speakers that I have consulted rejecting it.

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Part II: Empirical domains

Norbert Corver

The Freezing points of the (Dutch) adjectival system

Abstract: This article examines the freezing behavior of displaced constituents that find their origin in a base position within the Extended Adjectival Projection (XAP). On the basis of data from Dutch, it is shown that both constituents in a derived XAP-internal position and constituents in a derived XAP-external position display freezing behavior. An important ingredient of my analysis of the Dutch adjectival system concerns the distinction between “regular” (i.e. structurally non-composite) adjectives (e.g. *bang* ‘afraid’), on the one hand, and deverbal (i.e. structurally composite) adjectives (e.g. *afhankelijk*), on the other hand. The former class takes its (base-generated) PP-complement to the right (i.e. A + PP). The latter class has two options: The base-generated PP-complement occurs either to the left of an XAP-internal verbal root (i.e. PP + V) or to the right of a derived deverbal adjective ($[_A V+elijk] + PP$). It is further shown that adjectives such as *afhankelijk* can also behave like “regular” adjectives (like *bang* ‘afraid’). In that case, they are non-composite adjectives (i.e. $[_A afhankelijk]$) that take their complement to the right (i.e. A + PP). A consequence of this mixed behavior of adjectives such as *afhankelijk* is that there is more than one structural base position for PP-complements. Thus, the word order variation displayed by adjectives such as *afhankelijk* (i.e. A + PP and PP + A) does not result from PP-displacement. PP is in its base position, and, consequently, there is no freezing effect. Subextraction from both PP-positions is possible.¹

Keywords: adjectives, Extended Adjectival projection, freezing, Dutch, labeling

1 Introduction

Freezing refers to the phenomenon that a constituent becomes an island for extraction when that constituent has undergone syntactic movement (Ross 1967; Wexler and Culicover 1980; Corver 2006). In other words, the constituent is opaque (“frozen”) in its movement-derived position. When it occupies its base position, the constituent is typically transparent for subextraction if the base position is a non-

¹ I am grateful to two anonymous reviewers and the editors of this volume for their useful comments on an earlier draft of this article. All errors are my own.

adjunct position. The freezing phenomenon is exemplified by the Dutch example in (1)²:

- (1) Ik vraag me af ...
 I wonder REFL PRT ...
 ‘I wonder ...’
- a. of Jan <daaraan> gisteren <daaraan> gedacht heeft.
 whether Jan that.of yesterday thought has
 ‘whether Jan thought of that yesterday.’
- b. *waar*_i Jan <*t_i aan> gisteren <t_i aan> gedacht heeft.
 what Jan of yesterday thought has
 ‘what Jan thought of yesterday.’

(1a) shows that the PP *daaraan*, which consists of an R-pronominal variant of the demonstrative *dat* ‘that’ and the adposition *aan*, can occur in the complement position immediately to the left of the verb *gedacht* or in a scrambled position in the middle field of the clause; i.e. a position to the left of the adverbial element *gisteren*. It is generally assumed that the R-pronominal PP occupies the latter position as a result of PP-displacement, a movement phenomenon that is sometimes characterized as an instance of ‘scrambling’. As shown in (1b), subextraction of the interrogative R-pronominal form *waar* is possible if the PP occupies its base position. Subextraction from the derived position is blocked.

The phenomenon of freezing has mostly been studied on the basis of displacement phenomena that apply to satellite constituents, especially arguments, of the verb. The freezing behavior of satellites of other categorial heads – such as nouns, adjectives and prepositions – has been examined less systematically. Obviously, it is important to find out to what extent the phenomenon of freezing is a cross-categorial phenomenon. That is, does displacement of a satellite (YP) of head H, where H equals V, N, A, and P, consistently lead to a freezing effect?

The aim of this chapter is to systematically investigate the freezing behavior of satellite constituents that find their origin within the extended adjectival projection. For this, I will describe and analyze a number of Dutch adjectival construction types that seem to involve word order rearrangement. The question that will be addressed for each construction type is to what extent word order rearrangement yields a freezing effect. Or to put it differently, which *loci* within (but also outside of) the Dutch adjectival system constitute “freezing points”?

² ‘< α_1 > ... < α_2 >’ designates that α occupies either syntactic position α_1 or syntactic position α_2 . In the gloss I will only give the translation of the first occurrence of α in the sentence.

The chapter is organized as follows: In section 2, it is shown that certain adjectives allow their PP-complement to occur either in a post-adjectival position (A+PP) or in a pre-adjectival position (PP+A). In spite of this word order rearrangement, subextraction is possible from both PPs. This raises the question as to why freezing is absent even though the PPs seem to occupy different positions. Section 3 discusses adjectival patterns in which the PP-complement occurs in the left periphery of the eXtended Adjectival Projection (XAP) or occupies a position external to XAP and within the clausal middle field.³ It will be shown that the PP occupies a derived (i.e. non-base) position and that subextraction from PP is blocked. In other words, there is a freezing effect. Section 4 discusses the pattern PP-A-*er*, where *-er* is a bound comparative morpheme. It will be shown that, while subextraction is possible when the PP precedes a positive adjective, subextraction is blocked when the adjective has a comparative form. It will be proposed that the sequences PP-A_{positive} and PP-A-*er*, even though linearly similar, have different hierarchical organizations. The different hierarchical placement of the PP-complements in the two adjectival structures accounts for the asymmetric subextraction behavior. Section 5 discusses freezing effects of object-DPs of so-called transitive adjectives (i.e. adjectives that, at the surface, select a bare DP rather than a PP). Section 6 examines the freezing behavior of an indirect object-DP/-PP that is selected by the degree word *te* ‘too’. Section 7 gives a brief discussion of freezing effects from the perspective of labeling theory. Section 8 concludes the chapter.

2 Word order variation without a freezing effect

This section discusses the absence of a freezing effect in spite of the presence of a word order rearrangement within the adjectival domain. Specifically, with certain adjectives, an argumental PP (i.e. a PP selected by A) can either precede or follow the adjective. This is exemplified in (2), where ‘< > A < >’ indicates that the PP occurs either in a pre-adjectival position or in a post-adjectival one⁴:

- (2) a. ...dat Jan <daarvan> afhankelijk <daarvan> is.
 ...that Jan that.on dependent is
 ‘...that Jan is dependent on that.’

³ See Grimshaw (1991) for the notion of ‘Extended Projection’. See also Corver (1997b, 2013).

⁴ Other adjectives displaying this behavior are: *gesteld op* ‘keen on’, *geschikt voor* ‘suitable for’, *ingenomen met* ‘delighted with’, *verliefd op* ‘in love with’, *verwant aan* ‘related to’, *bekend met* ‘familiar with’, *bevreesd voor* ‘fearful of’, *bereid tot* ‘willing to’. See also Corver (1997b), Broekhuis (2013).

- b. ...dat Jan <daarvoor> gevoelig <daarvoor> is.
 ...that Jan that.to sensitive is
 ‘...that Jan is sensitive to that.’
- c. ...dat Jan <daaraan> gewend <daaraan> raakte.
 ...that Jan that.to accustomed got
 ‘...that Jan got accustomed to that.’

As exemplified in (3), which is based on (2a), subextraction is possible from both PP-positions:

- (3) Ik vraag me af [_{CP} waar_i Jan <t_i van> afhankelijk <t_i van> is].
 I wonder REFL PRT what Jan on dependent is
 ‘I wonder what Jan is dependent on.’

The question arises as to why freezing is absent even though the PPs seem to occupy different positions within the adjectival domain.

It should be noted that the phenomenon in (2) is not attested with all adjectives. Many adjectives have a strong preference for a post-adjectival argumental PP, as in (4):

- (4) a. ...dat Jan <??daarvan> bang <daarvan> is.
 ...that Jan that.of afraid is
 ‘...that Jan is afraid of that.’
- b. ...dat Jan <??daarop> trots <daarop> is.
 ...that Jan that.of proud is
 ‘...that Jan is proud of that.’

As expected, these adjectives permit subextraction only from the post-adjectival PP:

- (5) Ik vraag me af [waar_i Jan <*t_i van> bang <t_i van> is].
 I wonder REFL PRT what Jan of afraid is
 ‘I wonder what Jan is afraid of.’

The question arises how to characterize this dichotomy in the class of adjectives. In line with Corver (1997b) and Broekhuis (2013), I propose that adjectives like *afhankelijk*, *gevoelig*, and *gewend* in (2) are deverbal. Their deverbal status comes from two observations: Firstly, some of those adjectives display participial morphology and as such are formally similar to verbal forms (e.g. *gewend*, *gevoelig*). Secondly, some of those adjectives are derivationally related to a verb. For

example, *afhankelijk (van)* ‘dependent (on)’ clearly relates to the verb *afhangen (van)* ‘to depend (on)’, and *gevoelig voor* ‘sensitive to’ relates to the verb *voelen* ‘to feel/to sense’.

In section 2.1, I discuss the transparency of PP as exemplified in (3). Section 2.2 discusses two approaches to the subextraction patterns in (3) that take the pre- and post-adjectival PP in (3) to occupy a single structural base position. In section 2.3, I propose an analysis according to which both PPs in (3) occupy a base position but the pre-adjectival position is structurally distinct from the post-adjectival one. In other words, more than one structural base position can be identified for adjectives like *afhankelijk*.

2.1 Transparent PPs

Consider again the word order variation in (2): adjective + PP *versus* PP + adjective. If this word order variation resulted from PP-displacement, we would (incorrectly) predict a freezing effect for one of the PP-positions. As an alternative approach, one might propose that this word order variation results from movement of an adjective (or adjectival phrase), so that the PP remains *in situ*. Under this PP-*in-situ* analysis, subextraction from PP is predicted to be possible. No freezing effect obtains, since, in both word order patterns, the PP is in its base position (i.e. a non-derived position). The question, obviously, arises whether there is any independent support for this PP-*in-situ* approach.

A first argument in support of the PP-*in-situ* approach comes from the distribution of PPs containing a weak (i.e. unaccented) pronoun (see also Broekhuis 2013:67). As shown in (6), this “weak PP” can occur both to the left and to the right of the adjective:

- (6) a. ...dat Jan nooit <ervan> afhankelijk <ervan> was.
 ...that Jan never it.on dependent was
 ‘...that Jan has never been dependent on it.’
- b. ...dat Jan nooit <van ’m> afhankelijk <van ’m> was.
 ...that Jan never of him_{weak} dependent was
 ‘...that Jan has never been dependent on him.’

It is unlikely that one of the word orders in (6) results from displacement of the PP, this for the reason that weak PPs typically do not undergo displacement. This immobility of weak PPs is illustrated in (7a) and (7b). In (7a), the PP has been “scrambled” to a position in the clausal middle field; more specifically, to a

position preceding the clause-internal modifier *nooit*. In (7b), the weak PP has been topicalized to Spec,CP.⁵

- (7) a. *...dat Jan *ervan/van 'm* nooit *afhankelijk* was. (compare with (6a,b))
 b. **Ervan/van 'm* was Jan nooit *afhankelijk*.

A second observation regarding the distribution of weak pronominal PPs is that they can occupy a position in between the degree modifier *erg* ‘very’ and the adjective: *erg PP_{weak} A*. This is exemplified in (8), where the string *erg afhankelijk ervan/erg ervan afhankelijk* has been moved to Spec,CP; that is, to the initial position of the clause that is followed by the finite verb, which is moved to C in Dutch main clauses (the well-known Verb Second phenomenon). The fact that this string can occupy the position preceding the finite verb shows that it forms a constituent, viz., an adjectival phrase.

- (8) [*Erg* <*ervan*₂> *afhankelijk* <*ervan*₁>]_j is Jan nooit t_j geweest.
 very it.of dependent has Jan never been
 ‘Jan has never been very dependent on it.’

The placement of the weak PP in between the modifier *erg* and the adjective suggests that this weak PP occupies a structurally low position. I propose it is a base position.

As shown in (9), both PP-positions are transparent for extraction:

- (9) ...dat Jan *er*_i nooit [*erg* <t_i van> *afhankelijk* <t_i van>] is geweest.
 ...that Jan it never very on dependent has been
 ‘that Jan has never been very dependent on it.’

If we assume that the placement of weak PPs and the possibility of subextraction from PP are diagnostic signs for base (i.e. non-derived) positions, we can take the PP in the sequences *erg+A+PP* and *erg+PP+A* to occupy a base position. The following question needs to be addressed then: Exactly what syntactic position corresponds to this base position? In what follows, I will briefly discuss two approaches to answering this question, each of which has two variants. According to the first approach, the base position corresponds to a single syntactic

⁵ I use the term Scrambling in a descriptive way. As shown in Broekhuis (2008), different types of displacement to the so-called clausal middle field fall under this cover term. See also Broekhuis & Corver (2016) for discussion of the different types of movement operations that fall under the notion of scrambling.

position; according to the second approach, there are two possible base positions for the PP-complement. I will first discuss the ‘single base position’ approach.

2.2 The ‘single base position’ approach

Traditionally, it is assumed that adjectives such as *trots* ‘proud’ and *bang* ‘afraid’ take their complement to the right: A+PP; (see (4)). The relation between P and its associated DP is considered to be thematic; that is, P assigns, or plays a role in the assignment of, a thematic role to its object-DP. If A+PP is also the base order for adjectives such as *afhankelijk* ‘dependent’ and *gevoelig* ‘sensitive’ in (2), then the word order PP+A, with PP *in situ*, can be derived by moving A to the right, across the PP complement, to a (right branch) functional head; see Corver (1997b), in which F equals (adjectival) Agr. This displacement operation is depicted in (10).

- (10) a. $[_{FP} [_{AP} A PP] F] \rightarrow [_{FP} [_{AP} t_i PP] F+A_i]$
 b. $[_{FP} [_{AP} afhankelijk ervan] F] \rightarrow [_{FP} [_{AP} t_i ervan] F+afhankelijk_i]$

As an alternative to (10), one might consider an approach in which the adjectival constituent does not move rightward but rather leftward, leaving the PP *in situ*. In recent years, especially under the influence of Kayne’s (1994) theory of antisymmetry of syntax, the existence of rightward syntactic displacements, as in (10), has sometimes been doubted. A possible implementation of this leftward movement approach would be one which, in the spirit of Kayne (2000, 2004), does not take the PP to be base generated as a complement of (i.e. E-merged with) A, but rather to be introduced later in the derivation. Specifically, the preposition is merged externally to AP and acts as a probe attracting the DP-complement (i.e. internal argument) of A. In other words, P’s role is not theta-role-related. It is the adjective that is solely responsible for theta-role assignment to the internal argument. The internal DP-argument raises to the specifier position of the prepositional probe (arguably, for reasons of case assignment). This movement operation is (sometimes) followed by movement of P to some higher functional head W (mnemonic for word order) within the extended adjectival projection. Spec, WP functions as a potential landing site for a “small” adjectival projection (AP) that has been moved within the (bigger) XAP.⁶

⁶ Another approach towards the word order variation A-PP and PP-A would be along the lines of Barbiers’ (1995) analysis of PP-extraposition phenomena in the Dutch clausal domain. According to Barbiers, the word order PP-V, as in *Jan heeft in die stad gewerkt* (Jan has in that

To make things more concrete, the derivational steps of this leftward movement approach are depicted in (11) for the adjectival expressions *ervan afhankelijk* (it.on dependent; ‘dependent on it’) and *afhankelijk ervan* (dependent it.on; ‘dependent on it’).

- (11) a. $[_{AP} \text{afhankelijk het}]$ base structure
 b. $\text{van } [_{AP} \text{afhankelijk het}]$ E-merge of P
 c. $[_{PP} \text{het}_i \text{ van } [_{AP} \text{afhankelijk } t_i]]$ I-merge of Object
 d. $[_{PP} \text{er}_i \text{ van } [_{AP} \text{afhankelijk } t_i]]$ conversion: $\text{het}+\text{van} \rightarrow \text{er}+\text{van}$
 (linear order: *ervan afhankelijk*)
 e. $\text{W } [_{PP} \text{er}_i \text{ van } [_{AP} \text{afhankelijk } t_i]]$ E-merge of W
 f. $[_{WP} [\text{afhankelijk } t_i]_k [_{W'} \text{W } [_{PP} \text{er}_i \text{ van } [t_k]]]]$ I-merge of AP
 (linear order: *afhankelijk ervan*)

This derivation consists of the following steps: First, A combines with its internal argument *het* (11a).⁷ Second, P combines with AP (11b). Third, the argument *het* is moved into the specifier position of P (11c). Fourth, the pronoun *het* ‘it’ gets an R-pronominal form (*er*) when it occupies the specifier of P (see Van Riemsdijk 1978). Fifth, the functional head W combines with PP (11e). Sixth, in order to derive the order *afhankelijk ervan*, a final movement step needs to take place, viz., movement of AP to the specifier of W (11f).

city worked), can be derived from *Jan heeft gewerkt in die stad* by moving VP into the specifier position of PP. This is exemplified in (i):

- (i) a. $[_{VP} [_{PP} \text{in die stad}] [_{VP} \text{gewerkt}]]$ (base order: PP-V)
 b. $[_{VP} [_{PP} \text{gewerkt}_i [_{PP} \text{in die stad}]] [_{VP} t_i]]$ (derived order: V-PP)

If one extends this approach to adjectival expressions, the base order *van 'm afhankelijk* can be changed into *afhankelijk van 'm* by moving the PP into the specifier position of AP:

- (ii) a. $[_{AP} [_{PP} \text{van 'm}] [_{AP} \text{afhankelijk}]]$ (base order: PP-A)
 b. $[_{AP} [_{PP} \text{afhankelijk}_i [_{PP} \text{van 'm}]] [_{AP} t_i]]$ (derived order: A-PP)

For more discussion, see Barbiers (1995).

7 In this article I will abstract away from the syntactic placement of the external argument of the extended adjectival projection.

Notice that the PP remains *in situ* in (11). There is no point in the derivation at which the PP is displaced. The crucial derivational step that yields the word order alternation PP-A *versus* A-PP is the final step: movement of AP to Spec,WP. The fact that *er* is accessible to movement both in (11d) and in (11f) follows from the fact that in both patterns the PP occupies its base position. Subextraction of *er* out of this base-generated PP-position is permitted; see (9).

So far, we have seen that both the analysis in (10) and the one in (11) account for the absence of freezing in the patterns A+PP and PP+A. But the question, obviously, arises as to what triggers the displacement operation. In the case of (10), what triggers rightward head movement of *afhankelijk* to F, and, in the case of (11), what motivates AP-movement to Spec,WP? Reversely, the question can be raised as to why adjectives such as *bang* ‘afraid’ and *trots* ‘proud’ cannot undergo such a displacement operation; that is, why are they restricted to the word order A+PP?

2.3 The ‘multiple base position’ approach

As was hinted at above, adjectives such as *afhankelijk* ‘dependent’ and *gevoelig* ‘sensitive’ differ from adjectives such as *bang* and *trots* in being deverbal. Somehow, this distinction between deverbal versus non-deverbal (say, “normal/regular”) should be reflected in the syntactic analysis. Specifically, the analysis in (10) needs a “verbal” trigger on F that attracts *afhankelijk* but not *bang*. The analysis in (11), however, needs a “nonverbal” trigger on W that would obligatorily attract the AP *bang* (as in *bang ervan*) but optionally attract the AP *afhankelijk* (see (11f)). Since the exact nature of the feature triggering A(P)-displacement is not entirely clear for the two analyses, it seems fair to consider alternative approaches that still start from the assumption that subextraction from PP is possible only if PP occupies a base position. If neither PP-movement nor A(P)-movement is at the basis of the word order variants A+PP and PP+A, then the conclusion seems inescapable that adjectives such as *afhankelijk* can have two base positions for PP. One way of implementing this idea would be to say that adjectives like *afhankelijk* allow for flexible base-generation of the PP, i.e. both in pre- and in post-adjectival position. Thus, both $[_{AP} \textit{afhankelijk} \textit{PP}]$ and $[_{AP} \textit{PP} \textit{afhankelijk}]$ would be base-generated word orders. This flexibility of word order might be accounted for in terms of directionality of theta-assignment (see Koopman 1984, Travis 1984); that is, *afhankelijk* is lexically specified as being able to assign its (internal) thematic role both to the right and to the left. An adjective like *bang*, on the contrary, can assign its (internal) theta role only to the right. The possibility of leftward theta role assignment might be a verbal trait of

deverbal adjectives like *afhankelijk*. If one takes SOV to be the basic word order in Dutch (see Koster 1975), then leftward theta-assignment is a verbal characteristic.

Instead of (lexically) encoding the two base word orders (*afhankelijk*+PP, PP +*afhankelijk*) in terms of bi-directionality of theta-assignment, one might also propose that PP occupies a base position but that the structural environment in which PP is embedded differs for the two (base) word orders. Specifically, one might propose that “regular” adjectives such as *bang* ‘afraid’ and *trots* ‘proud’ always take their PP-complement to the right. Thus, A+PP. This would be the order we find in *bang daarvan* (4a) and *afhankelijk daarvan* (2a).⁸ Suppose now that the PP+A word order, as in *daarvan afhankelijk* (see (2a)), is the “verbal” word order. Notice at this point that under an SOV-analysis of Dutch basic word order, the PP-complement typically precedes the verb⁹:

- (12) a. ...dat Jan ervan afhangt.
 ...that Jan it.on depends
 ‘...that Jan depends on it.’
 b. ...dat Jan ervan afhankelijk is.
 ...that Jan it.on dependent is
 ‘...that Jan is dependent on it.’

As a next step in the argumentation, one might represent the parallelism depicted in (12) at the categorial level: *ervan afhankelijk* displays verb-like word order because the adjectival expression actually contains a verbal projection, as is depicted in (13)¹⁰:

- (13) [AP [VP [PP ervan] ahang] -elijk] → [AP [VP [PP ervan] ahang] ahang-elijk]

8 It will be argued later that the surface pattern *afhankelijk daarvan* actually has two structural analyses, one corresponding to that of regular adjectives and one corresponding to deverbal adjectives, where ‘deverbal’ implies the presence of a verbal projection in XAP.

9 In Dutch, PPs can also occur in postverbal (i.e. extraposed) position. A weak PP like *ervan*, however, typically cannot occupy a postverbal position: *...dat Jan afhangt ervan (that Jan depends it.on, ‘...that Jan depends on it’).

10 I would like to thank the reviewers for helpful suggestions regarding the analysis of deverbal adjectives. Note that the analysis in (13) is somewhat reminiscent of the one which has been proposed for gerunds like *John’s eating the apple*. Gerunds have been argued to contain a noun phrase (DP-) internal VP-layer (see e.g. Abney 1987). Schematically: [_{DP} John’s [_{VP} eating the apple]]. Externally, the gerund behaves like a nominal expression; internally, its lower layer displays verbal behavior (e.g. selection of a DP-argument to its right).

In (13), we have an adjectival expression in which the adjectival suffix *-elijk* takes a verbal projection (VP) as its complement. Just as with other verbal projections, the PP-complement precedes the verbal root.

In what follows I will adopt this last approach to the word orders *afhankelijk ervan* and *ervan afhankelijk*. According to this approach, each word order corresponds to a different configurational structure: *afhankelijk ervan* is a regular AP (see below, though). This means that it has the same structural analysis as, for example, *bang ervan* ‘afraid of it’. The pattern *ervan afhankelijk* is special in the sense of being an adjectival expression containing a verbal part. Importantly, in both patterns, the PP occupies its base position and therefore subextraction from PP is permitted with both word orders.

The question obviously arises as to whether there is any independent support for the presence of a VP-projection in expressions like *ervan afhankelijk*. The behavior of degree words seems to provide evidence in support of a VP-layer in adjectival expressions having a deverbal adjective as their head. It turns out that degree words that modify a deverbal adjective display the same grammatical behavior as degree words that act as modifiers of clause-internal VPs. Furthermore, their behavior differs from those degree words that modify regular adjectives such as *bang* ‘afraid’ and *trots* ‘proud’. Let us first consider some asymmetries between degree modifiers of deverbal adjectives and degree modifiers of regular adjectives and then turn to the parallelism between degree modifiers of deverbal adjectives and degree modifiers of verbs.

First of all, even though both *bang* and *afhankelijk*, being gradable, can be modified by the degree modifier *erg* ‘very’ (see (14)), they display a striking contrast: *erg* can have a synthetic comparative form when it modifies the deverbal adjective *afhankelijk* but not when it modifies the regular adjective *bang*. This contrast is exemplified in (15). Note in passing that the sequence ‘degree modifier + A + PP (+ *dan*-phrase)’ occurs at the beginning of the clause and precedes the finite verb of the main clause. This shows that the sequence forms a constituent (in Spec,CP).

- (14) a. Erg bang ervan was Jan niet.
 very afraid it.of was Jan not
 ‘Jan wasn’t very afraid of it.’
 b. Erg ervan afhankelijk was Jan niet.
 very it.on dependent was Jan not
 ‘Jan wasn’t very dependent on it.’
- (15) a. *Nog erger bang ervan dan Piet was Jan.
 still very-COMPAR afraid it.of than Piet was Jan
 ‘Jan was even more afraid of it than Piet was.’

- b. Nog erger ertan afhankelijk dan Piet was Jan.
 still very-COMPAR it.of dependent than Piet was Jan
 ‘Jan was even more dependent on it than Piet was.’

Secondly, the free comparative morpheme *meer* ‘more’ easily combines with the deverbial adjective *afhankelijk* but less easily with the regular adjective *bang*. This is exemplified in (16). As will be discussed more elaborately later, regular adjectives such as *bang* typically combine with the bound morpheme *-er* in comparative formation, as in *bang-er* (afraid-COMPAR, ‘more afraid’).¹¹

- (16) a. ??Meer bang daarvan dan Piet was Jan.
 more afraid that.of than Piet was Jan
 ‘Jan was more afraid of that than Piet was.’
 b. Meer daarvan afhankelijk dan Piet was Jan.
 more that.on dependent than Piet was Jan
 ‘Jan was more dependent on that than Piet was.’

Thirdly, the *dan*-phrase that cooccurs with the free comparative morpheme *minder* ‘less’ can immediately follow the comparative morpheme when it modifies a deverbial adjective. This is illustrated in (17b). As shown by (17a), however, the *dan*-phrase cannot immediately follow *minder* when the latter acts as a modifier of a regular adjective like *bang*. In (18) the same contrast is shown for the equative pattern *net zo ... als XP* ‘as ... as XP’.

- (17) a. [Veel minder <*dan Piet> bang daarvan <dan Piet>] was Jan.
 much less than Piet afraid that.of was Jan
 ‘Jan was much less afraid of that than Piet was.’
 b. [Veel minder <dan Piet> daarvan afhankelijk <dan Piet>] was Jan.
 much less than Piet that.on dependent was Jan
 ‘Jan was much less dependent of that than Piet was.’
 (18) a. [Net zo erg <*als Piet> bang daarvan <als Piet>] was Jan.
 just so very as Piet afraid that.of was Jan
 ‘Jan was just as afraid of that as Piet was.’
 b. [Net zo erg <als Piet> daarvan afhankelijk <als Piet>] was Jan.
 just so very as Piet that.on dependent was Jan
 ‘Jan was just as dependent on that as Piet was.’

¹¹ In section 4, it will be shown that (synthetic) comparative formation by means of *-er* is also possible with *afhankelijk*.

Fourthly, even though both *bang* and *afhankelijk* can be preceded by the sequence *hoe erg* ‘how much’ – as exemplified in (19), where pied piping of the entire adjectival expression has taken place – subextraction of this sequence is possible only from an adjectival expression “headed” by a deverbal adjective like *afhankelijk*. This is exemplified in (20b). As shown by (20a), subextraction of *hoe erg* yields an ill-formed result when it takes place from an adjectival expression headed by a regular adjective like *bang*:

- (19) a. Hoe erg bang ervan is Jan?
 how very afraid it.of is Jan
 ‘How afraid of it is Jan?’
 b. Hoe erg ervan afhankelijk is Jan?
 how very it.on dependent is Jan
 ‘How dependent on it is Jan?’
- (20) a. *Hoe erg is Jan [~~hoe erg~~ bang ervan]?
 how very is Jan afraid it.of
 ‘How afraid of it is Jan?’
 b. Hoe erg is Jan [~~hoe erg~~ ervan afhankelijk]?
 how very is Jan it.on dependent
 ‘How dependent on it is Jan?’

Fifthly, as also noted in Broekhuis (2013:156–57), the modifier *voldoende* ‘sufficiently’ combines most naturally with deverbal adjectives, as shown in (21b). When it combines with a regular adjective, the result is quite marked, as is shown in (21a):

- (21) a. ?*Jan is [voldoende goed/slim om die baan te kunnen
 Jan is sufficiently good/smart for that job to be.able
 krijgen].
 get
 ‘Jan is good/smart enough for getting that job.’
 b. Jan is [voldoende onderlegd/ontwikkeld om die baan te
 Jan is sufficiently educated/developed for that job to
 kunnen krijgen]
 be.able get
 ‘Jan is sufficiently educated/developed for getting that job.’

Sixthly, and related to the previous point, the modifier *genoeg* ‘enough’ can at least marginally occur in a position preceding the deverbal adjective (see (22b)).

As shown by (22a), placement of *genoeg* in front of a regular adjective yields a strongly ill-formed sentence.

- (22) a. Jan is [**genoeg* slim <genoeg> om die baan te kunnen
 Jan is enough smart for that job to be.able
 krijgen].
 get
 ‘Jan is smart enough to get that job.’
- b. Jan is [*<?genoeg>* ontwikkeld <genoeg> om die baan te
 Jan is sufficiently educated for that job to
 kunnen krijgen]
 be.able get
 ‘Jan is sufficiently educated to get that job.’

On the basis of the contrasts exemplified in (15)–(22), the conclusion can be drawn that regular and deverbal adjectives display different grammatical behavior as regards their degree modifiers. It turns out that the grammatical behavior of degree modifiers that combine with a deverbal adjective is very similar to that of degree modifiers that modify a verb phrase that is part of a clause. Consider the following examples:

- (23) a. [Nog erger gehuild dan Piet] had Jan. (compare (15b))
 even much-COMPAR cried than Piet had Jan
 ‘Jan had cried even more than Piet had.’
- b. [Meer gehuild dan Piet] had Jan. (compare (16b))
 more cried than Piet had Jan
 ‘Jan had cried more than Piet had.’
- c. [Veel minder <dan Piet> gehuild <dan Piet>] (compare (17b))
 much less than Piet cried
 had Jan.
 had Jan
 ‘Jan had cried much less than Piet had.’
- d. [Net zo erg <als Piet> gehuild <als Piet>
 Just so much as Piet cried
 had Jan. (compare (18b))
 had Jan
 ‘Jan had cried just as much as Piet had.’
- e. Hoe erg had Jan ~~hoe erg~~ gehuild? (compare (20b))
 how much had Jan cried
 ‘How much had Jan cried?’

- f. Je hebt nu [voldoende gehuild]. (compare (21b))
 you have now sufficiently cried
 ‘You have cried enough now.’
- g. Je hebt nu [genoeg gehuild] (compare (22b))
 you have now enough cried
 ‘You have cried enough now.’

Given this parallelism, I propose that the degree modifiers in the b-examples in (14)–(22) are part of a VP that is selected by the adjectival suffix *-elijk*. For the sake of the argument, I place the degree modifier (XP) in the specifier position of a functional head (see Cinque 1999), which is simply represented here as F.

- (24) $[_{AP} [_{FP} XP_{degree} [_F F [_{VP} [_{PP} \text{ervan}] \text{afhang}]]]] -elijk]$
 where XP = *erg, erger, meer, minder dan Piet, net zo erg als Piet, hoe erg, voldoende, genoeg*

As indicated in (24), the degree modifier is a phrasal constituent. This is most clearly shown by complex modifiers such as *minder dan Piet, net zo erg als Piet*, and *hoe erg*. The fact that the *dan/als*-phrase can stay within the degree modifier and does not have to occur in extraposed position, as shown in (17b)–(18b), shows that the right recursion restriction (or whatever principle from which this effect can be derived) is not active in this structural environment. As is well-known (see e.g. (23c,d)), this restriction does not apply to clause-internal VPs either.

Let us now turn to the syntactic placement of degree words that modify regular adjectives. Following Corver (1997a,b), I propose that they are part of the functional structure that is built on top of the lexical projection AP. Specifically, I propose the following representations:

- (25) a. $[_{QP} \text{Spec} [_Q \text{erg} [_{AP} \text{bang PP}]]]$ (see (14))
 b. $[_{QP} \text{Spec} [_Q \text{-er} [_{AP} \text{bang PP}]]]$
 c. $[[[_{QP} \text{min-} [_Q \text{-der} [_{AP} \text{bang PP}]]] \text{dan XP}]$ (see (17a))
 d. $[_{DegP} [_{Deg} \text{hoe}] [_{QP} [_Q \text{erg} [_{AP} \text{bang PP}]]]]$ (see (19a)–(20a))¹²
 e. $[_{QP} [_Q \text{bang+genoeg} [_{AP} \text{bang PP}]]]$ (see (22a))

As shown in (25a), I take *erg* ‘very’ to be the lexicalization of $Q_{[+positive]}$, where Q is the functional head that is associated with positive, comparative (see (25b)) and

¹² As we will see later, *erg* can also be absent, as in *Hoe bang ervan is Jan?* (how afraid it.of is Jan; ‘How afraid of it is Jan?’).

superlative degree. The fact that *erg* cannot combine with the comparative morpheme *-er*, as shown in (15a), follows from the fact that they compete for the same syntactic slot, viz. Q. I take *minder* in (17a) to be a composite form (see (25c)), of which the final part, *-er*, designates ‘comparison’, and the first part, *mee-/min-*, higher and lower degree, respectively. Importantly, the *dan*-phrase, even though in a selectional relationship with *-er*, does not immediately follow the *meer/minder* for the simple reason that $Q_{[+comparison]}$ first combines with its lexical complement AP. In (25d), the interrogative degree word *hoe* occupies the left peripheral head Deg and *erg* lexicalizes $Q_{[positive]}$. The fact that the sequence *hoe erg* cannot be extracted out of the adjectival projection (see (20a)) follows immediately from this structure: *hoe* and *erg* do not form a constituent. Movement of the sequence *hoe erg* would violate the constituency requirement on displacement operations. As depicted by (25e), finally, I take *genoeg* to be a Q-head that can lexically select an AP and attract the adjectival head, yielding an inverted pattern: *bang genoeg*.¹³ The lexical entry of the quantifying element *voldoende* is not specified for AP-selection, whence the unacceptability/markedness (?) of *voldoende goed/slim/bang* (see (21a)).

So far, I have argued that an adjective phrase having a regular adjective as its core element (e.g. *bang daarvan* ‘afraid of that’) behaves differently from an adjective phrase having a deverbal adjective as its core element (e.g. *daarvan afhankelijk* ‘dependent on that’). The latter, it was argued, contains a verbal projection selected by an adjectival suffix (e.g. *-elijk*), as in (13). The possibility of having the PP-complement to the left of the deverbal adjective is a reflex of this verbal component. I assume that Dutch verbs take their complement to the left: PP + V. Recall, though, that deverbal adjectives like *afhankelijk* can also have their complement to the right, as in *afhankelijk daarvan* (see (2a)). Furthermore, as was shown in (6), this PP can be a “weak” PP (e.g. *ervan* ‘on it’, *van ’m* ‘of him’). Since weak PPs cannot be displaced, the word order *afhankelijk ervan/van ’m* cannot be derived in terms of rightward movement from within the verbal part of the extended adjectival projection to its adjectival part, as in (26).

(26) $[_{AP} [_{AP} [_{FP} XP_{degree} (e.g. erg) [_{F'} F [_{VP} ervan\ ahang]]] afhank-elijk] [_{PP} ervan]]$

Notice also that the derivation depicted in (26) would raise the question why subextraction from PP is possible. That is, PP-arguments to the immediate right

¹³ Notice that the *genoeg*-inversion pattern is not possible in patterns where *genoeg* modifies a verb. Thus, (23g) cannot be transformed into: **Je hebt nu gehuild genoeg*. In short, *genoeg*-inversion can only apply in an adjectival environment.

of a deverbal adjective permit subextraction, as was exemplified in (9), which is repeated here as (27):

- (27) ...dat Jan er_i nooit [erg < t_i van> *afhankelijk* < t_i van>] is
 ...that Jan it never very on dependent has
 geweest.
 been
 ‘...that Jan has never been very dependent on it.’

If the word order ‘deverbal adjective + PP’ is a base-generated one, then the question arises how this order is derived. One way to go would be to say that a deverbal adjective like *afhankelijk* is lexically and structurally ambiguous. Specifically, one might argue that besides the derived (i.e. truly de-verbal) pattern in (24), where *afhankelijk* has a composite form, there is also a non-composite analysis of *afhankelijk*; that is, *afhankelijk* is a single lexeme (say, [_A *afhankelijk*]), just like regular adjectives such as *bang* and *trots*. Under this non-composite analysis, *afhankelijk* takes the selected PP to its right in the base structure, just like regular adjectives: [_{AP} *afhankelijk* [_{PP} *ervan*]]. Although, as we will see later, this structural analysis is certainly an option provided by the grammar, it should be noted that also the word order pattern *afhankelijk ervan* can display “verbal” behavior of its degree modifiers; i.e. the degree modifier can exhibit the same grammatical behavior as those that are contained within clause-internal VPs (see (23)). Crucially, under the approach adopted here, this would imply that also for the sequence *afhankelijk ervan* a representation like (24) should be possible, but with the crucial difference that the PP is in a base-generated position to the right of *afhankelijk*. Let me first give the representation that I have in mind for deverbal *afhankelijk ervan* and then turn to the facts that show that degree elements modifying *afhankelijk ervan* behave like VP-modifiers.

As for the structural representation of (erg) *afhankelijk ervan*, I propose that *afhankelijk* has a verbal component, just like (24), and that the theta-role of the verbal root *afhang-* is not discharged immediately within the AP-internal VP but at a later moment, namely after *afhang-* has been combined with (adjoined to) the adjectival suffix *-elijk*. After the adjectival form *afhankelijk* has been derived (i.e. [_A [_V *afhang-*] *-elijk*]), the selectional properties of the derived adjective take the “adjectival direction”; i.e. complement to the right. In short, this analysis of *afhankelijk ervan* keeps the underlying syntax the same for *afhankelijk ervan* and *ervan afhankelijk*, but distinguishes them in terms of the moment at which the selectional properties of V (say, C-selection and theta-assignment) are satisfied. In *ervan afhankelijk*, the selectional requirements are satisfied within the (verbal)

projection of *afhang-* (see (24)), whereas in *afhankelijk ervan* they are satisfied within the (adjectival) projection of *-elijk*. The latter situation is depicted in (28):

(28) [_{AP} [_{FP} XP_{degree} [_{F'} F [_{VP} ~~afhang~~]]] [afghang-elijk] ervan]

Having given the underlying representation for (*erg*) *afhankelijk ervan*, let us next consider the grammatical behavior of the degree elements; see (29). Recall my earlier statement that these modifiers can display behavior reminiscent of degree elements modifying VPs. As such, we find the same properties as those illustrated by the b-examples in (14)–(22).

- (29) a. Erg afhankelijk ervan was Jan niet. (compare with (14b))
 b. [Nog erger afhankelijk ervan dan Piet] was Jan. (compare with (15b))
 c. [Meer afhankelijk daarvan dan Piet] was Jan. (compare with (16b))
 d. [Veel minder <dan Piet> afhankelijk daarvan <dan Piet>] was Jan. (compare with (17b))
 e. [Net zo erg <als Piet> afhankelijk daarvan <als Piet>] was Jan. (compare with (18b))
 f. Hoe erg is Jan [~~hoe~~—erg afhankelijk ervan] geweest? (compare with (20b))
 g. Jan is [voldoende afhankelijk ervan] geweest. (compare with (21b))

(29b) shows that *erg* can combine with the bound comparative morpheme *-er*; (29c) illustrates the possibility of combining with the free comparative morpheme *meer*; (29d,e) show that the *dan/als*-phrase can immediately follow the degree element; (29f) exemplifies subextraction of the phrase *hoe erg*; and (29g), finally, shows that the degree element *voldoende* can precede *afhankelijk*. This behavior of the degree modifier hints at the presence of a verbal part in the extended adjectival projection of deverbal adjectives that take their complement to the right (as in, *afhankelijk ervan*).

Let me briefly summarize: So far I have argued that deverbal adjectives like *afhankelijk* consists of a verbal part and an adjectival part. In the pattern (*erg*) *ervan afhankelijk*, the PP *ervan* is base-generated to the left of the verb (*afhang-*), whereas in the pattern (*erg*) *afhankelijk ervan*, the PP is base-generated to the right of the derived adjective *afhankelijk*. It was also shown that, with both word orders, degree modifiers can occur that display the grammatical behavior of VP-modifying degree words.

There is one final piece of information that needs to be added to make complete the story about deverbal adjectives like *afhankelijk*. It turns out that those adjectives can also combine with degree modifiers displaying the

grammatical behavior of degree elements modifying regular adjectives such as *bang* ‘afraid’ and *trots* ‘proud’. For one thing, *genoeg*-inversion can apply in an adjectival environment (see (22a)) but not in a verbal environment (see note 13). As shown in (30), *genoeg* can be inverted with *afhankelijk*, which suggests that *afhankelijk* can display the behavior of a regular adjective.

- (30) Jan is [afhankelijk genoeg ervan] geweest.
 Jan has dependent enough it.on been
 ‘Jan has been dependent enough on it.’

Further illustrations of behavior that is typically found with regular adjectives are given in (31):

- (31) a. [Te bang daarvan] is Jan geweest.
 too afraid that.of has Jan been
 ‘Jan has been too afraid of that.’
 b. [Te afhankelijk daarvan] is Jan geweest.
 too dependent that.on has Jan been
 ‘Jan has been too dependent on that.’
- (32) a. [Hoe bang daarvan] is Jan geweest?
 how afraid that.of has Jan been
 ‘How afraid of that has Jan been?’
 b. [Hoe afhankelijk daarvan] is Jan geweest?
 how dependent that.on has Jan been
 ‘How dependent on that has Jan been?’

The a-examples show that regular adjectives can be preceded by the degree word *te* and the bare interrogative degree word *hoe*. The b-examples show that these degree words can also combine with an adjective like *afhankelijk*. Importantly, as shown in (33), these degree words cannot act as degree modifiers within VP:¹⁴

- (33) a. Jan heeft erg/*te gehuild.
 Jan has much/too cried
 ‘Jan cried much/too much.’

¹⁴ (33b) is fine under a manner interpretation of *hoe*, as in the following English discourse: Person A: *How did she cry?* Person B: *She cried in an exaggerated way.* Under a degree interpretation, *te* and *hoe* in (33) must combine with *erg*: *Jan heeft te erg gehuild* (‘Jan cried too much’), *Hoe erg heeft Jan gehuild?* (‘How much did Jan cry?’).

- b. *Hoe heeft Jan gehuild?
 how has Jan cried
 ‘How much did Jan cry?’

The fact that *afhankelijk* can be part of a *genoeg*-inversion pattern and the fact that it can combine with degree words such as *te* and *hoe* suggest that *afhankelijk* can be part of a structural configuration that is typical of regular adjectives. Specifically, I assume that the patterns in (30), (31b) and (32b) have the representations in (34a,b,c), respectively:

- (34) a. [_{QP} [_Q afhankelijk+genoeg [_{AP} afhankelijk ervan]]] (compare (25e))
 b. [_{DegP} [_{Deg} hoe] [_{QP} [_Q Q_[positive]] [_{AP} afhankelijk ervan]]]] (compare (25d))
 c. [_{DegP} [_{Deg} te] [_{QP} [_Q Q_[positive]] [_{AP} afhankelijk ervan]]]]

One might generalize the A-to-Q movement operation, which is visible in the case of *genoeg*-inversion ((25e) and (34a)) and comparative forms such as *banger* in (25b) and *afhankelijker* (dependent-COMPAR, ‘more dependent’), to the positive form *afhankelijk*. Suppose Q_[positive] is occupied by a zero-affix (say, Ø), then head movement of *afhankelijk* to Q would yield the derived form: [_{DegP} [_{Deg} hoe/te] [_{QP} [_Q afhankelijk+Ø_{positive]} [_{AP} afhankelijk ervan]]]].

I propose that when *afhankelijk* displays the grammatical behavior of regular adjectives such as *bang* ‘afraid’ and *trots* ‘proud’, the verbal projection is no longer part of its syntactic structure. In that use, *afhankelijk* is a non-derived word that is stored as a single lexical unit (lexeme) in the lexicon. This means that adjectives such as *afhankelijk* have an ambiguous status: they are non-decomposable words that are stored in the lexicon (just like the regular adjectives *bang* and *trots*) or they can be decomposable items consisting of a verbal part (*afhang-*) and an adjectival part (*-elijk*).¹⁵ In its “regular-adjectival” use, the PP complement occurs to the right of *afhankelijk*, as in (34); in its deverbal use, the PP occurs to the left of the verbal part (*afhang-*), as in (24), or to the right of the derived composite form *afhang+elijk*, as in (28).

¹⁵ This ambiguous status of the adjective *afhankelijk* arguably also holds for its English equivalent *dependent*. Note, for example, that *dependent* can be modified by *very*, a degree word that typically combines with “regular” (i.e. non-deverbal) adjectives (e.g. *John is very proud of her*), but also by *much*, as in *The Byzantine economy was much dependent on the state’s ability to control its borders*. The modifier *much* is found in verbal contexts (*The Byzantine economy depended much on the state’s ability to control its borders*) but not in adjectival expressions headed by adjectives such as *proud* and *angry* (**John is much proud of her*).

As shown in (35), it is impossible for the PP-complement to occur to the left of *afhankelijk* when the latter combines with a degree word that can only cooccur with a regular adjective.¹⁶ As exemplified by (36), we find exactly the same behavior for a regular adjective like *bang*.

- (35) a. [Hoe <*ervan> afhankelijk <ervan>] is Jan?
 how it.on dependent is Jan
 ‘How dependent on it is Jan?’
 b. [Te <*ervan> afhankelijk <ervan>] is Jan.
 too it.on dependent is Jan
 ‘Jan is too dependent on it.’
- (36) a. [Hoe <*ervan> bang <ervan>] is Jan?
 how it.of afraid is Jan
 ‘How afraid of it is Jan?’
 b. [Te <*ervan> bang <ervan>] is Jan.
 too it.of afraid is Jan
 ‘Jan is too afraid of it.’

I take this parallelism in word order behavior (specifically, the placement of the PP-argument) to be support for the idea that an adjective like *afhankelijk* can also be a “regular” adjective. Importantly, the absence of this parallelism in (37), where we have the degree word *erg* ‘very’, is only apparent:

- (37) a. [Erg <ervan> afhankelijk <ervan>] was Jan niet.
 very it.on dependent was Jan not
 ‘Jan wasn’t much dependent on it.’
 b. [Erg <*ervan> bang <ervan>] was Jan niet.
 very it.on afraid was Jan not
 ‘Jan wasn’t very afraid of it.’

The pattern *erg ervan afhankelijk*, where the PP occurs in between the degree word and the adjective, is possible when this sequence has the structure in (24), where *erg* is a modifier of VP, but not when it has the “regular-adjectival”

¹⁶ Compare with (19b), where we have the sequence *hoe erg ervan afhankelijk*. Recall that in that example *afhankelijk* is deverbal and that the adjectival expression contains a verbal layer.

structure in (25d), where *erg* lexicalizes the functional head Q and takes AP as its complement. Thus, the following representation is ruled out:

(38) * $[_{QP} [_Q \text{ erg } [_{AP} \text{ PP afhankelijk}]]]$

Summarizing: in this section, it was shown that PP is *in situ* in the adjectival patterns *erg ervan afhankelijk* and *erg afhankelijk ervan*. In the first pattern, the PP is base-generated to the left of a verb heading a VP-projection that is embedded within the extended adjectival projection. In the second pattern, the PP-complement is base generated to the right of *afhankelijk*, where *afhankelijk* has either a composite form consisting of the verbal root *afhang-* and the adjectival suffix *-elijk*, or a non-composite form. In the latter case, *afhankelijk* behaves like regular adjectives such as *bang* ‘afraid’ and *trots* ‘proud’. Since PP occupies a base position in both *erg ervan afhankelijk* and *erg afhankelijk ervan*, extraction from PP is permitted with both word order patterns. This brings us to the next question: Do PP-complements ever occur in a derived position? And if so, do we find a freezing effect? These two questions will be addressed in the next section.

3 Displacement and freezing effects

The question as to whether PP ever occupies a derived position (i.e. a position resulting from displacement) can be split up into two sub-questions. First, does PP ever occupy a derived position *within* the extended adjectival projection? Secondly, does PP ever occupy a derived position *external to* the extended adjectival projection? With regard to the second question, observe that the PP-complement can be separated from the adjective by means of an intervening clausal modifier (*altijd*):

- (39) a. Jan zal <daarvan₃> altijd [_{XAP} erg <daarvan₂>
 Jan will that-on always very
 afhankelijk <daarvan₁>] zijn.
 dependent be
 ‘Jan will always be very dependent on that.’
- b. Jan zal <daarop₃> altijd [_{XAP} erg <*daarop₂> trots <daarop₁>] zijn.
 Jan will that.of always very proud be
 ‘Jan will always be very proud of that.’

In (39a), *daarvan_{1/2}* represents the base position of PP, that is, the position in which *daarvan* can be replaced by the weak PP *ervan* and from where

subextraction of *daar* is possible. *Daarvan*₃ occupies a derived, clause-internal position. Expectedly, *daarvan*₃ cannot be replaced by the weak PP *ervan*. Recall that a weak PP like *ervan* typically does not undergo any movement operation. In (39b), *daarop*₁ occupies the base position, where it can be replaced by the weak PP *erop*. Recall that non-deverbal adjectives like *trots* do not permit the PP in a position in between the degree word and the adjective. Thus, the pattern featuring *daarop*₂ is impossible. *Daarop*₃ is in a derived XAP-external but clause-internal position. Consequently, replacement by *erop* is impossible.

With regard to the question as to whether subextraction is possible from the displaced PP₃, consider the following examples¹⁷:

17 For the sake of completeness, it should be noted that there is another XAP-external position in which the PP-complement of an adjective can be found, namely an extraposed (i.e. postverbal) position. As shown in (ia), the PP *daarvan* can occur in postverbal position. Extraction from this postverbal position is blocked; see (ib):

- (i) a. Jan zal altijd erg afhankelijk zijn daarvan.
 Jan will always very dependent be that.on
 ‘Jan will always be very dependent on that.’
 b. *Daar_i zal Jan altijd erg afhankelijk zijn [t_i van].

From the ungrammaticality of (ib) one might draw the conclusion that extraposition in Dutch involves rightward movement to a postverbal position. Under such a movement analysis of extraposition, the ill-formedness of (ib) can be analyzed as a freezing effect. It should be noted, however, that under an “extraposition = movement” analysis, one would expect to find the same freezing effect with an extraposed clause that is selected by the adjective (see (iia)). As shown by (iib), however, extraction from within the extraposed complement clause is permitted.

- (ii) a. Ik denk dat Jan bang is [_{CP} om daarvan beschuldigd te worden].
 I think that Jan afraid is for that.of accused to be
 ‘I think that Jan is afraid that he will be accused of that.’
 b. Waar_i denk je dat Jan bang is [_{CP} om [t_i van] beschuldigd te worden]?
 what think you that Jan afraid is for of accused to be
 ‘What do you think Jan is afraid of being accused of?’

The contrast between (ib) and (iib) has given rise to the claim that extraposition is not a unitary phenomenon (see, for example, Barbiers 1995, 2000). For an overview of Dutch extraposition phenomena, see Broekhuis and Corver (2016: Chapter 12). See also Koster (2000) and De Vries (2002) for analyses of extraposition.

- (40) a. *Daar_i* zal Jan <*t_i van₃> altijd [_{XAP} erg <t_i van₂>
that will Jan on always very
afhankelijk <t_i van₁>] zijn.
dependent be
'That (thing) Jan will always be very dependent on.'
- b. *Daar_i* zal Jan <*t_i op₃> altijd [_{XAP} erg <*t_i op₂> trots <t_i op₁>] zijn.

As indicated, subextraction from the derived clause-internal position is impossible. In other words, we have a freezing effect.

Let us now turn to the question as to whether the PP ever occupies a derived position *within* the extended adjectival projection, and to the related question as to whether we find a freezing effect in that case. The relevant patterns to look at are those in which the PP occupies a position to the left of the degree word that modifies the adjective, that is, PP + Deg + A. Furthermore, it should be clear that the sequence forms an adjectival phrase; i.e. the left-peripheral PP should be contained within the adjectival projection. I will start my discussion with adjectival patterns featuring a deverbal adjective.

Consider the examples in (41) and (42):

- (41) a. [²*Daarvan*₃> erg <PP₂> afhankelijk <PP₁>]_j is Jan eigenlijk
that.on very dependent has Jan really
nooit t_j geweest.
never been
'Very dependent on that, Jan hasn't really been.'
- b. [²*Daarvoor*₃> veel minder <PP₂> gevoelig <PP₁> dan Piet]_j
that.to much less sensitive than Piet
leek Jan me toentertijd t_j.
seemed Jan me at.the.time
'Jan seemed to me much less dependent on that at the time.'
- (42) a. een [<*daarvan*₃> erg <PP₂> afhankelijke <*PP₁>] man
a that.on very dependent man
'a man who is very dependent on that.'
- b. een [<*daarvoor*₃> veel minder <PP₂> gevoelige <*PP₁>]
a that.to much less sensitive
man (dan Piet)
man (than Piet)
'a man who is much less sensitive to that (than Piet is).'

In (41), the complex adjectival phrase has been fronted to the beginning of the clause; that is, Spec,CP. The head of CP is occupied by the finite verb (*is/leek*),

which has been input to the Verb Second rule (i.e. move the finite verb to C in main clauses). In (42), the adjectival phrase functions as an attributive modifier of the noun. Although the patterns featuring PP_3 in (41) sound slightly degraded, they do not seem to be completely impossible, at least not to my ear. Notice furthermore that, both in (41) and in (42), the (phonetically) strong PP *daarvan*₃ is much better in the derived left peripheral position than is its weak counterpart *ervan*. That is, the adjectival patterns in (43a,b) are completely impossible if the weak PP occupies the left periphery of the XAP.

- (43) a. [\ast *Ervan*₃ > *erg* < PP_2 > *afhankelijk* < PP_1 >]_j is Jan eigenlijk nooit
 t_j geweest. (Compare (41a))
 b. een [\ast *ervan*₃ > *erg* < PP_2 > *afhankelijke* < \ast PP_1 >] man¹⁸ (Compare (42a))

On the basis of the examples in (41) and (42), I propose that the PP *daarvan* can reasonably well occur in the left periphery of the extended adjectival projection. As shown in (44), the sequence *PP+erg+A* can also form a XAP that occupies a clause-internal position. In that case, the clausal modifier preceding the XAP preferably carries emphatic accent, which is represented here by means of small capitals; see also Broekhuis (2013:88). Also here, replacement of *daarvan*₃ by the weak PP *ervan* yields a strongly ungrammatical pattern: \ast *ervan erg afhankelijk*.

- (44) a. Jan is ALTIJD AL [<²*daarvan*> *erg* <*daarvan*>
 Jan has always PRT that.on very
 afhankelijk <*daarvan*>] geweest.
 dependent been
 ‘Jan has always been very dependent on that.’
 b. Jan is OOK VROEGER [<²*daarvoor*> *erg* <*daarvoor*>
 Jan has also in.the.past that.to very
 gevoelig <*daarvoor*>] geweest.
 sensitive been
 ‘Jan was very sensitive to that also in the past.’

18 As opposed to the predicative XAP in (43a), the attributive XAP in (43b) does not permit the pattern featuring PP_1 . That is, the (inflected) adjective cannot be followed by a PP; it must be linearly adjacent to the noun. See also (42a,b). This restriction on the placement of PP within an attributive adjectival phrase has been attributed to a ban on right recursion for (certain) phrases occurring on left branches. For discussion, see among others Zwarts (1974), Emonds (1976), Williams (1981), and Biberauer, Holmberg and Roberts (2008), Cinque (2010).

derived position, we expect subextraction from this PP to be impossible. Example (48) shows that this is indeed the case:

- (48) Daar_i is Jan ALTIJD AL [_{*t_i} van₃] erg <t_i van₂>
 that has Jan always PRT on very
 afhankelijk <t_i van₁>] geweest.
 dependent been
 ‘That, Jan has always been very dependent on.’

So far, the discussion has centered on the distribution and freezing behavior of PPs (and R-pronouns) that undergo leftward movement inside of an adjectival phrase headed by a deverbal adjective. The behavior of PP-complements and R-pronouns that belong to a non-deverbal adjective is quite similar. Consider, for example, the following patterns featuring the adjective *trots* ‘proud’.

- (49) a. [_{<??Daarop₃>} erg <*PP₂> trots <PP₁>]_j is Jan eigenlijk
 that.of very proud has Jan actually
 nooit t_j geweest.
 never been
- b. een [_{<daarop₃>} erg <*daarop₂> trotse <*daarop₁>] man
 a that.of very proud man
- c. Jan is ALTIJD AL [_{<??daarop>} erg <*daarop>
 Jan has always PRT that.of very
 trots <daarop>] geweest.
 proud been
- d. Jan is ALTIJD AL [_{?daar_i} erg <*t_i op₂> trots <t_i op₁>] geweest.

Example (49a) shows that PP preferably occurs in a post-adjectival position (see PP₁). Recall that a position in between the degree word and the adjective is impossible for PP-complements of non-deverbal adjectives (see PP₂). Placement in the left periphery of a predicative XAP is possible, though somewhat degraded. (49b) shows that the left-peripheral position within the attributive XAP is, actually, the only position in which the PP is permitted. (49c) shows the same patterns as in (49a), but now the XAP is in a clause-internal position. In (49d), it is the R-pronoun *daar* that has been moved to the left periphery of the XAP. Observe that subextraction from PP₂ is blocked. This is not surprising, since, as we have seen before, PPs can’t occur in this position at all when the adjective is non-deverbal.

As expected, subextraction is only permitted from the post-adjectival PP-position. If the PP occupies the left periphery of the XAP, the PP is frozen; that is, subextraction is impossible. This is exemplified in (50):

- (50) Daar_i is Jan ALTIJD AL [_{<*t_i op₃>} erg _{<*t_i op₂>} trots _{<t_i op₁>}]
 that has Jan always PRT of very proud
 geweest.
 been
 ‘That, Jan has ALWAYS been very proud of.’

Recall from the discussion in section 2 that *afhankelijk* can also be analyzed as a non-composite, regular adjective, analogously to an adjective like *trots*; see (34). In that case, the PP-complement of [_A *afhankelijk*] is expected to exhibit exactly the same syntactic behavior as the PP-complement of *trots* in (49) and (50). At the surface, however, this similarity in grammatical behavior is sometimes hard to identify, simply because the deverbal analysis is present in the background as an alternative structural analysis. As we have seen, however, there are adjectival contexts in which the deverbal analysis is not possible, e.g. when the adjective is specified by the degree word *te* ‘too’, which was analyzed as a functional head Deg; see (34c). Consider now the following examples:

- (51) a. Jan is ALTIJD AL [_{<²daarvan₃>} te _{<*daarvan₂>}
 Jan has always PRT that.on too
 afhankelijk _{<daarvan₁>}] geweest.
 dependent been
 ‘Jan has always been too dependent on that.’
 b. Daar_i is Jan ALTIJD AL [_{<*t_i van₃>} te _{<*t_i van₂>}
 that has Jan always PRT on too
 afhankelijk _{<t_i van₁>}] geweest.
 dependent been
 ‘That, Jan has always been too dependent on.’

(51a) shows that the PP-complement occurs either in the rightmost position (the base position) or in the leftmost position within the XAP. As we have seen before, the PP-complement cannot occur in between the functional head *te* and the adjective. I assume that the left-peripheral position within the XAP is derived by leftward scrambling and that the leftward scrambled PP is adjoined to the maximal projection (DegP) of *te*. Schematically: [_{DegP} PP_i [_{DegP} *te* *afhankelijk* t_i]]. As shown in (51b) subextraction from PP is

possible when PP occupies the base position but not when it occupies the derived left-peripheral position. In other words we have a Freezing effect. As indicated, subextraction from the intermediate position is impossible, but presumably the ill-formedness of this sentence is not so much related to subextraction *per se* but rather to the fact that the PP cannot occur in that position, as shown in (51a).

Summarizing: in this section, I argued that PP remains *in situ* in the Dutch word order patterns *erg daarvan afhankelijk* and *erg afhankelijk daarvan*. In the first word order pattern, the PP occupies a position to the left of an XAP-internal verbal root. The second word order pattern has two possible derivations: the PP is base-generated to the right of a derived deverbal adjective *afhankelijk* (i.e. *afhang+elijk*) or to the right of a non-derived (i.e. non-composite: *afhankelijk*) adjectival head. The non-derived form displays the same syntactic behavior as “regular” adjectives such as *bang* ‘afraid’ and *trots* ‘proud’. It was shown that extraction from PP is possible when PP occupies its base position but impossible when PP occupies a derived position. Thus, displacement of the PP-complement of the adjective yields a freezing effect.

4 Surface similarity but a freezing asymmetry

In section 2 we saw that PP-complements can immediately follow or precede an adjective like *afhankelijk*. Furthermore, it was shown that subextraction from these pre-/post-adjectival PPs is possible. Importantly, all the examples discussed were adjectival patterns featuring a positive adjective (i.e. an adjective designating a positive degree, which, by the way, is not marked morphologically (i.e. overtly) in Dutch). As indicated in (52), PPs can follow and precede not only positive adjectives like *afhankelijk* but also synthetic comparative adjectives like *afhankelijker*. It should be noted, however, that the subextraction behavior of a PP-complement that combines with a comparative adjective (*afhankelijker*) deviates from that of a PP-complement that combines with a positive adjective (*afhankelijk*). Specifically, subextraction from PP is blocked if the PP precedes the comparative adjective; see (53b). If the PP immediately follows the positive/comparative adjective, subextraction from PP is permitted; see (53a).

- (52) Jan is [*<daarvan> afhankelijk(er)* *<daarvan>*] geweest
 Jan has that.on dependent(-COMPAR) been
 ‘Jan was (more) dependent on that.’

- (53) a. Daar_i is Jan afhankelijk(-er) [t_i van] geweest.
 that has Jan dependent(-COMPAR) on been
 ‘That, Jan was (more) dependent on.’
 b. Daar_i is Jan ooit [t_i van] afhankelijk(*-er) geweest.

The contrast in subextraction behavior between the comparative pattern in (53a), on the one hand, and the comparative pattern in (53b), on the other, but also the contrast between the positive pattern in (53b) and the comparative pattern in (53b), suggests that the PP is no longer in its base position in the sequence PP+A-er. Plausibly, the PP has been moved leftward to the left periphery of the extended adjectival projection, or to some position in the clausal middle field. This means that the PP occupies a derived position and, in line with the Freezing principle, subextraction is blocked. Thus, even though at the surface (i.e. linearly) PP-A_{positive} and PP-A_{comparative} look alike, their corresponding hierarchical structures differ greatly.

Before giving some overt evidence for the displacement of the PP within the comparative adjective phrase in (53b), let me give the derivation of the comparative adjectival patterns in (52), starting with *afhankelijker daarvan*. I propose that the synthetic comparative form *afhankelijker* is derived from the structure in (54a) by moving and adjoining the (non-composite) adjective *afhankelijk* (i.e. [_A *afhankelijk*]) to the bound comparative morpheme -er, which I take to be the realization of Q_[comparative].

- (54) a. [_{QP} -er_[comparative] [_{AP} afhankelijk daarvan]]
 b. [_{QP} afhankelijk_i-er_[comparative] [_{AP} t_i daarvan]]

In (54b), the R-pronoun *daar* occupies the Spec-position of a base-generated PP. Subextraction from PP, as in (53a), is therefore permitted. In order to derive the word order *daarvan afhankelijker*, the PP moves to the left periphery of the extended adjectival projection. This implies that the PP is in a derived position and, in line with the Freezing principle, the displaced PP is an island for extraction (see (53b)).

Evidence that PP ends up in a left peripheral position within XAP comes from the placement of this PP with respect to modifiers of the comparative adjective. Consider the following examples, in which the string that forms the complex adjectival constituent occupies Spec,CP. The finite verb *was* occupies the C-position as a result of the Verb Second rule (i.e. move the finite verb to C).

- (55) a. [**Veel/een stuk** afhankelijker *daarvan* dan Piet] was
 much/a lot dependent-COMPAR that.on than Piet was
 Jan toentertijd.
 Jan at.the.time
 ‘At the time, Jan was much more dependent on that than Piet was.’
- b. ***[Veel/een stuk** *daarvan* afhankelijker dan Piet] was Jan toentertijd.
- c. [*Daarvan* **veel/een stuk** afhankelijker dan Piet] was Jan toentertijd.

In (55a), the modifier *veel/een stuk* precedes the string that corresponds to structure (54b). This modifier specifies what the gap is between *Jan*’s dependence and *Piet*’s dependence (see Schwarzschild 2005, Corver 2009). I assume that this modifier occupies the specifier position of QP: [_{QP} *veel/een stuk* [_Q ...]]. The ill-formedness of the word order in (55b) shows that *daarvan* cannot occur in a position within the QP-projection; specifically, it cannot be interspersed between the modifier in Spec,QP and the AP. If the modifier is located in QP, then the word order in (55c) can only be derived by fronting the PP to a structural position to the left of Spec,QP. I assume that the leftward moved PP is adjoined to QP, yielding the structure in (56):

- (56) [_{QP} [_{PP} *daar van*]_j [_{QP} **veel/ een stuk** [_Q afhankelijk_i-er_[comparative] [_{AP} t_i t_j]]]]

In (56), *daarvan* occupies a derived position. As expected, subextraction from this position is blocked. That *daarvan* occupies a derived position in (56), and also in (53b) for that matter, is corroborated by the fact that it cannot be substituted for by the weak PP *ervan*, that is: **ervan (veel/een stuk) afhankelijker*.

As shown in (57), a string like *daarvan veel afhankelijker* can also be found as an attributive modifier within a noun phrase, and as a clause-internal constituent, as in (58). In the latter example, the complex adjectival phrase occupies a position following a clause-internal modifier. This placement of the adjectival phrase (with PP in its left periphery) is felt to be slightly degraded. It should be noted, though, that this adjectival pattern with *daarvan* in the left periphery is much better than its counterpart with the weak PP *ervan*. Furthermore, when the clausal modifier preceding the adjectival projection carries strong accent (represented by means of small capitals), the sentence is quite acceptable.

- (57) a. Jan ontmoette [_{DP} een [*daarvan veel afhankelijke*] man].
 Jan met a that.on much dependent-COMPAR man
 ‘Jan met a man who was much more dependent on that.’

- b. Marie is een [daarvoor veel gevoeliger meisje].
 Marie is a that.to much sensitive-COMPAR girl
 ‘Marie is a girl who is much more sensitive to that.’
- (58) a. [?]Ik geloof dat Jan AL JAREN [daarvan veel
 I believe that Jan already years that.on much
 afhankelijker] was (dan Piet).
 dependent-COMPAR was (than Piet)
- b. [?]Ik geloof dat Jan OOK TOEN [daarvoor veel
 I believe that Jan also then that.to much
 gevoeliger] was (dan Piet).
 sensitive-COMPAR was (than Piet)

Besides the examples in (58a,b), where the PP *daarvan* occupies a left peripheral position within the XAP, it is also possible to move the PP complement into the clausal middle field; that is, to a position preceding the clausal modifiers *al jaren/ook toen*. This is exemplified in (59):

- (59) a. Ik geloof dat Jan *daarvan* toentertijd [*veel*
 I believe that Jan that.on at.the.time much
afhankelijker] was (dan Piet).
 dependent-COMPAR was (than Piet)
- b. Ik geloof dat Jan *daarvoor* toentertijd [*veel*
 I believe that Jan that.to at.the.time much
gevoeliger] was (dan Piet).
 sensitive-COMPAR was (than Piet)

Let us now return to the freezing effect in (53b). If the PP *daarvan* in (53b), (58a,b) and (59a,b) occupies a movement-derived position, then subextraction should be blocked. That is, the derived position should be frozen for extraction. The ill-formed examples in (60) show that this is indeed the case.

- (60) a. *Daar_i geloof ik dat Jan AL JAREN [[t_i van]_j veel
 that believe I that Jan already years on much
 afhankelijker t_j] was (dan Piet).
 dependent-COMPAR was (than Piet)
- b. *Daar_i geloof ik dat Jan [t_i van]_j toentertijd [t'_i
 that believe I that Jan on at.the.time
 veel afhankelijker t_j] was.
 much dependent-COMPAR was

So far, I have given an account of the subextraction asymmetry between *afhankelijker daarvan* (see (53a)) and *daarvan afhankelijker* (see (53b)). The latter pattern does not permit subextraction due to the Freezing constraint. The PP to the left of the synthetic-comparative adjectival form occupies a derived position (see (56)). But what accounts for the asymmetry depicted in (53b)? Why is it possible to extract from PP when it precedes a positive adjective (*afhankelijk*) but not when it precedes a comparative form (*afhankelijker*)? The answer to this question was given in section 2: in the sequence *daarvan afhankelijk*, the PP can be analyzed as a (left branch) complement of the verbal root (*afhang-*) that forms a derived adjective after adjunction to the adjectival suffix *-elijk* (see the base structure in (24)). Under this analysis the PP simply occupies its base position. Consequently, extraction from the PP-complement is permitted.

For the sake of completeness, it may be useful to add that deverbal *afhanke-lijk* also has a comparative pattern, namely the analytic comparative pattern; that is, the one featuring *meer* ‘more’ (see also (16b)).¹⁹ As shown in (61), the PP can occupy three positions within the XAP. Observe that the entire XAP occupies Spec,CP.

- (61) [_{CP} <Daarvan₃> veel meer <daarvan₂> afhankelijk <daarvan₁>
 that.on much more dependent
 dan Piet] was Jan toentertijd.
 than Piet was Jan at.the.time
 ‘Jan was much more dependent on that than Piet at the time.’

As shown in (62), the analytic comparative form can also occupy a clause-internal position:

- (62) Ik geloof dat Jan AL JAREN [_{CP} <daarvan₃> veel meer
 I believe that Jan already years that.on much more
 <daarvan₂> afhankelijk <daarvan₁> dan Piet] was.
 dependent than Piet was
 ‘I believe that, for years, Jan has been much more dependent on that than Piet.’

As shown in (63), subextraction is only permitted from PP₁ and PP₂, but not from PP₃.

¹⁹ Recall that the analytic pattern is typically not found with regular adjectives: ??*meer bang daarvan* (see (16a)).

- (63) Daar_i geloof ik dat Jan AL JAREN [$\langle *t_i \text{ van}_3 \rangle$ veel
 that believe I that Jan already years on much
 meer $\langle t_i \text{ van}_2 \rangle$ afhankelijk $\langle t_i \text{ van}_1 \rangle$] was.
 more dependent was
 ‘On that I believe that Jan has been much more dependent for years.’

PP₁ and PP₂ occupy a base position. Specifically, PP₁ is part of a structure like (64a) and PP₂ of a structure like (64b); compare (24) and (28), respectively:

- (64) a. [_{AP} [_{FP} [_{QP} veel meer] [_{F'} F [_{VP} [_{PP} daarvan] afhang]]] -elijk]
 b. [_{AP} [_{FP} [_{QP} veel meer] [_{F'} F [_{VP} afhang]]] [afghang-elijk] daarvan]

The sequence *daarvan veel meer afhankelijk* corresponds either to (65a) or to (65b); compare (45a) and (45b), respectively. In (65a), *daarvan* has been left-adjoined to the highest functional projection (*in casu* FP) within the verbal part of XAP. In (65b), it has been left-adjoined to AP.

- (65) a. [_{AP} [_{FP} daarvan_i [_{FP} [_{QP} veel meer] [_{F'} F [_{VP} [_{PP} t_i] afhang]]] -elijk]
 (*daarvan_i veel meer t_i afhankelijk*)
 b. [_{AP} daarvan_i [_{AP} [_{FP} [_{QP} veel meer] [_{F'} F [_{VP} afhang]]] [afghang-elijk] t_i]]
 (*daarvan_i veel meer afhankelijk t_i*)

When the PP occupies a position in the clausal middle field as a result of scrambling (out of XAP), extraction from PP is excluded as well, due to the derived position of the PP.

- (66) a. Ik geloof dat Jan *daarvan* toentertijd *veel meer afhankelijk*
 I believe that Jan that.on at.the.time much more dependent
 is geweest.
 has been
 b. *Daar_i geloof ik dat Jan [t_i van]_j toentertijd [t_j veel meer afhankelijk] was.

Summarizing: in this section it was shown that, even though the sequences *daarvan afhankelijk* and *daarvan afhankelijker* look alike at the surface, their corresponding hierarchical structures are quite different. The former pattern, featuring a positive (deverbal) adjective, has the PP in its base position. The latter pattern, featuring a synthetic comparative adjectival form, has the PP in a derived position. In line with the Freezing principle, the latter pattern does not permit extraction from PP.

5 Transitive adjectives and freezing effects

So far, our discussion has focused on the grammatical behavior (distribution and freezing behavior) of PP-complements of adjectives. As has been shown in a number of generative-linguistic studies (Van Riemsdijk 1983; Platzack 1982; Maling 1983), many Germanic languages, including Dutch, have so-called transitive adjectives; i.e. adjectives that, at the surface, take a noun phrase (DP) as their complement (see also Broekhuis 2013:75–82). In this section, I will examine the distribution of this nominal argument within the adjective phrase and try to find out how its distribution interacts with freezing.

I will start my discussion with the examples in (67), where we find an adjective that combines with a PP-complement. Observe that, as we have seen before, there are adjectives that can take the (weak) PP both to their right and to their left (see (67a,b)), but also adjectives that can take a PP-complement only to their right (see (67c,d)). The former class can be characterized as ‘deverbal’ (i.e. they display verbal characteristics, like participial morphology), the latter as ‘non-deverbal’.

- (67) Ik geloof niet dat ...
 I believe not that
- a. ...Jan zich [helemaal <ervan> bewust <ervan>] was.
 ...Jan REFL entirely it.of aware was
- b. ...Jan [helemaal <eraan> gewend <eraan>] was.
 ...Jan entirely it.to used was
- c. ...Jan [helemaal <*eraan> trouw <eraan>] zal blijven.
 ...Jan entirely it.to loyal will stay
- d. ...Jan [helemaal <*ervan> moe <ervan>] was.
 ...Jan entirely it.of weary was

As shown in (68), the adjectives in (67) can also combine with a bare noun phrase:

- (68) Ik vraag me af of...
 I wonder REFL PRT whether
- a. ...Jan zich <zoiets> helemaal <*> bewust <*> was.
 ...Jan REFL such.a.thing entirely aware was
- b. ...Jan <zoiets> helemaal <*> gewend <*> was.
 ...Jan such.a.thing entirely used was
- c. ...Jan <zo iemand> helemaal <*> trouw <*> zal blijven.
 ...Jan such. a.person entirely loyal will stay
- d. ...Jan <zoiets> helemaal <*> moe <*> was.
 ...Jan such.a.thing entirely weary was

As indicated, the distribution of the bare noun phrase is quite limited: a postnominal position is excluded, as is a position in between the modifier *helemaal* and the adjective. The only position permitted is the one preceding the modifier.

On the basis of the examples in (68a-d), it is not entirely clear whether the nominal object is located in a peripheral position within the adjectival projection or in a clause-internal middle field position. The following examples show that the nominal complement can both follow the clausal modifier (*ooit* ‘ever’, *voorgoed* ‘for ever’) and precede it. When it follows the clausal modifier, the nominal complement arguably occupies a position in the left periphery of the adjectival projection. As indicated, leaving the nominal complement within the adjectival projection yields a slightly degraded result. Importantly, though, this placement within the adjectival projection does not seem to be ruled out completely. Especially when the clausal modifier carries accent, it is quite acceptable to have the nominal complement in the left periphery of the XAP.

- (69) Ik vraag me af of ...
 I wonder REFL PRT whether
 ‘I wonder whether ...’
- a. ...Jan zich <zoiets> **ooit** [<<?> helemaal bewust] zal zijn.
 ...Jan REFL such.a.thing ever entirely aware will be
 ‘... Jan will ever be fully aware of such a thing.’
- b. ...Jan <zo iemand> **voorgoed** [<<?> helemaal trouw] zal
 ...Jan such.a person for.ever entirely loyal will
 blijven.
 stay

Notice also that the nominal object follows a low indefinite subject noun phrase when the “high subject” position (i.e. Spec,TP) is occupied by expletive *er* ‘there’. Under a small clause analysis, *iemand* occupies a specifier position within the small clausal projection of the adjective. It is likely, then, that the nominal object *zulke principes* in (70) is part of the adjectival projection.

- (70) ...dat er vermoedelijk nooit [iemand_{Subj} zulke principes_{Obj}
 ...that there presumably never someone such principles
 helemaal trouw] zal blijven.
 entirely loyal will stay
 ‘...that, presumably, there will never be a person who will remain entirely
 loyal to such principles.’

Let me, finally, add that fronting of the predicative adjective phrase that contains a nominal object, as in (71a), is felt to be somewhat degraded by certain speakers. Speakers, generally, prefer patterns in which either the nominal complement is fronted, as in (71b), or the sequence *helemaal* + A, as in (71c); see also Broekhuis (2013).

- (71) a. ^{??}*Dat geld helemaal waard zal hij nooit zijn.*
 that money entirely worth will he never be
 b. *Dat geld zal hij nooit helemaal waard zijn.*
 c. *Helemaal waard zal hij dat geld nooit zijn.*

On the basis of the phenomena in (69)–(71), I conclude that the nominal complement can be part of the extended adjectival projection, even though there is a tendency for the nominal complement to leave the adjectival projection and move to a position within the clausal domain. If the nominal complement stays within the adjectival domain, the complement typically occupies a position in the left periphery of the adjectival projection, i.e. a position preceding a modifier like *helemaal* ‘entirely’.

Clearly, the clause-internal middle-field position in (69) is a movement-derived position; the noun phrase is not part of the phrasal projection whose head assigns a thematic role to it. The left peripheral position within the extended adjectival projection is also a movement-derived position. Normally, an internal argument is closer to a theta-assigning head than is a modifier (e.g. *helemaal*). Now, if the two positions have a movement-derived status, we would expect to find a freezing effect if material is moved out of the displaced nominal complement.

Consider at this point the data in (72):

- (72) a. ^{??}*Wat_i zal Jan voorgoed [[t_i voor iemand]_j helemaal trouw t_j] blijven?*
 what will Jan for.ever for someone entirely loyal stay
 ‘What kind of person will Jan forever stay loyal to?’
 b. ^{*}*Wat_i zal Jan [t_i voor iemand]_j voorgoed [t_j helemaal trouw t_j] blijven?*

These examples illustrate the phenomenon of *wat voor*-split (see e.g. Den Besten 1985), which is familiar from examples like *Wat heb je voor boeken gekocht?* (what have you for books bought; ‘What kind of books did you buy?’), where *wat* has been extracted out of a direct object argument of the verb, leaving behind the sequence *voor boeken*. As indicated in (72a,b), subextraction of *wat* yields an ill-formed sentence. The sentence becomes acceptable if the wh-word *wat* drags along (‘pied pipes’) the rest of the noun phrase:

(73) Wat voor iemand_i zal Jan voorgoed [t'_i helemaal trouw t_i] blijven?

Having presented some properties of adjectival expressions headed by a transitive adjective, I will finish this section with a more precise syntactic analysis of this type of adjectival construction. As a starting point and also building on what I argued for in sections 2 and 3, I will take the position that deverbal adjectives such as *bewust* and *gewend* in (67a,b) display the same phrase structural ambiguity as the deverbal adjective *afhankelijk*. Specifically, an extended adjectival phrase having *gewend* as its semantic “head” can have three kinds of structural analyses. Those three analyses are represented in (74), where, for the sake of presentation, I have chosen comparative adjectival structures. The adjectival expressions in (75a,b,c) are illustrations of the patterns in (74a,b,c).

- (74) a. [AP [FP [QP meer] [F' F [VP [PP daaraan] wen]]] ge-...-d] (Compare (24))
 b. [AP [FP [QP meer] [F' F [VP ~~wen~~]]] [ge-wen-d] daaraan] (Compare (28))
 c. [QP [Q' -er]_[comparative] [AP gewend daaraan]] (Compare (54))

- (75) a. ...dat Jan [meer daaraan gewend] raakte.²⁰
 ...that Jan more that.to accustomed got
 ‘...that Jan got more used to that.’
 b. ...dat Jan [meer gewend daaraan] raakte.
 c. ...dat Jan [gewender daaraan] raakte.

(74a,b) are analytic comparative structures that are built “on top of” a deverbal adjective *gewend*. Analogously to deverbal *afhang-elijk* (= *afhankelijk*), I take the surface form *gewend* in (74a,b) to be a composite form consisting of a verbal part (*wen*) and an adjectival suffixal part, *in casu* the circumfixal morpheme *ge- ... -d*. In (74a), the PP is base-generated to the left of *gewend*, whereas, in (74b), it is base-generated to the right of the composite adjectival form [_A *ge-wen-d*]. As indicated, I take these deverbal adjectival forms to be compatible with analytic comparative formation. Specifically, the free morpheme *meer* acts as a modifier of the verbal part of XAP. Consider next (74c). I take this representation to be the one that is built on top of the “regular” adjective *gewend*, that is, the adjective that does not have a composite form and corresponds to non-analyzable adjectives such as *bang* ‘afraid’, *trots* ‘proud’ but also *trouw* ‘faithful’ and *moe* ‘tired’ in (67c,d). Thus, non-composite *gewend* looks like: [_A *gewend*]. When *gewend* has

²⁰ Observe that regular (i.e. non-deverbal) transitive adjectives such as *trouw* ‘faithful’ and *moe* ‘tired’ typically do not combine with the free morpheme *meer*: ??*meer trouw eraan*. Compare with (16a).

this lexically adjectival status, the extended projection of *gewend* has the functional layers that are typically found with “regular” adjectives. I assume that the synthetic comparative form *gewender* is derived by head movement of the adjective *gewend* to the bound comparative morpheme *-er*.

Taking the structures in (74) as our background, let us next consider the superficially transitive adjectival patterns; that is, the ones featuring a bare DP. As a starting point for my analysis, I take the contrast in (76)–(77) between the a-examples, on the one hand, and the b-examples, on the other.

- (76) a. Jan raakte [gewender daaraan dan Piet].
 Jan got used-COMPAR that.to than Piet
 ‘Jan got more used to that than Piet did.’
 b. ?*Jan raakte dat gewender dan Piet.
 Jan got that used- COMPAR than Piet
- (77) a. Jan bleef [trouwer aan de wet dan Piet].
 Jan stayed loyal-COMPAR to the law than Piet
 ‘Jan stayed more loyal to the law than Piet did.’
 b. ?*Jan bleef [de wet trouwer dan Piet].
 Jan stayed the law loyal- COMPAR than Piet

These examples show that transitive adjectives carrying the bound comparative morpheme *-er* are much worse than synthetically marked comparative adjectives taking a PP-complement; see also Zwart (1993). The question arises what this contrast tells us about the derivation of each pattern. If synthetic comparative forms such as *gewender* and *trouwer* are derived by means of A-to-Q movement, where Q is lexicalized by the bound morpheme *-er*, then somehow A-to-Q movement must be blocked in patterns featuring a transitive adjective. It would be interesting if the ill-formedness of the b-examples could be connected to this other remarkable property of transitive adjectives: the presence of a “bare” (i.e. preposition-less) DP at the surface. With Emonds (1985), I will assume that the bare DP is actually a hidden PP. More specifically, following Emonds (1985), I will take morphological case to be an *alternative realization* of the case assigning head (*in casu* P). That is, the morphological case is an affixal (specifically: suffixal) realization of P on the object-DP: [DP+P_{aff}].²¹ Schematically, with subscripted P being affixal P (= morphological case):

²¹ See also Pesetsky (2013) for the idea that Case is a part-of-speech suffix.

(78) $[_{AP} A [_{PP} P DP]] \rightarrow [_{AP} A [_{PP} P [DP_P]]]$

In a morphologically rich language like German, this hidden P surfaces overtly as morphological (oblique) case (i.e. affixal P) on the DP-object. This is exemplified in (79); examples drawn from Van Riemsdijk (1983).

- (79) a. Dieser Mann muss *des Französischen mächtig* sein.
 this man must the.GEN French.GEN in-command be
 ‘This man must speak French.’
 b. Das Französische ist *ihm ungeläufig*.
 the French is him.DAT not-fluent
 ‘He is not fluent in French.’

I propose that (present-day) Dutch transitive adjectival constructions also feature the operation in (78), with the difference that suffixal P does not spell out overtly; that is, it is a null-affix.

The question arises why P, the head of PP, does not surface overtly. One might conjecture that it does not have to be realized, since it already “surfaces” as a part-of-speech affix (overt in German, silent in Dutch). In a way, the contents of empty P are recoverable from the affixal realization on DP. But that cannot be the complete answer since, in a language like German, there are prepositional phrases in which both P and affixal P are realized simultaneously, as in *mit dem Mann* (with the.DAT man.DAT, ‘with the man’), where dative case on the DP is a realization of affixal P. I, therefore, tentatively propose that the absence (i.e. non-realization) of P is due to incorporation of P into the “transitive” adjective. Schematically, elaborating on (78):

- (80) a. $[_{AP} A [_{PP} P DP]] \rightarrow [_{AP} A [_{PP} P [DP_P]]] \rightarrow [_{AP} [P_1+A] [_{PP} t_i [DP_P]]]$
 b. $[_{AP} gewend [_{PP} P DP]] \rightarrow [_{AP} gewend [_{PP} P [DP_P]]] \rightarrow [_{AP} [P_1+gewend] [_{PP} t_i [DP_P]]]$

According to the analysis sketched in (80), “transitive” *gewend* is a composite adjectival head consisting of an adjective and an incorporated (silent) P. As a result of the P-incorporation process the adjective *gewend* no longer has a non-composite form. Under the assumption that only “regular” adjectives (i.e. simplex A) can move to comparative *-er*, the ill-formedness of the b-examples in (76)–(77) is accounted for. Importantly, the a-examples in (76)–(77) are fine because P (*aan*) has not been incorporated into A.

Having tried to give an analysis of the nature of the bare DP and the nature of the transitive adjective, let us examine the placement of the superficially

bare object. Consider, for example, the derivation of a string like *zo iemand helemaal trouw* (such a person entirely loyal, ‘entirely loyal to such a person’) in (68c), where *zo iemand* occupies the left periphery of the adjectival projection. Recall that the nominal complement cannot occupy a position in between the modifier *helemaal* and the adjective: **helemaal zo iemand trouw*. In other words, the nominal complement must move to the left periphery of the adjectival projection. Under the assumption that a modifier like *helemaal* ‘entirely’ occupies Spec,QP, the word order *zo iemand helemaal trouw* can be derived by moving (scrambling) the nominal complement to the edge position of the adjectival projection:

(81) $[_{QP} [_{PP} t_i [_{DP} zo\ iemand]]]_j [_{QP} helemaal [_{AP} [P_i+trouw] t_j]]$

As indicated in (81), I assume that the entire PP-complement has moved to the left periphery of the adjectival projection. The left peripheral position occupied by *zo iemand* in (81) is clearly a derived position. In line with the Freezing principle, this position is frozen: extraction of material out of the left peripheral prepositional phrase is blocked.²² For example, *wat* in (72a) cannot be removed from the noun phrase *wat voor iemand*, which is part of the XAP *wat voor iemand helemaal trouw*. Notice, finally, that subextraction from the superficially bare DP (actually, a PP) is also blocked when it has moved to a position in the clausal middle field (see (72b)). Clearly, *wat voor iemand* occupies a derived position in (72b) and, therefore, subextraction of the wh-element *wat* is impossible.

6 More PP-DP alternations and freezing effects

The previous section discussed adjectival expressions that exhibit a PP-DP alternation at the surface; for example, *trouw aan mij* (loyal to me) and *mij trouw* (me loyal). This section discusses another type of adjectival construction displaying a PP-DP alternation, viz., adjectival constructions featuring the degree word *te* ‘too’; see also Den Besten (1989), Hoekstra (1991), Corver (1997b), Broekhuis (2013) for discussion. As shown in (82a), this degree word is able to license an

²² Possibly, the silent PP-layer on top of the DP also plays a role in the impossibility of extracting material from within the object-DP. Normally, PPs are islands for extraction in Dutch (see Van Riemsdijk 1978).

indirect object PP headed by the preposition *voor*. Besides the pattern *te-A-PP*_{IO} we also find the surface pattern *DP*_{IO}-*te-A* (see (82b)).²³

- (82) a. Deze wijn is *(*te*) zoet voor mij.
 this wine is too sweet for me
 b. Deze wijn is mij *(*te*) zoet.
 this wine is me too sweet
 ‘This wine is too sweet for me.’

The degree word *te* in (82a,b), indicates that the subject of the adjective (*deze wijn*) possesses the property denoted by the adjective to an extent that exceeds a certain norm, where the norm is defined in terms of the person whose evaluation is given (i.e. the person sets the norm).

The question arises as to how the word order alternation in (82) can be accounted for. Also, how does this word order alternation interact with the phenomenon of freezing? In this section, I will try to give an answer to these questions. I will start my investigation, however, with the (basic) question whether the sequences *te-A-PP* and *DP-te-A* form constituents.

Evidence in support of the constituency of the sequence *te-A-PP* comes from various phenomena. First of all, as shown in (83a), fronting of the sequence yields a quite acceptable sentence. Secondly, the string can be substituted for by a pro-form *dat* ‘that’ (see (83b)). Thirdly, as shown in (83c), which must be pronounced with accent on *zoet* and *droog*, the string can function as a conjunct in a coordinate structure. Normally, a string functioning as a conjunct is taken to be a constituent.

- (83) a. ?*Iets te zoet voor mij* is deze wijn.
 a-little too sweet for me is this wine
 b. Deze wijn is *iets te zoet voor mij* en die wijn is
 this wine is a-little too sweet for me and that wine is
 dat ook.
 that too
 c. [En [*iets te zoet voor mij*] en [*iets te droog voor*
 and a-little too sweet for me and a-little too dry for
 mij]] is deze wijn.
 me is this wine

²³ This word order alternation is also found with adjectival expressions featuring the degree word *genoeg*, as in *Deze wijn is zoet genoeg voor mij* (This wine is sweet enough for me) and *Deze wijn is mij zoet genoeg* (this wine is me sweet enough; ‘This wine is sweet enough for me.’).

As shown by the following examples, the PP headed by *voor* can also occur at the left periphery of the XAP²⁴:

- (84) a. [?]*Voor mij iets te zoet* is deze wijn.
 for me a-little too sweet is this wine
- b. [?]*Deze wijn is voor mij iets te zoet* en die wijn is
 this wine is for me a-little too sweet and that wine is
 dat ook.
 that too
- c. [En [*voor mij iets te zoet*] en [*voor jou iets te*
 and for me a-little too sweet and for you a.little too
 zoet]] is deze wijn.
 sweet is this wine
- d. *Deze voor mij iets te zoete wijn* komt uit Oostenrijk.
 this for me a-little too sweet wine comes from Austria

Example (84a), in which the XAP has been fronted to the left periphery of the clause, sounds a little more degraded to my ear than does (83a). (84b) shows that the XAP containing the left peripheral *voor*-PP can be substituted for by the pro-form *dat*. In (84c), which must be pronounced with an accent on *mij* and *jou*, the XAP forms a conjunct of a coordinate structure. In (84d), finally, the sequence *voor mij iets te zoete* functions as an attributive modifier. This attributive behavior also suggests that the sequence functions as a syntactic unit.

The same constituency tests as in (83)–(84) can be applied to the sequence $DP_{IO} + te + A$. Some of the sentences have a slightly degraded status, but they do not seem to be completely impossible.

- (85) a. [?]*Mij iets te zoet* is deze wijn.
 me a-little too sweet is this wine
- b. *Deze wijn was mij iets te zoet* en die wijn was
 this wine was me a-little too sweet and that wine was
 dat ook.
 that too

²⁴ The attributive adjectival pattern in (84d) does not have a counterpart in which the *voor*-PP is at the end of the XAP. The ill-formed sequence *deze iets te zoete voor mij wijn* is ruled out by the principle that blocks right recursion for phrases occurring on left branches; see footnote 18.

- c. [?]Deze wijn was [niet alleen [niemand te droog] maar ook
 this wine was not only noone too dry but also
 [niemand te zoet]].
 noone too sweet
- d. Deze [*mij iets te zoete*] wijn komt uit Oostenrijk
 this me a-little too sweet wine comes from Austria

As shown by the examples in (86), both the IO-DP and IO-PP can be part of an XAP when the latter occupies a clause internal position. Observe that the IO-DP/PP follows a (preferably accented) clausal modifier.

- (86) a. ...dat deze wijn NOG NOOIT [(voor) ook maar iemand iets
 ...that this wine yet never for anyone a.little
 te zoet] was.
 too sweet was
- b. ...dat dit soort maatregelen AL JAREN [(voor) sommige
 ...that this kind measures already years for some
 mensen veel te gortig] zijn.
 people much too unacceptable are

Besides placement of the IO-DP/PP within the left periphery of the extended adjectival projection, it is also possible to move (“scramble”) the IO-DP/PP to a position in the clausal middle field.

- (87) a. ...dat deze wijn (voor) *de sommelier*_i NOG NOOIT
 ...that this wine for the sommelier yet never
 [t_i ook maar iets te zoet] was.
 even a.little too sweet was
- b. ...dat dit soort maatregelen (voor) *de meeste burgers*_i AL
 ...that this kind measures for the most citizens already
 JAREN [t_i veel te gortig] zijn.
 years much too unacceptable are

Before addressing the question whether subextraction is permitted from the IO-DP/PP, I briefly consider the internal syntax of the patterns *iets te zoet voor mij* (83), *voor mij iets te zoet* (84), and *mij iets te zoet* (85). Given the fact that the IO is selected by *te*, I assume that (*voor*) *mij* has its base position within the projection DegP; see (88a). I take the word orders *voor mij iets te zoet* and *mij iets te zoet* to be derived word orders. Specifically, the IO-DP/PP has been moved (scrambled) to a position in the left periphery of the XAP, as in (88b,c):

- (88) a. [_{DegP} iets [_{Deg'} [_{Deg'} te [_{AP} zoet]]] [_{PP} voor mij]]]
 b. [_{DegP} [_{voor mij}]_j] [_{DegP} iets [_{Deg'} [_{Deg'} te [_{AP} zoet]]] t_j]]]
 c. [_{DegP} [_{P \emptyset} mij]_j] [_{DegP} iets [_{Deg'} [_{Deg'} te [_{AP} zoet]]] t_j]]]²⁵

Having shown that the strings *te+A+PP*, *PP+te+A*, and *DP_{IO}+te+A* can form a constituent and having given an analysis of their internal syntax, let us now examine their subextraction behavior. Notice, first of all, that subextraction of an R-pronoun from within the PP (and from within the XAP) is permitted when the PP is in its base position (see (88a)). This is exemplified in (89a). As shown in (89b,c), however, subextraction is blocked when the PP occupies a movement-derived position. In (89b), subextraction takes place from a left-peripheral (scrambled) position within the XAP, and in (89c) from a scrambled position within the clausal middle field.

- (89) a. Het meisje *waar_i* deze opdrachten AL JAREN [*veel te*
 the girl who these exercises already years far too
moeilijk [*t_i voor*]] zijn (heet Susan).
 difficult for are (is-called Susan)
 ‘The girl for whom these exercises have been far too difficult (is called Susan).’
 b. *Het meisje *waar_i* deze opdrachten AL JAREN [[*t_i voor*]_j] *veel te moeilijk* t_j]
 zijn (heet Susan).
 c. *Het meisje *waar_i* deze opdrachten [*t_i voor*]_j AL JAREN [*veel te moeilijk* t_j]
 zijn (heet Susan).

Subextraction from the IO-DP is also ruled out (see also Hoekstra 1991:169). This is illustrated in (90c,d), where the *wh*-word *wat* has been moved out of a larger *wat voor*-noun phrase. Examples (90a,b) show that the indefinite IO noun phrase *zulke burgers* – say, the “non-interrogative” counterpart of the indefinite noun phrase *wat voor burgers* – can occur in the left periphery of XAP or in a clause-internal middle field position.

- (90) Ik wil weleens weten ...
 I want PRT know ..

²⁵ P \emptyset stands for a silent preposition. The question, obviously, arises how this silent P is licensed. Along the lines of the analysis given for transitive adjectives in section 5, one might propose that silent P results from incorporation of P into another (c-commanding) head. Possibly, the IO-P gets incorporated into the degree word *te*. I leave this issue for future research.

- a. ...of dit soort maatregelen_{SUBJ} ooit [zulke burgers_{IO}
...whether this sort measures one.day such citizens
te gortig] worden.
too unacceptable become
'...whether this kind of measures will get too unacceptable for such
citizens.'
- b. ... of dit soort maatregelen zulke burgers_i ooit [t_i te gortig] worden.
- c. *...wat_i deze maatregelen ooit [t_i voor burgers te
...what these measures one.day for citizens too
gortig] worden.
unacceptable become
'...for what kind of citizens these measures will get too unacceptable one
day.'
- d. *...wat_i deze maatregelen [t_i voor burgers]_j ooit [t_j te gortig] worden.

The examples in (90c,d) show that subextraction from a DP_{IO} is impossible. Since the DP_{IO} occupies a movement-derived position, this violation can be characterized as a freezing effect. Notice for the sake of completeness that displacement of the entire DP_{IO} (actually, a PP; see (88c)) is permitted:

- (91) Ik wil weleens weten wat voor burgers_i deze maatregelen
I want PRT know what for citizens these measures
ooit [t_i te gortig] worden.
one.day too unacceptable become
'I would like to know for what kind of citizens these measures will get too
unacceptable one day.'

Summarizing: in this section it was shown that the IO-DP/PP selected by the degree word *te* forms an island for extraction when it occupies a derived position in the left periphery of XAP or a derived position in the clausal middle-field.

7 Labeling and freezing

In the previous sections, we saw that subextraction from PP (i.e. extraction of an R-pronoun) or DP (i.e. *wat voor* split) is blocked if those constituents occupy a position in the left periphery of the adjectival expression or some position in the clausal middle field. Since those positions are derived (i.e. non-base) positions,

subextraction is blocked, in line with Ross's (1967) and Wexler & Culicover's (1980) insight that displaced constituents are islands for extraction. In the course of time, various proposals have been made to account for the islandhood of displaced constituents (see Corver 2006 for an overview). In Rizzi (2012), an analysis of freezing effects in terms of Chomsky's labeling theory (see Chomsky 2013) is proposed. According to Chomsky's labeling approach, displacement (I-merge) of a phrase XP (consisting of X and ZP) to some left peripheral landing site YP – in Rizzi (1997, 2006)'s terms: 'a criterial position' – creates a configuration like (92):

(92) [_α [_{XP} X_σ] [_{YP} Y_σ ~~XP~~]]

According to Chomsky's (2013) labeling theory, X and Y can jointly determine the label of α if they share the same criterial feature. This is what happens, for example, in the Dutch sentence (93), where the *wh*-word *wie* and the interrogative complementizer *of* share the interrogative feature Q.

(93) Ik vraag me af [_α [_{XP} *wie*_{+Q}] [_{CP} *of*_{+Q} [hij ~~*wie*~~ zag]]].
 I wonder REFL PRT who whether he saw
 'I wonder who he saw.'

If X and Y do not share a feature in (92), α won't get labeled, which yields an ill-formed structure (i.e. a structure which is not interpretable at the LF-CI-interface). This happens, for example, in (94a), where *wie* carries an interrogative feature Q and the complementizer *dat* carries the feature -Q (i.e. declarative). If the *wh*-phrase *wie* moves on, as in the long-distance *wh*-extraction pattern in (94b), labeling of α is possible; this for the reason that the copy of *wie* is invisible for labeling. In other words, the declarative complementizer C_{-Q} labels α as CP_{-Q} .

(94) a. *Jij denkt [_α [*wie*_{+Q}] [_{CP} *dat*_{-Q} [hij ~~*wie*~~ zag]]].
 you think who that he saw
 b. [*Wie*_{+Q}] denk jij [~~*wie*~~_{+Q} [_{CP} *dat*_{-Q} [hij ~~*wie*~~_{+Q} zag]]]?
 who think you that he saw
 'Who do you think that he saw?'

Consider now what happens when an element is extracted out of a displaced phrasal constituent. Schematically, we have the representation in (95). A concrete example instantiating this pattern is given in (95b). In this example, a preposition is stranded in an intermediate landing site position.

- (95) a. *ZP [_α [_{XP} ZP X] [_{YP} Y_G ~~XP~~]]
 b. *Waar denk je [_α [_{PP} waar aan] [_{CP} dat_Q Jan een
 who/what think you to that Jan a
 boek ~~waaraan~~ gaf]]?
 book gave
 ‘Who/what do you think that Jan gave a book to?’

As Rizzi (2012) points, the ill-formedness of patterns like (95b) follows from labeling: X (= *aan*) and Y (= the complementizer *dat*) compete for labeling of α. They are equally close to α and consequently both qualify as potential labeling candidates. Since they do not share a relevant feature, α cannot be labeled via feature sharing. A consequence of this situation is that α does not get labeled. Therefore the structure is ill-formed (i.e. uninterpretable at the LF-CI interface).

For reasons of space, I will not show for each freezing effect discussed in the previous sections how it can be derived. On the basis of the freezing effect exemplified in (96), however, I will show how freezing effects in the adjectival domain can be accounted for in terms of labeling theory.

- (96) *Waar_i is Jan [_{t_i} van (veel) afhankelijker] geweest?
 what has Jan on much dependent-COMPAR been
 PP + A-COMPAR (Compare (53b))
 ‘What has Jan been (much) more dependent on?’

In my discussion of example (53b), I assumed that displacement of PP to the left periphery of the extended adjectival projection (XAP) involved adjunction to XAP’s highest functional layer; see example (97), which is a slightly adapted version of example (56).

- (97) [_{QP} [_{PP} waar van]_j [_{QP} veel [_{Q'} afhankelij_{k_i}-er_[comparative] [_{AP} t_i t_j]]]]]

Suppose that, in line with Rizzi’s cartographic approach, displacement of PP to XAP’s left periphery involves movement to the “specifier” position of a designated functional projection. In (98a), I represent this left peripheral node as CP_A (i.e. the highest functional projection in the XAP, which functions as a landing site for XAP-internally displaced constituents). Extraction of *waar* out of the displaced PP yields the configuration in (98b).

- (98) a. ... [_α [_{PP} waar van]_j [_{CP} C_A [_{QP} veel [_{Q'} afhankelij_{k_i}-er_[comparative] [_{AP} t_i t_j]]]]]]]
 b. Waar_k [_α [_{PP} t_k van]_j [_{CP} C_A [_{QP} veel [_{Q'} afhankelij_{k_i}-er_[comparative] [_{AP} t_i t_j]]]]]]]

After *waar* has been moved out of the left-peripheral PP, P (*van*) and (adjectival) C are in competition with each other for labeling of α . As a result of that, the entire extended adjectival projection cannot be labeled, and, consequently, the structure is ill-formed.

When the entire PP (*waarvan*) leaves the “specifier” of adjectival CP, as in (99), no labeling problem arises: the trace/copy of *waarvan* is not visible. Adjectival C wins the competition for labeling, and consequently the highest projection of the XAP has a label and is interpretable at the LF-CI interface.

- (99) a. *Waarvan_k is Jan [t_k (veel) afhankelijk_{er}] geweest?*
 what.on is Jan much dependent-COMP_{AR} been
 ‘On what has Jan been (much) more dependent?’
- b. *Waarvan_k [α t’_k [_{CP} C_A [_{QP} veel [_Q afhankelijk_i-er_[comparative] [_{AP} t_i t_k]]]]]*

In this section, I showed how Rizzi’s (2012) analysis of freezing effects in terms of Chomsky’s (2013) labeling theory can be extended to freezing effects in the Dutch adjectival system.

8 Conclusion

The phenomenon of freezing has mostly been studied from the perspective of the clausal domain (i.e. the extended verbal projection, in the sense of Grimshaw 1991/2005). Satellite constituents (e.g. a PP-complement) of the verb that have undergone displacement are typically frozen in their derived positions; that is, subextraction is blocked. From the perspective of cross-categorial symmetry, one would expect to find freezing effects not only in the clausal domain but also in other types of phrasal domains. That is, islandhood of a phrase XP as a result of displacement of that XP is expected to be a cross-categorial phenomenon in human language. In this chapter I have tried to show for the extended adjectival projection (XAP) that displaced satellites that find their origin in an XAP-internal base position get frozen once they end up in a derived position. This derived position can be XAP-internal (e.g. the left periphery of the XAP) or some XAP-external position (e.g. a scrambled position in the clausal middle field). It was further shown that the various freezing effects involving the adjectival system could be derived in terms of Rizzi’s (2012) account of freezing phenomena, which is based on Chomsky’s (2013) theory of labeling.

An important ingredient of my analysis of the Dutch adjectival system concerned the distinction between “regular” (i.e. structurally non-composite) adjectives such as *bang* ‘afraid’, on the one hand, and deverbal (i.e. structurally composite) adjectives, such as *afhankelijk* ‘dependent’, on the other hand. The former class takes its (base-generated) PP-complement to the right (i.e. A + PP). The latter class has two options: The base-generated PP-complement occurs either to the left of an XAP-internal verbal root (i.e. PP + V) or to the right of a derived deverbal adjective ([_A V+*elijk*] + PP). It was further shown that adjectives such as *afhankelijk* can also behave like “regular” adjectives (like *bang* ‘afraid’). In that case, they are non-composite adjectives (i.e. [_A *afhankelijk*]) that take their complement to the right (i.e. A + PP). A consequence of this mixed behavior of deverbal adjectives is that there is more than one structural base position for PP-complements. Specifically, in both (*erg*) *daarvan afhankelijk* (very that.on dependent; ‘very dependent on that’) and (*erg*) *afhankelijk daarvan*, the PP *daarvan* occupies a base position. As a consequence of that, subextraction is possible from both structural positions.

Another outcome of my analysis of the Dutch extended adjectival projection is that displacement is a quite common phenomenon within the Dutch adjectival domain. Obviously, it would be interesting to find out whether XAP-internal displacement is also attested in languages other than Dutch, and if so, whether it triggers freezing effects. I will leave the cross-linguistic study of freezing effects in the adjectival system to future research.

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Jutta M. Hartmann

Freezing in *it*-clefts: Movement and focus

Abstract: This paper discusses the interaction of Freezing with movement and focus on the basis of subextraction from the pivot of *it*-cleft sentences. It shows that subextraction is in principle possible, and that it is not sensitive to whether the pivot is related to a derived subject or real object. However, if the context induces an additional contrastive focus on the pivot, extraction is less acceptable. It is suggested that the problem is that two different sets of alternatives need to be construed on the basis of one and the same syntactically marked focus phrase, the pivot. Once the two sets of alternatives are syntactically separated, interpretation is less complex and licit.

Keywords: *it*-clefts, subextraction, focus phrase, contrastive focus, passive, derived subject, subject island

1 Introduction

The notion of Freezing has been used to refer to a range of empirical observations of different types (for an overview see Corver 2006; Hartmann et al. this volume) and different proposals have been put forward for partly overlapping sets of data. This paper addresses the restriction of subextraction from noun phrases in interaction with information structural constraints.

Previous work on subextraction from noun phrases has isolated a number of factors that facilitate/constrain it. Most prominently these are: definiteness vs. indefiniteness of the base noun phrase (i.e. the noun phrase from which a phrase is extracted) (see originally Erteschik-Shir 1973); class and interpretation of the head noun (Davies & Dubinsky 2003); the position of the noun phrase, i.e. subject vs. object (see Ross 1967), subject/adjunct vs. complement (see the CED in Huang 1982; Müller 2010 for a recent discussion and references) or the syntax of the selecting verb (unaccusative vs. unergative, see Chomsky 2008); the aspectual class of the selecting verb (see Diesing 1992; Erteschik-Shir 1981; Kluender 1992); the referentiality of the extracted phrase (see originally Pesetsky 1987, from a processing perspective Kluender 1992; Hofmeister 2007); and last but not least subextraction has been claimed to be restricted from moved phrases, i.e. Freezing (see the definition of the Raising Principle in Wexler &

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Culicover 1980 defined below; for further discussion see Corver 2017; Hartmann et al. this volume and references therein).

While these restrictions are well documented (though not necessarily settled), less attention has been paid to the information-structural constraints that are relevant for the availability of (sub)extraction. Subextraction has been suggested to be only possible from the focus domain, see Erteschik-Shir (1973, 1997), and/or impossible from topic positions, see Meinunger (2000); Bayer (2005); Erteschik-Shir (1997). The restrictions discussed with respect to focus do not distinguish between different types of foci. The contexts and examples used suggest that the restriction can be subsumed under the notion of new information focus, which has been argued to be different from the notion of contrastive focus broadly defined (see Halliday 1967; Rochemont 1986; Drubig 1994, 2003; É. Kiss 1998; Winkler 2005; Rochemont 2013; Hartmann 2016 for the distinction and discussion). A question that has been hardly addressed so far is: How does contrastive focus interact with subextraction? Thus, a central goal of this paper is to investigate the availability of subextraction from the domain of a contrastive focus, namely from the clefted constituent/pivot in clefts as in (1).

(1) ?What was it an increase in that the parliament discussed?

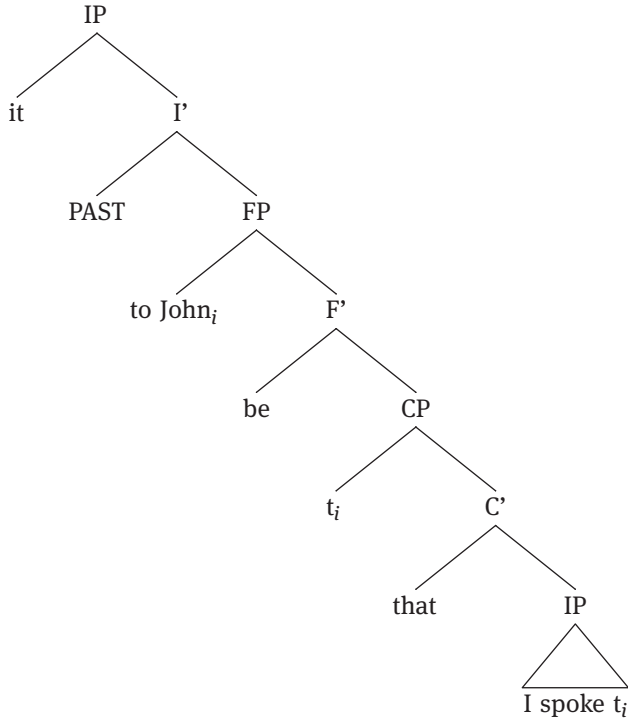
On first sight, it seems straightforward, that (1) shows that extraction from a contrastive focus position is indeed felicitous, and the validity of the judgment in (1) has been supported empirically in Hartmann (2013), who concluded that the availability of subextraction shows that the movement analyses of clefts should be discarded, assuming that the Freezing Principle indeed holds.

However, the empirical validity of the Freezing Principle as a general syntactic restriction on extraction from moved phrases has been called into question more recently. Instead it has been discussed that the effects of Freezing, are rather due to information-structural and processing effects (see among others Winkler et al. 2016; Hofmeister et al. 2015; Culicover & Winkler this volume). Thus, two issues are relevant here: (i) Is there further evidence that the pivot in cleft does not pattern with moved constituents (as argued in Hartmann 2013)? (ii) What are the information-structural and context effects with extraction in clefts? These questions will be investigated in turn in this paper.

The first question is relevant to the overall study of Freezing in general. There are a number of analyses of *it*-clefts that propose that the pivot is moved to a focus

position (see Chomsky 1977; Rochemont 1986; É. Kiss 1998; Meinunger 1998, to some degree Frascarelli & Ramaglia 2013), roughly along the lines as in (2).¹

(2) É. Kiss (1998: 245)



The availability of subextraction as in (2) can be interpreted in two ways: (i) the Freezing Principle holds, and therefore, the pivot movement analysis of clefts is not adequate (see Hartmann 2013 for this conclusion); or (ii) the clefted constituent is moved, but the Freezing Principle does not hold (the Freezing Principle in the sense of the original Raising Principle defined below; see Müller 2010 for example, Corver 2017 for further discussion). For (i), we expect that subextraction from pivots in clefts differs from subextraction from moved phrases, such as a

¹ For an overview of different analyses of clefts see Hartmann (2016). Non-movement analyses are named as such with respect to whether or not the pivot is moved from inside the cleft clause to a left-peripherally position of that cleft clause. In non-movement analyses, where the cleft clause is taken to be a relative clause, there is still operator movement inside the cleft clause.

derived subject in a pair such as in (3). For (ii), we expect them to behave alike. The investigation of this potential difference will be discussed in section 2.

- (3) Without judgment:
- a. What was it an increase in that was discussed by government?
 - b. What was an increase in discussed by government?

The second question concerns the role of contrastive focus for the extraction in clefts, a question which is not addressed in Hartmann (2013) with respect to clefts and it hasn't received much attention in the literature on extraction restrictions (except for the literature on intervention effects; see Beck 2006; Haida & Repp 2013 and references therein). This question will be dealt with more extensively in the second part of the paper. As we will see from the first section, subextraction from the pivot in clefts is equally possible as subextraction from object position, i.e. there is a degradation in acceptability in both types of structures. This result will be the basis for the second part of the paper, where the effect of a contrastive focus on the pivot is investigated. The discussion will be based on the analysis of clefts as being necessarily contrastive on the pivot (see Rochemont 1986; É. Kiss 1998 contra Prince 1978; Delin 1990; Hedberg 1990), contrastive in a sense that will be made explicit below (for discussions on the notion of contrast see Molnár 2006 and Repp 2010, 2016 and references therein).

The structure of the paper is as follows. Section 2 will be concerned with the question of whether clefts pose a counter-example to the Raising Principle, or whether the movement analysis of *it*-clefts should be discarded instead. Section 3 discusses the role of contrastive focus and provides experimental evidence that suggests that contrastive focus on the pivot and/or subparts of the pivot interacts with *wh*-movement. The data suggests that it is impossible for two operators to target two separate parts of the same focus phrase, as proposed in Krifka (2006). This observation will be hypothesized to follow from interpretative problems when two different alternative sets need to be interpreted in Section 4. The last section concludes the paper.

2 No Movement, no Freezing in *it*-clefts

2.1 Introduction

In this section, I address the question whether the results of Hartmann (2013), namely that (4) is grammatical, should be taken as an argument against the

movement analysis of clefts, or should be considered as counter-evidence to the Freezing generalization based on the Raising Principle in Wexler & Culicover (1980), where Raising corresponds to movement.

(4) ?What was it an increase in that the parliament discussed?

(5) Raising Principle

If a node A is raised, then no node that A dominates may be used to fit a transformation. (Wexler & Culicover 1980: 143)

Alternatively, the Movement Hypothesis of Clefts as formulated in (6), illustrated in (7) and (2) might be correct:

(6) Movement Hypothesis of Clefts

The pivot in cleft sentences is moved to a focus position.

(7) it was [_{Focus} JOHN₁ [_{CP} t₁ that t₁ left]]

If the Raising Principle is correct, we predict that extraction from a moved phrase is degraded as opposed to extraction from a phrase in its base position, see the literature on the extraction restriction of derived subjects (an overview is provided in Corver 2006: section 3.5.). If we additionally do not see a reflex of this pattern in *it*-clefts, we can reject the Movement Hypothesis of Clefts. If we do not find a difference in acceptability for the extraction from in-situ noun phrase as opposed to an ex-situ noun phrase, there is indeed a case to be made against the Raising Principle, and then, no conclusion can be drawn from the *wh*-movement data for the Movement Hypothesis of Clefts.

2.2 Method

2.2.1 Design and materials

In order to test the validity of the Raising Principle as well as the Movement Hypothesis of clefts, three factors are necessary. First, we need to investigate both non-clefted clauses versus *it*-clefts. Second, as clefts are focus constructions and focus constructions are generally rated slightly worse than regular SVO sentences, it is necessary to control for this difference (see Hartmann 2013 for discussion). Thus, it is not enough to just compare different extractions, but we also need to have the non-extracted versions as a base-line for extraction.

Third, we need to compare extraction from a noun phrase in its base position to a noun phrase in a derived position. In principle one might want to take a complex noun phrase in an A'-position, i.e. either a topicalized phrase, or a *wh*-phrase in an embedded *wh*-question. The former is not a good testing ground in experimentation, as embedded topicalization is extremely marked in English (see Jäger this volume). Additionally, the full paradigm requires embedding in a cleft clause, thus, an embedded *wh*-clause would make the structure rather complex to begin with and add a further factor, namely embedded *wh*-movement. In order to avoid complex structures of this type, I chose to test differences in subextraction from a complex derived subject noun phrase in passive vs. a complex object.²

Thus, the relevant examples to be tested are the following in (8) where subextraction targets an object, and (9) where subextraction targets a derived subject (with the subject being raised from object position).

(8) Comparison of objects (active)

- a. [cleft-base] It was a manipulation of data that the committee criticized.
 - b. [cleft-sub] What was it a manipulation of that the committee criticized?
 - c. [SVO-base] The committee criticized a manipulation of data.
 - d. [SVO-sub] What did the committee criticize a manipulation of?
- (Hartmann 2013: 490)

(9) Comparison of derived subjects (passive)

- a. [cleft-base] It was an increase in taxes that was discussed by government.
- b. [cleft-sub] What was it an increase in that was discussed by government?
- c. [SVO-base] An increase in taxes was discussed by government.
- d. [SVO-sub] What was an increase in discussed by government?

² Note that this design does not rule out that a difference in subextraction of the moved noun phrase vs. in-situ noun phrase is actually a difference in subextraction from objects vs. subextraction from subjects (see the extensive literature on subject islands and explanations independent of the freezing principle Ross 1967; Huang 1982 and follow-up work). Two comments are in order here; first, it has been shown that in-situ subjects are not necessarily opaque to extraction (see Haider 1983; Lasnik & Saito 1992; Stepanov 2001; Müller 2010; Winkler et al. 2016); second, the main concern is on the one hand the rejection of the Cleft Movement Hypothesis and on the other to establish the base line for the experiments in the second part. Thus, a potential restriction on extraction from subjects is less of a concern than using extraction from embedded *wh*-phrases. The difference in the acceptability of clefts and non-clefts is not predicted if the pivot moves through the derived position to another position, independent of whether we observe a violation of the raising principle or some type of subject island violation.

Table 1: Expected outcomes for the difference between base and subextraction in the different construction types.

Raising Principle	MAC	SVO object	SV derived subject	cleft object	cleft derived subject
✓	✓	small	large	large	large
✓	*	small	large	small	small
*	✓	no difference			
*	*	no difference			

Within the different theories we expect the outcomes as in Table 1. The first two columns define whether or not the raising principle and the movement analysis of clefts (MAC) hold, the next three columns indicate the expected outcome, which is measured as the difference between the clause with extraction vs. without, i.e. the decrease in acceptability ratings compared to the base structure.

Twenty-four lexical variants of the kind in (8) and (9) were created and spread across eight different lists in a Latin Square design. Thus, each condition was tested three times, which seems a good compromise to be able to test all the relevant conditions and at the same time, still have enough distractors while not asking too much from the participants in the experimental sessions.

Besides the 24 test sentences from this experiment another 46 fillers were added, which included another experiment suitable as distractor for this experiment.

2.2.2 Procedure

The study was set-up online in OnExp as a thermometer study (see Featherston 2008), a version of the magnitude estimation technique (see Bard et al. 1996). After a training phase in which participants had to judge the length of lines, the participants' task was to judge the naturalness of sentences in relation to two reference sentences on a scale between 20 and 30. Participants can provide higher and lower scores than these two. This method has the advantage that the interval scale used allows statistical analysis of variance. Furthermore, participants can use an open scale, which allows the precise rendering of perceived differences. Before the actual study, participants went through another training phase judging sentences to become acquainted with the method. After the training phase participants rated 70 sentences of which 24 sentences were relevant test sentences for this study.

2.2.3 Participants

A total of 192 participants took part in the study (24 per List). Participants were recruited via Mechanical Turk and were paid \$3 for their participation. Participants' age ranged from 18 to 69 years, with a mean age of 35.4 years. Participants had to provide their mother tongue. Twelve participants were excluded from the analysis because their mother tongue was not English or not exclusively English.

2.3 Results

Raw ratings were z-transformed per participant (with fillers included) and aggregated within conditions for each participant (F_1) or item (F_2). The raw results and z-transformed values calculated per condition are provided in Table 2 and in Figure 1.

The results were analyzed with two repeated measures ANOVAs with subjects and items as random effects. There were three factors with two levels each. All three factors give rise to a significant main effect. Overall the difference between objects (active) versus derived subjects (passive) is significant: sentences containing objects are overall rated better than the passive counterpart with a derived subject ($F_1(1,179) = 117.2$, $p < .0001$; $F_2(1,23) = 46.4$, $p < .0001$;). Additionally, there is a main effect of construction type. Cleft sentences are overall rated worse than SVO sentences ($F_1(1,179) = 131.9$, $p < .0001$; $F_2(1,23) = 99.7$, $p < .0001$;). Finally, *wh*-extraction is overall rated much worse than base

Table 2: Mean ratings per condition experiment 1.

Condition		Raw Rating		Z-score	
		Mean	StdDev	Mean	StdDev
Obj-Cleft-Base	1	27.68	8.12	.20	.69
Obj-Cleft-Extr	2	22.54	8.23	-.52	.81
Obj-SVO-Base	3	31.93	8.87	.79	.73
Obj-SVO-Extr	4	27.90	8.69	.19	.82
Subj-Cleft-Base	5	29.01	12.48	.32	.75
Subj-Cleft-Extr	6	22.49	9.93	-.55	.84
Subj-SVO-Base	7	31.78	13.76	.69	.76
Subj-SVO-Extr	8	19.83	7.49	-.91	.78

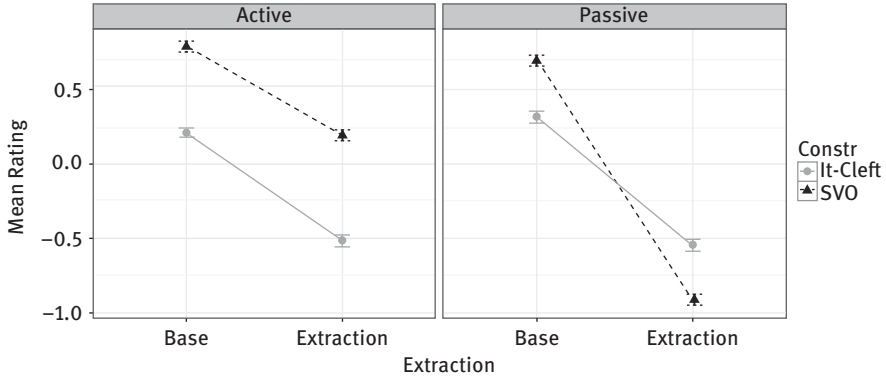


Figure 1: Normalized Mean Ratings Experiment 1 (Errorbars show SE).

sentences ($F_1(1,179) = 619.2$, $p < .0001$; $F_2(1,23) = 703.1$, $p < .0001$). Additionally, we get a three-way interaction ($F_1(1,179) = 171.2$; $p < .0001$; $F_2(1,23) = 86.8$, $p < .0001$). This three-way interaction is due to the interaction of the factors Construction*Extraction in the derived subject conditions ($F_1(1,179) = 110.2$, $p < .0001$; $F_2(1,23) = 126.6$, $p < .0001$), an interaction which is marginal in the object conditions ($F_1(1,179) = 4.4$, $p = .04$; $F_2(1,23) = 3.5$, $p = .07$). Crucially, as expected under the Raising Principle, extraction has a much stronger effect in regular sentences, when the DP is a derived subject (mean difference in regular sentences between base and extraction: 1.6) than when it is in object position (mean difference in regular sentences between base and extraction: .6), the differences are significant, as a t-test comparing the decrease for extraction from derived subjects (mean difference in regular sentences: 1.6) vs. from derived object (mean difference in regular sentences: .6) reveals: $t_1(1,179) = -15.7$, $p < .0001$; $t_2(1,23) = -15.5$, $p < .0001$). There is a much smaller, but marginally significant difference in clefts: while the decrease for subextraction when a derived subject is clefted amounts to .9, the difference is .7 when an object is clefted ($t_1(1,179) = -2.4$, $p < .05$; $t_2(1,23) = -2.1$, $p = .05$). I put this difference aside.

2.4 Discussion

The results can be summarized as follows:

1. Subextraction from NP constitutes a violation which leads to a decrease in acceptability ratings. This violation occurs both in SVO sentences as well as in clefts.

2. Cleft sentences are generally judged less acceptable than SVO sentences. Thus, we see a cumulative effect of the markedness of cleft sentences and subextraction.
3. While subextraction in SVO sentences is sensitive to whether the noun phrase is a base-generated object or a derived subject, we do not see such an effect in cleft sentences.

The clear drop in acceptability in SVO sentences with subextraction from objects vs. subextraction from derived subjects supports the Raising Principle, or at least any principle that distinguishes objects from derived subjects.³ More importantly clefts are not sensitive to the difference whether the position in the cleft clause is an object or a derived subject. Thus, I conclude that the movement analysis of clefts has to be rejected, also on the grounds of *wh*-extraction restrictions (for plenty of other reasons to reject the movement analysis of clefts, see Hartmann 2016).

3 Extraction from a Contrastive Focus Domain

3.1 Introduction

From the previous discussion, we have seen that subextraction from the pivot in *it*-clefts is possible even though we do see a decrease in ratings with subextraction. Subextraction from the pivot does give rise to the same decrease in ratings independent of whether the gap in the cleft clause is a object gap or a derived subject gap. I concluded that the pivot is not moved via the subject position to the cleft position; from a syntactic perspective, this result is not compatible with a movement analysis of clefts.

³ Note that these results are not compatible with Chomsky (2008), who claims that extraction possibilities distinguish subjects from derived subjects (contra the raising principle), see also Surányi & Turi (this volume); Polinsky (this volume) for more extensive discussion of extraction possibilities of subjects. Note that I used *wh*-extraction here, so we might well find interactions with information-structural restrictions, see Erteschik-Shir (1973); Bayer (2005); Winkler et al. (2016), with subjects being topics in regular SVO sentences but not in clefts, see Surányi & Turi (this volume) for discussion on this issue, and the finding for Hungarian that the topic status does not rule out extraction generally. I leave the investigation of the relevance of topichood to future research.

In this part, I turn to the information-structural aspects of subextraction. It has been suggested in the literature, that information structure is a factor that is relevant (if not decisive) for a number of extraction restrictions including Freezing. Erteschik-Shir (1973) argued already that extraction can only be from a information-structural domain, which she calls the dominant part of a clause, i.e. the part of the clause that is neither given nor presupposed, so some type of new information. She explicitly excludes contrastive focus, because the non-dominant part of the clause can contain a contrastive focus (Erteschik-Shir 1973:11) (underline marks the dominant part):

(10) It is very significant that JOHN ate the porridge. (Erteschik-Shir 1973: 11)

From this perspective, clefts provide an interesting testing ground: the clefted constituent is part of the dominant part of a cleft clause, so (sub-)extraction should be fine. However, there is an issue as to whether the whole pivot can and should be considered the unique domain of contrastive focus, or whether it just needs to *contain* the contrastive focus. As we will see in this section, *wh*-extraction helps to understand the issues here. And it further supports Erteschik-Shir's point that the relevant information-structural concept is not generally a focus domain, but the restriction is rather that extraction cannot target given/presupposed constituents.

In order to reach this point, I will first argue that cleft sentences indeed are contrastive. Then, I will discuss the relevance of the pivot being the unique and complete domain of contrastive focus. Then I present the experimental studies that support these observations.

3.2 *It*-clefts and contrastive focus

This section argues that the pivot in clefts should be generally analyzed as a contrastive focus, a claim that has been made previously (see among others Rochemont 1986; É. Kiss 1998, contra Prince 1978; Delin 1990; Hedberg 1990, see Hartmann 2016 for in-depth discussion). This section serves as the theoretical background for the investigation in the following sections.

First, ICs clearly contain a marked/contrastive focus and not just a new information focus. Independent of the information status of the pivot as given or new, there is always a focus effect of contrast (see Hartmann 2016 for a detailed proposal). Consider (11) from Hartmann (2016: 256). In this context, Jan Timman is already introduced and thus, given. The cleft clause provides new information.

Yet, the whole sentence still expresses the contrast that Jan Timman and not any of the others gained the attention of the Dutch.⁴

- (11) Context: In the Pilkington Glass World Chess Championship semi-finals at Sadler's Wells, the former world champion, **Anatoly Karpov**, has taken a 2-1 lead after his opponent, **Artur Yusupov**, resigned the adjourned third game of their match yesterday. In the other semi-final, **Jan Timman** leads **Jonathan Speelman**, also by 2-1. [...] The scene as the game was adjourned on Thursday night told the whole story: **Yusupov**, head buried in hands, glumly contemplated the ruins of his previously wonderful position; **Karpov** stood impassively behind his own chair, surveying the battleground with quiet authority.

IC: But **it is Jan Timman who has gained the attention of the Dutch.**

PoT: The Netherlands' chess tradition dates back to 1935 when Dr Euwe won the world championship. [...]

(BNC, A3G, 267–280; Title: Karpov discovers fear is the key to winning ways, By WILLIAM HARTSTON, Chess Correspondent)

The contribution of the contrasting focus can be informally described as follows.^{5,6}

(12) **Contrasting Focus Hypothesis**

ICs express Contrasting Focus, i.e. there is an asserted proposition p and an alternative proposition q such that

- i. $p = \alpha(\beta)$; where α corresponds to the background/cleft clause and β to the focus phrase/pivot
- ii. $q = \alpha(x)$ where $x \in \{ALT(\beta)\}$;
- iii. $q \neq p$;

⁴ For the analysis of examples from the British National Corpus (BNC), I provide first the context, then the target IC and additionally some text following the cleft. This text is abbreviated as PoT (Post *it*-cleft text).

⁵ A weaker version of the CFH is exchanging (iv) with (iv'):

(iv') p is asserted, q is excluded as potential development of the common ground (along the lines of Krifka 2015)

⁶ As an anonymous reviewer pointed out, it is questionable whether (iii) in (12) is necessary, i.e. whether β is itself part of $\{ALT(\beta)\}$; this partly formal approach is in the spirit of the focus semantic value of Rooth (1992) and the comparability operator \approx in Krifka (1992), both of which include β in the respective set. That is why (iii) is included. Thus, I take $ALT(x)$ to select all the relevant alternatives. How the contextual relevant set of alternatives is selected depends on the context as well as the intonation. I leave the exact process open to future research.

- iv. p and q are mutually exclusive, i.e. p and q are asserted with opposite truth values (strong version);
(adjusted from Hartmann 2016: 253)

Here I follow the strong version and I take the cleft operator that contributes to the focus interpretation to add the two propositions p and q with opposite truth values to the common ground. For a sentence such as (13) this can be illustrated as in (14).

- (13) Who thought of it? Binyon, or Pound? Hugh Kenner is no doubt right to suppose that *it was Pound who had been thinking of it*. (BNC, A1B, 377, quoted from Hartmann 2016: 254)

- (14) It was Pound who had been thinking of it.

p = thought-of-it(Pound)

q = thought-of-it(x) where $x \in \{ \text{Pound, Binyon} \}$

→ q = thought-of-it(Binyon)

p and q are mutually exclusive: p is asserted as true → q is asserted as false.

(Hartmann 2016: 255)

This focus contribution is also present in various sub-classes of clefts which have been argued to be non-contrastive or not even focus. A case in point are the so-called Topic-Comment clefts (see Hedberg 1990):

- (15) But why is everybody so interested in uranium? Because it is uranium that you need to produce atomic power. (Declerck 1984: 263)

The question inquires about uranium. Thus, uranium is given and the topic of this utterance. The cleft clause asserts that everyone is interested in uranium, because uranium is the one element that is needed for producing atomic power. This is not the case for other elements, such as gold. The semi-formal analysis is given in (16).

- (16) p = need-to-produce-atomic-power(uranium);
q = need-to-produce-atomic-power(x), where $x \in \{ \text{uranium, gold, ...} \}$
q is false: \neg need-to-produce-atomic-power(gold)

This short discussion is meant to show that indeed the pivot in clefts is contrastively focused. Sub-classes of clefts can be defined on the basis of the information-status or correspondingly intonational differences (as in Delin 1989), yet all of these cases exhibit contrastive focus (for further discussion see Hartmann 2016).

3.3 Focus domain and the role of extraction

With this much background on the contrastiveness of clefts, I want to turn to interaction of contrastive focus and *wh*-extraction. This point needs to be considered carefully, as *wh*-extraction is just like a focus operator. The question is how these do interact. The focus domain or the domain for the question operator might be smaller than the pivot. This issue relates to the discussion whether or not there is a focus phrase that establishes the focus domain, as defined and discussed in Drubig (1994); Krifka (2006).⁷

That it is indeed the pivot and not the subpart of the pivot that is the relevant domain can be shown on the basis of a set of example provided in Velleman et al. (2013) (though analysed differently than done here):

- (17) It was JOHN'S eldest daughter who attended the party.
- a. ... and 200 of her closest friends were there.
 - b. ... and John's YOUNGEST daughter was ALSO there.
 - c. #... and MARY'S eldest daughter was ALSO there.
- (Velleman et al. 2013: 448)

Their observation is that the cleft operator does not give rise to an inference that noone came to the party. Rather the cleft operator associates with the focused phrase, and thus only the continuation in (17-c) is ruled out.⁸

Note though that any analysis taking a subpart of the pivot being the focus needs to ensure that the cleft operator does not directly exhaustify the prosodically marked constituent. The sentence *It was JOHN'S eldest daughter who attended the party.* cannot plausibly mean that it was the daughter of only John who attended the party. So, this shows that the domain for establishing the relevant alternatives is indeed the whole pivot, however, the prosodical marking of the pivot can reduce the number or relevant alternatives (see Hartmann 2016 for further discussion).

⁷ Krifka (2006) discards cleft sentences as arguments in favour of FP, because the effects could as well be a result of moving the pivot. As I showed above, the pivot is not moved in *it*-clefts, thus, clefts can be considered another argument in favor of FP, as will become clear in the following discussion.

⁸ In the analysis by Velleman et al. (2013) this means that the cleft is an answer to the current question under discussion (=CQ) *Whose eldest daughter attended the party?* The cleft provides an exhaustive answer to this question.

Thus, this set of data supports an analysis in which the domain of focus is relevant, a discussion that has been raised considering the notion of focus phrase in Drubig (1994). Krifka (2006) argues that if there is indeed a focus phrase, we expect that it is impossible to have two operators associating with two different elements inside a focus phrase (adapted from Krifka 2006: 127).

(18) *FO_i FO_j [... [... F_j ... F_i ...]_{FP} ...]

The examples he suggests for evaluating this claim are based on the combination of islands with two focus operators, as in (19):

(19) Context: He only recommended the woman that had rescued the orphan_{F1} children from Somalia to the prime minister.
Also₁, he only₁ recommended [the woman that had rescued the orphan_{F1} children from Eritrea_{F2}] to the prime minister. (Krifka 2006: 128)

As Krifka (2006: 127) acknowledges: ‘The relevant data are not easy to judge because instances of multiple focus are complex to begin with, and even more so when we embed foci in islands.’ I would like to suggest a different test here. If the pivot corresponds to the focus phrase in cleft sentences, we expect the following configuration to be illicit (Q-OP = question operator; CLEFT = cleft operator):

(20) #Q-OP₂ CLEFT₁ it is [F₁ ... F₂] [cleft clause]

Following Beck (2006), I take the interpretation of *wh*-questions to be similar to the interpretation of focus sentences. Thus a sub-extracted *wh*-phrase can be taken to correspond to F₂ and the question operator (Q-OP₂) is another focus operator besides the cleft operator and it associates with the *wh*-phrase.⁹ The interpretation of F₁ as contrastive independent of the cleft can be ensured by providing a contrastive phrase in the context such that the noun left in-situ is contrasted. Thus, the relevant test sentences look as follows:

(21) I already know that the parliament talked about a decrease in taxes yesterday, but what was it an increase in _____ that the parliament discussed?

⁹ I take both the question operator and the cleft operator to be silent operators that associate with the *wh*-phrase/pivot; see Rochemont this volume for related discussion concerning *only*.

If Krifka's restriction in (18) is correct, it predicts that the configuration in (22) and illustrated in (23) is licit, as both F_1 and F_2 operate on the same set of alternatives for FP.

(22) Q-OP₂ CLEFT₁ it is [N]_{F₁, F₂} [FOC-OP₃ cleft clause F₃]

(23) I already know that the parliament talked about a decrease in taxes yesterday, but what was it _____ that the parliament discussed an increase in _____ ?

Thus, I will investigate whether the following hypothesis is true:

(24) Focus Phrase Hypothesis

- a. The pivot in cleft clauses corresponds to the FP.
- b. As a result, the cleft operator cannot target a subpart of the pivot, when at the same time another operator (e.g. a question operator) targets a different subpart (e.g. a stranded noun)

In order to test the hypothesis in (24), I first turn to set-up and test the appropriate context for the base sentences in order to ensure that any effect that we see with *wh*-extraction is actually an effect of the extraction, and not just the context.

3.4 Testing context: Experiment 2

In order to test the intended configuration, I first want to establish, whether the contexts for the contrastive interpretation of a subpart of the pivot are felicitous. Additionally, this experiment serves to establish to what extent the same context is acceptable for SVO vs. cleft sentences. This is relevant for experiment 3, where the context should not affect clefts and SVO differently. Additionally, a third condition is added in which the contrast is located in the cleft clause. This condition serves a dual purpose. On the one hand it allows to show that participants do take context into account in their ratings, as this condition is expected to be not acceptable in the context that the other conditions are acceptable. Second, it allows us to test whether this condition improves when we are dealing with multiple foci as in (22).

3.4.1 Design and materials

In this experiment, I tested how well ICs and SVO sentences fit with a contrastive interpretation triggered by the context. The context for all three conditions sets up a contrast with the first noun in a complex noun phrase (*decrease* vs. *increase* in (25)). The first condition contains an IC and this complex noun phrase occupies the pivot position. The second condition contains the regular SVO sentence. The third condition has again a IC as target sentence, but this time the contrast is located in the cleft clause.

(25) Condition 1: IC-pivot

C: I thought that the parliament talked about a **decrease** in taxes yesterday.

T: But it was an **increase** in taxes that the parliament discussed.

(26) Condition 2: SVO

C: I thought that the parliament talked about a **decrease** in taxes yesterday.

T: But the parliament discussed an **increase** in taxes.

(27) Condition 3: IC-clause

C: I thought that the parliament talked about a **decrease** in taxes yesterday.

T: But it was taxes that the parliament discussed an **increase** in.

The expectation for the results are that condition one and two are perfectly acceptable, while condition three should be rather degraded. For the experiment 18 different lexicalizations were created, based on the sentences tested in experiment 1. Additionally, 28 filler sentences were added which contained a set of test sentences for another experiment, which was not related to the investigation here. Test sentences were distributed across three lists in a Latin Square design.

3.4.2 Procedure and participants

The experiment was set up in OnExp and participants were recruited via Amazon Mechanical Turk. Participants received \$2.50 for their participation. The task for the participants was to judge whether the target sentence was a natural continuation of the preceding context on a scale from 1–7. After reading the instructions, participants had to provide some information about their language background and age. After that participants went through a short practice stage to familiarize with the task. Test sentences and fillers were randomized per participant.

30 self-reported native speakers of English filled in the questionnaire (10 per list). They were between 22 and 55 years old with a mean age of 32.5 years. There were 16 female and 14 male participants.

3.4.3 Results and discussion

The mean ratings per condition are provided in Table 3 and in Figure 2.

There is a main effect for the condition ($F_1(2,58) = 46.9, p < .0001$; $F_2(2,34) = 126.9, p < .0001$). Three contrasts for planned comparisons within the three-level factor condition were computed. There is no difference between SVO and the cleft

Table 3: Mean ratings per condition experiment 2.

	Condition	Mean Rating	StdDev
1	IC-pivot	5.12	0.11
2	SVO	5.21	0.14
3	IC-clause	3.01	0.19

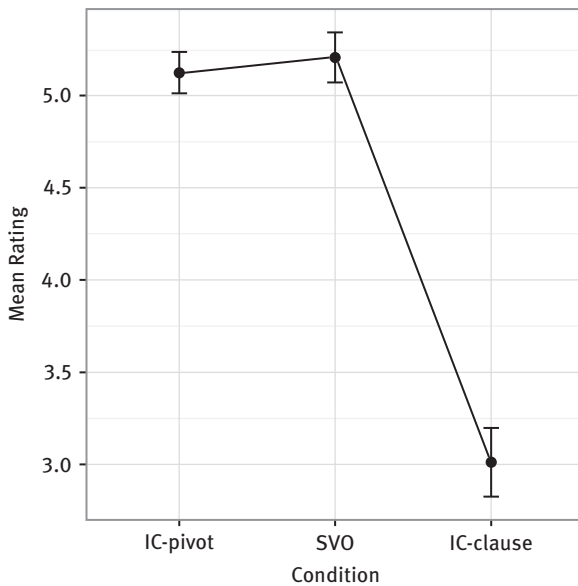


Figure 2: Mean Ratings Experiment 2.

sentences as long as the contrast falls on the pivot ($F_1(1,29) < 1$; $F_2(1,17) < 1$). There is a clear contrast when comparing these felicitous conditions to the third condition when the contrastive focus falls to the cleft clause ($F_1(1,29) = 59.1$, $p < .0001$; $F_2(1,17) = 190.03$, $p < .0001$).

We can conclude from these results two central points that are relevant for the next experiment. First, the contexts that were provided in the experiment are suitable for both clefts and SVO sentences. Second, the results indicate that cleft sentences are not felicitous in a context that gives rise to a contrast in the cleft clause.¹⁰

3.5 Experiment 3: Extraction in context

With the context tested, the following experiment investigates the validity of the Focus Phrase Hypothesis, repeated here for convenience.

(28) Focus Phrase Hypothesis

- a. The pivot in cleft clauses corresponds to the FP.
- b. As a result, extraction from the pivot is illicit, if there is an additional contrastive focus in the pivot.

Given that the pivot corresponds to the FP, and given that the FP can be more flexibly defined in SVO sentences, we expect to find that extraction gives rise to a stronger decrease in acceptability than the decrease that we expect to find in SVO sentences. Finally, cleft sentences in which the contrastive focus established in the context is not part of the pivot should be rated better than the corresponding clauses in which both the *wh*-extraction and the contrast target the pivot.

10 An anonymous reviewer points out that the target sentence in the third condition differs from the two in the first and second condition, i.e. the complex noun phrase is inside the cleft clause, while it is in the pivot in the other two conditions, so that the second conclusion is rather weak. Two remarks on this issue: First, there is no reason to believe that this sentence is much worse than the other two; second, the results in experiment 3 support this, as the extraction condition is as good as the SVO extraction. Instead of introducing a different type of target, it would have been possible to vary the context so that the contrast is on *parliament* in *It was an increase in taxes that parliament discussed*. However, I decided to stick to the same context and vary the target as the main purpose was to test the adequacy of the context.

3.6 Method

3.6.1 Design and materials

In this experiment, I tested two factors. The first factor is the location of the contrastive focus. This factor contains the same three levels as above: contrastive focus is located in the pivot position in an *it*-cleft, in the object position of a regular SVO structure, or in the cleft clause. The second factor is the base form versus *wh*-extraction.

The resulting six conditions are provided in (29)–(34).

(29) [1] ICpivot-base

I thought that the parliament talked about a decrease in taxes yesterday, but it was an increase in taxes that the parliament discussed.

(30) [2] ICpivot-extraction

I already know that the parliament talked about a decrease in taxes yesterday, but what was it an increase in that the parliament discussed?

(31) [3] SVO-base

I thought that the parliament talked about a decrease in taxes yesterday, but the parliament discussed an increase in taxes.

(32) [4] SVO-extraction

I already know that the parliament talked about a decrease in taxes yesterday, but what did the parliament discuss an increase in?

(33) [5] ICclause-base

I thought that the parliament talked about a decrease in taxes yesterday, but it was taxes that the parliament discussed an increase in.

(34) [6] ICclause-extraction

I already know that the parliament talked about a decrease in taxes yesterday, but what was it that the parliament discussed an increase in?

The same 18 lexical variants as in experiment two and the same contexts were used for this experiment. The test sentences were distributed across six lists in a Latin-Square design and a set of 52 distractors was added, which included test sentences from a different study that was not related to this study.

3.6.2 Procedure and participants

The study was set-up in OnExp. Sentences and fillers were randomized per participant. Participants were recruited via Amazon Mechanical Turk. The task was to rate the naturalness of the target sentence on a scale of 1–7. Target sentences were presented with a context sentence. After reading the instructions, participants had to provide some information about their language background and age. After that participants went through a short practice stage to familiarize with the task. Then they provided their ratings for the individual sentences in context.

60 self-reported native speakers of English filled in the questionnaire (10 per list). They were between 19 and 67 years old with a mean age of 31.8 years. There were 21 female and 39 male participants.

3.7 Results

The results of the study are provided in Table 4 and Figure 3.

The data has been subjected to two repeated measures ANOVA with items and participants as random effects. As before, the factor that changes the position of the contrastive focus (SVO vs. IC-pivot vs. IC-clause) is still significant ($F_1(2,118) = 57.5$, $p < .0001$; $F_2(2,34) = 49.8$, $p < .0001$). Extraction also has a main effect on the data: $F_1(1,59) = 37.3$, $p < .0001$; $F_2(1,17) = 22.5$, $p < .0001$). Additionally, we find a significant interaction between the two factors ($F_1(2,118) = 74.7$, $p < .0001$; $F_2(2,34) = 37.9$, $p < .0001$).

While extraction gives rise to a significant drop in acceptability with SVO sentences and in the IC-pivot conditions (i.e. when the contrastive focus lies on the pivot in ICs, condition 1 vs. 2), the opposite holds with those cleft-sentences where the contrastive focus lies in the cleft clause.

Additionally, the effect of extraction is stronger with the *it*-clefts when the focus is on the pivot, than with the SVO sentence. There is still a significant

Table 4: Mean ratings per condition experiment 3.

Condition		Mean Rating	StdDev
1	IC-pivot base	5.53	0.098
2	IC-pivot extraction	3.65	0.13
3	SVO base	6.01	0.10
4	SVO extraction	5.15	0.09
5	IC-clause base	4.08	0.10
6	IC-clause extraction	4.99	0.09

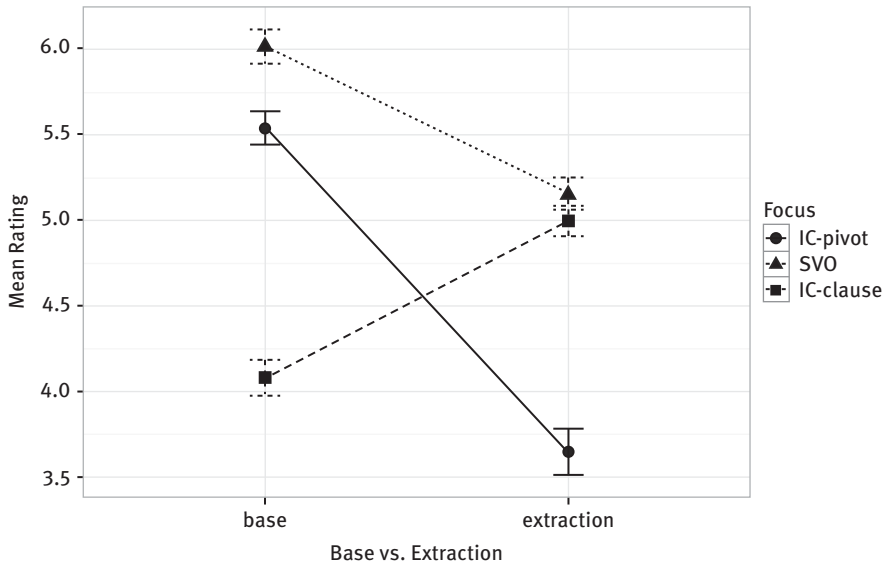


Figure 3: Mean Ratings Experiment 3.

interaction between the two factors for condition 1–4 ($F_1(1,59)=19.1$, $p < .0001$; $F_2(1,17)=13.1$, $p < .005$).

Finally, we can clearly see that the context manipulation does affect naturalness ratings. Thus, even though the task was different in experiment two, the results from experiment two have been roughly reproduced with this study on rating naturalness.¹¹

3.8 Discussion

The main results of the third experiment in comparison with the results of experiment one and two can be summarized as follows:

11 Note that there is a syntactic difference between the conditions IC-pivot vs. IC-clause which has not been tested independently of this study. In the condition IC-pivot subextraction is *wh*-extraction from the pivot; in the condition IC-clause subextraction occurs in the cleft clause and is relative clause formation. I do not expect that this difference is responsible for the increase in acceptability for *wh*-movement with the IC-clause conditions base vs. *wh*. This difference is due to the fact that IC-clause is bad in the relevant context (contrast is located in the cleft clause, not in the pivot). When *wh*-extraction occurs, there is a contrast due to *wh*-extraction and a second focus in the cleft clause is licensed.

(i) Subextraction gives rise to a decrease in naturalness rating. This cannot be ameliorated by a context in which the noun left in the base position is contrastively focused. Thus, extraction from the noun phrase (b) is less accepted than the base (a) in both (35) and (36). The source of this decrease in acceptability might be some processing effect of establishing filler gap dependencies (see e.g. Culicover & Winkler this volume and references therein for recent discussion) or a (weak) syntactic constraint that restricts extraction from noun phrases (see e.g. Keller 2000 for some discussion), or some other constraint. As this aspect is not the main interest of the study, I leave it to future research.

- (35) a. The scientist developed a treatment of diabetes.
 b. ?What did the scientist develop a treatment of?

- (36) a. I thought that the parliament talked about a decrease in taxes yesterday, but the parliament discussed an increase in taxes.
 b. ?I already know that the parliament talked about a decrease in taxes yesterday, but what did the parliament discuss an increase in?

(ii) A contrastive focus on the stranded noun in the pivot position leads to an even more serious violation of extraction with clefts than with SVO sentences. Thus, the difference between (36-a) and (36-b) is smaller than the difference between (37-a) and (37-b), as the reported interaction of the first 4 conditions shows.

- (37) a. I thought that the parliament talked about a decrease in taxes yesterday, but it was an increase in taxes that the parliament discussed.
 b. ??I already know that the parliament talked about a decrease in taxes yesterday, but what was it an increase in that the parliament discussed?

There was no such interaction without context in experiment 1 (see also the lack of such an interaction in Hartmann 2013). Thus, context here clearly has an effect. I take this to mean that the context induces that the cleft operator and the question operator target two different subparts of the focus phrase. The resulting decrease in acceptability supports Krifka's proposal of the restriction. Note though that even though we see a clear effect in the data, the absolute ratings are not dramatically bad (3.5 out of 7), this might provide a hint that the problem is not a strict grammatical effect but a difficulty in interpretation, see below.

(iii) Once the contrastive focus and the *wh*-phrase are set apart in two different focus phrases, Krifka's restriction does no longer apply. Thus, the sentence in (38) (condition ICclause-base in (33)) is clearly rated better than (39) (condition ICclause-wh in (34)).

(38) ???I thought that the parliament talked about a decrease in taxes yesterday, but it was taxes that the parliament discussed an increase in.

(39) ?I already know that the parliament talked about a decrease in taxes yesterday, but what was it that the parliament discussed an increase in?

Thus, the experimental data indeed suggests that Krifka's restriction in (18) indeed holds and that in *it*-clefts, the whole pivot is focused.

4 Wh-extraction and contrastive focus

In this section, I suggest that Krifka's restriction, repeated in (40) for convenience, holds in clefts because the alternatives that are derived on the basis of the focus phrase are in conflict. This results in difficulty in interpretation. As the focus alternatives are construed, the difficulty might be resolved by a coercion of a matching set of alternatives.

(18) *FO_i FO_j [... [... F_j ... F_i ...]_{FP} ...]

Let me start with an informal description of the meaning of a cleft question. Starting from a question interpretation along the lines of Hamblin (1973) and Karttunen (1977) the denotation of a question is the set of possible answers to the question. Questions that are formed based on a cleft structure need to factor in the additional focus properties of the question. As proposed in Hartmann (2016) the assertion of a cleft contributes two propositions, a proposition *p* which contains the assertion of the cleft clause and an additional proposition *q* which is derived from the alternatives, see (12) above.

For a question such as *What was it that the government discussed?* the interpretation can be roughly paraphrased as for which *x* does it hold that the government discussed *x*. The question alternatives are computed on the basis of the alternatives to the *wh*-word. Additionally, the alternatives are relevant for computing the alternatives to the pivot.

(40) What was it that government discussed?

- a. Q-Alternatives: {x:THING(x) & DISCUSS(government, x)}
- b. Foc-Alternatives: {x: DISCUSS(government, x) }
- c. Contribution of contrasting cleft focus: there is a y in the set of Foc-Alternatives for which it holds that it is not true that government discussed y.

When this interpretation is combined with a complex noun phrase such as *What was it an increase in that government discussed?*, the relevant sets of alternatives are sketched in (41).

(41) What was it an increase in that government discussed?

- a. Q-Alternatives: {x: THING(x) & INCREASE-IN(x) & DISCUSS(government, INCREASE-IN(x))},
e.g. y ∈ {increase in taxes, increase in social benefits, ... } & government discussed y.
- b. Foc-Alternatives: {x: INCREASE-IN(x) & DISCUSS(government, INCREASE-IN(x)) }
- c. Contribution of contrasting cleft focus: there is a y in the set of question alternatives for which it is not true that government discussed y.

In essence, this means that both the focus introduced in the cleft and the alternatives of the *wh*-question operate on the pivot, the focus phrase, and the relevant alternatives are derived based on this focus phrase. As they match, interpretation is possible.

When an additional contrastive focus accent is introduced into the pivot, an additional contrast should be built up on the basis of one and the same pivot/focus phrase. As the two relevant alternatives sets do not match, as illustrated in (42), (37-b) fails to receive an appropriate interpretation.

(42) What was it an INCREASE in that government discussed?

- a. Q-Alternatives: {x: THING(x) & INCREASE-IN(x) & DISCUSS(government, INCREASE-IN(x))},
e.g. y ∈ {increase in taxes, increase in social benefits, ... } & government discussed y.
- b. Foc-Alternatives {Y,c: Y(c) & DISCUSS(government, Y(c))}

e.g. $c=\text{taxes}$: $Y \in \{\text{decrease in taxes, increase in taxes, ...}\}$;
 $c=\text{social benefits}$: $Y \in \{\text{decrease in social benefits, increase in social benefits, ...}\}$

The problem is that the two sets of alternatives that the two operators need do not match. The cleft operator needs to pick two relevant alternatives (p, q as defined above) from the Foc-Alternatives set. But one of them will not fit into the set of alternatives relevant for the Q-operator. This mismatch generates a problem for interpretation.

Once the two foci are set apart structurally, it is possible to derive a multiple focus structure comparable (but not the same) to what we see in (43):

(43) It's not John_F that shot Mary_F , but Mary_F that shot John_F .

Thus, the question in (38) ('What was it that the parliament discussed an INCREASE in?' with a contrastive focus reading) should be interpreted based on the alternatives sketched in (44).

(44) What was it that government discussed an INCREASE in?

- a. Q-Alternatives: $\{x: \text{THING}(x) \ \& \ \text{DISCUSS}(\text{government}, \text{INCREASE-IN}(x))\}$
- b. Foc-Alternatives: $\{x: \text{DISCUSS}(\text{government}, \text{INCREASE-IN}(x))\}$
- c. Contribution of contrasting cleft focus: there is a y in the set of Foc-Alternatives for which it is not the case that government discussed an increase in y .

In the corresponding SVO sentences, we do not see the same effect (at least not the same strong effect), as the focus phrase is NOT unambiguously marked to be the full noun phrase complement both for the question focus and the contrastive focus. Thus, both sets of alternatives in (42) and (44) are possible, and the interpretation is possible.

5 Conclusion

In this paper, new experimental data have been presented which show that *wh*-extraction from the pivot in cleft sentences is possible, and the availability of this extraction does not depend on whether the pivot corresponds to the derived subject or object in the cleft clause. This contrasts with the availability of

subextraction in regular sentences where subextraction from the object is possible, but extraction from a derived subject gives rise to a clear violation.

Additionally, I have presented further experimental evidence that show that subextraction from the pivot in *it*-clefts is not possible if the pivot contains an additional independent contrastive focus on the stranded noun. The relevant problem is that both the question operator and the cleft operator target different subparts of the same Focus Phrase, a configuration which has been argued in Krifka (2006) to be illicit. The problem is that two different sets of alternatives need to be interpreted on the basis of one and the same syntactically marked focus constituent. When these sets are not matching, it is not possible to find a consistent interpretation for the question.¹²

By isolating additional focus restrictions on the availability of subextraction from the pivot in noun phrases, the paper contributes to the overall study of the relationship of Freezing effects and effects of information structure.

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¹² This raises the question of whether other additional operators such as *only* or *also* give rise to a similar configuration. Both *only* and *also* do occur with clefts, see Hartmann (2016) for some discussion.

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Josef Bayer

Criteria Freezing in the syntax of particles

Abstract: In this chapter, it will be shown that in the grammar of German, discourse as well as focus particles are part of the functional structure of the clause, and that in the unmarked case both types of particles take scope exactly where they are merged. Their scope must not be changed in the ongoing derivation. In other words, they are “frozen in place”. A challenge comes from those cases in which particles form constituents with sub-sentential phrases such as *my bike* or *in which village*, i.e. phrases which do not qualify as scope domains. While co-constituency with sub-sentential phrases is a widely known property of focus particles, corresponding constellations with discourse particles are less widely known and therefore more challenging. Due to this, the focus of the chapter will be on discourse particles. In part 1, I will present what I take to be the current base-line of a syntactic-semantic representation of discourse particles (in German and hopefully beyond). Part 2 develops an account of discourse particles in *wh*-questions and their dependence on interrogative force. Part 3 shows how discourse particles can directly combine with *wh*-phrases, and how the movement of phrases that are composed in such a way and their scope properties can be integrated into the account developed in part 2. Importantly, I will show that their scope freezes in a position lower than the position seen in surface structure. This finding defines the goal of our consideration of focus particles. Part 4 integrates focus particles and shows that the analysis gets close to a unified account of focus particles and discourse particles. The perspective and advantage of a unified theory of particles is commented on in section 5. Section 6 draws some conclusions.

Keywords: discourse particle, focus particle, scope, criteria freezing, agreement, illocutionary force, clause type (CT), speech act (SA), question, copy movement

1 Discourse particles in situ

Discourse particles (DiPs, in German known as *Modalpartikeln* or *Abtönungspartikeln*) make a rather clear semantic contribution to the meaning of a sentence. 1.1 provides an informal semantics of particles that play a role in *wh*-questions. This is followed by a brief introduction to the way we see the role of particles in the context of variable word order. 1.3 introduces the option of having in the very same clause more than a single DiP. 1.4 turns to the locality of

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licensing a DiP. In 1.5, I will argue that this licensing should be accounted for with the technology of probe-goal agreement.

1.1 Semantic contribution

DiPs are geared to certain clause types (declarative, polar interrogative, *wh*-interrogative, exclamative, imperative etc.) and arise mainly in root clauses. They make a semantic contribution by co-determining the illocutionary force of an utterance (Thurmair 1989; Coniglio 2011). For reasons to be seen shortly, our focus will be on particles that arise in constituent questions. Particles which appear in these questions, but not necessarily only there, are *denn* (lit. ‘then’), *wohl* (lit. ‘well’), *nur/bloß* (lit. ‘only’/‘barely’), *schon* (lit. ‘already’) and perhaps some more. Since our primary goal is not to give a detailed account of their contribution to illocutionary meaning, it will suffice to consider the variations in (2) over the particle-free *wh*-question in (1), and to characterize them descriptively.

(1) *Wo wohnt er?*
 where lives he
 ‘Where does he live?’

(2) a. *Wo wohnt er denn?*

(2a) means that given a common ground CG between speaker and hearer, where does he live in relation to some aspect of CG; *denn* is quasi anaphoric to CG. If the CG that relates to the open proposition, here λx , he lives in x , is missing, *denn* fails to refer, and the question fails pragmatically. This blocks *denn*-questions out-of-the-blue (see König 1977; Wegener 2002; Grosz 2005; Bayer 2012).¹

b. *Wo wohnt er wohl?*

In assertive clauses, *wohl* signals uncertainty of the speaker toward the proposition p . According to Zimmermann (2008), the request for an assertion by the

1 Assume you chat with someone who has learned in the course of the conversation that you are new in town. Your interlocuter may ask you *Wo wohnen Sie denn?* Imagine alternatively that you went to the registration office. The employee’s job is to write down your data. This person can ask you *Wo wohnen Sie?* but hardly *Wo wohnen Sie denn?* The reason is that there is normally no or no presumed relevant CG which *denn* could point to. Using *denn* in this situation is, so to say, none of the employee’s business.

hearer allows in this case an assertion that is weakened toward a guess or a speculation. While the question remains what it normally is, *wohl* affects the propositional commitment of the addressee allowing it to be *presumably* (p) instead of p.

c. *Wo wohnt er nur/bloß?*

In (2c), the speaker signals that he/she has so far unsuccessfully tried to find an answer; Obenauer (2004) has aptly dubbed questions of this type I-CAN'T-FIND-THE-VALUE QUESTIONS (CfvQ) (see also Hinterhölzl and Munaro (2015) for pragmatic effects of bewilderment and impatience of the the speaker that *nur/bloß* and also the particle/adverb *nun* (lit. ‘now’) give rise to).

d. *Wo wird er schon wohnen?*

By using *schon*, the speaker creates some scale by which the entities (here places) that can replace the variable are ranked according to their plausibility or likelihood of yielding a true answer; *schon* creates the implicature that few entities are high enough on the scale to make the answer true. This yields a rhetorical question (see Löbner 1990; Meibauer 1994; Bayer and Obenauer 2011; Egg 2012).

1.2 Word order

Since DiPs may appear in various linear orders, their surface appearance previously gave rise to the idea that they undergo movement. As expected, no good reason for such movement could be found though. Although they resemble adverbs and are in fact treated as adverbs in many accounts, a surprising finding was that they must not move to the clausal periphery. They can neither move to SpecCP nor can they be extraposed to the post-verbal domain. From today’s position, it is quite clear that DiPs arise in a fixed middle-field position, and other constituents move to their left, e.g. by scrambling operations.² Although DiPs contribute to Force, they arise comparatively low in the clause in a fixed position to the left of vP. Weak pronouns must and other topical constituents may move to the left of DiP.³

² See Ormelius-Sandblom (1997).

³ What I say here must be limited to the *wh*-questions under discussion. The particles *ja* and *wohl*, which are discussed in detail in Coniglio (2011:131ff) show slightly different distributions.

- (3) a. *Wann könnte **denn** er ihn mitgenommen haben?
 When could DENN he it along-taken have
 ‘When could he have taken it along? (I’m wondering)’
 b. *Wann könnte er **denn** ~~er~~ ihn mitgenommen haben?
 c. Wann könnte er ihn **denn** ~~er ihn~~ mitgenommen haben?
- (4) a. Wann könnte **denn** Otto den Brief gestern ins Büro
 when could DENN Otto the letter yesterday to office
mitgenommen haben?
 along-taken have
 ‘When could Otto have yesterday taken the letter to the office? (I’m wondering)’
 b. Wann könnte Otto **denn** ~~Otto~~ den Brief gestern ins Büro mitgenommen haben?
 c. Wann könnte Otto den Brief **denn** ~~Otto den Brief~~ gestern ins Büro mitgenommen haben?
 d. Wann könnte Otto den Brief gestern **denn** ~~Otto den Brief~~ gestern ins Büro mitgenommen haben?
 e. Wann könnte Otto den Brief gestern ins Büro **denn** ~~Otto den Brief~~ gestern ~~ins Büro~~ mitgenommen haben?

The conditions under which elements move to the left of the DiP are not really clear, at least they are less clear than movements across speaker oriented adverbs as discussed in Frey (2007). For the purposes of this chapter, it can be assumed that there is a topic field above the DiP which may host the aboutness topic but perhaps also elements familiar from the preceding discourse.⁴ An important function of the DiP is that it assigns material below its position to the information focus. Notice that in (4a-d) the unmarked phrasal accent is on the PP, i.e. *ins BÜRO mitgenommen*, while in (4e) the focus domain has shrunk to the verb, i.e. the accent is *MITgenommen*.⁵ Assuming that the DiP takes a fixed position, the phrase structure appears to be the following.

- (5) [_{ForceP} Force° ... [_{FinP} Fin° [_{TopP} ... [**Prt** [_{vP} ...]]]]]

⁴ The assumption of a TopP is controversial as there is no overt Top-head. We assume it for concreteness. Alternatives are, of course, possible.

⁵ This fact is a major reason for Egg and Mursell (2017) to propose a direct dependency between DiP and focus.

We cannot discuss here the relative order of Prt in connection with adverbs in Cinque's (1999) system. For relevant discussion the reader is referred to Coniglio (2011). Unlike most adverbs, DiPs are weak closed-class elements. Much of the inventory of DiPs in German has historically developed out of adverbs or focus particles in a process of grammaticalization. Unlike most adverbs, DiPs can neither be preposed nor extraposed; they are immobile. There is a debate about their X-bar status with rather heterogeneous proposals that range from *adverb* (assumed without discussion in most semantic work, and assumed *with* discussion in Manzini 2015), to "*deficient*" *adverb* (Cardinaletti 2011; Coniglio 2005, 2011), to *head* (Bayer 1996, 1999, 2012; Bayer and Obenauer 2011; Munaro and Poletto 2004; Petrova 2017; Struckmeier 2014), and even *undefined X-bar status* (Meibauer 1994). Assuming head status, a decision that I will further defend below, allows us to be more concrete about (5).⁶ In (6), Prt is the head of a PrtP.

(6) [_{ForceP} Force^o ... [_{FinP} Fin^o [_{TopP} ... [_{PrtP} Prt^o [_{vP} ...]]]]]

Weak pronouns and discourse-identified DPs move into the topic field. It is important to notice that they do not move into the specifier or Prt. Weak and topical elements do not associate with Prt. SpecPrtP plays an important role though, but it is reserved for other elements as we will show in detail below.

1.3 Stacking

DiPs may co-occur in a clause as long as they are clause-type compatible. Their order is fixed (see Thurmair 1989; Coniglio 2011). In the clause type under consideration, only the order *denn* > *wohl* > *schon* is allowed.

- (7) a. *Wann könnte Otto **denn** den Brief **wohl** gestern **schon** ins Büro mitgenommen haben?*
 b. **Wann könnte Otto **wohl** den Brief **denn** gestern **schon** ins Büro mitgenommen haben?*
 c. **Wann könnte Otto **schon** den Brief **wohl** gestern **denn** ins Büro mitgenommen haben?*

⁶ The top argument against head status has for a long time been that it would inhibit V2. This argument is entirely theory dependent. See Bayer and Obenauer (2011) for a possible solution. Svenonius and Bentzen (2016) suggest that V-movement may not be conventional movement at all. As long as the nature of head movement is still rather unclear, one should meet this argument against head status with reservation.

Merger of DiPs does not change the basic syntactic category of VP/vP. The reason for this is that DiPs – like other particles too – are syncategorematic heads. In this sense, they do not disrupt the projective spine of the verb, and scrambling out of VP/vP does not differ from regular scrambling. Under the assumption of a topic field, (7a) suggests that each of the DiPs is associated with a topic field. However as far as I see, nothing much hinges on this particular solution. The order in which stacked DiPs must appear seems to be a matter of scope although the rationale behind it is so far not clear. One reviewer suspects that one DiP “selects” another particle projection, and that this would be inhibited by scrambling into intermediate positions as seen in (7a). However, selection cannot play a role here for the simple reason that DiPs are optional. Notice that (7a) remains perfectly grammatical if *wohl* is missing: *Wann könnte Otto **denn** den Brief gestern **schon** ins Büro mitgenommen haben?* If *denn* selects a *wohl*P like a verb selects a PP, ungrammaticality would result, contrary to fact.

1.4 Long-distance dependency and scope

Notice now that Force *c*-commands the DiP, but the DiP is arguably not part of ForceP. How can it contribute to Force? Potential solutions in terms of LF movement or formal feature movement must be discarded. As Bayer, Häussler and Bader (2016) point out, question-dependent DiPs may show up in embedded clauses from which *wh*-movement has taken place. Consider the rhetorical questions in (8).

- (8) a. *Wo glaubst du, dass man hier nachts um 3 Uhr
Where believe you that one here at.night at 3 o'clock
schon Benzin bekommt?
SCHON gasoline gets
'Where do you believe that one can get gasoline here at 3 o'clock in the
night? – Nowhere/hardly anywhere!*
- b. *#Wo glaubst du **schon**, dass man hier nachts um 3 Uhr Benzin bekommt?*

These examples make two important points: First, (8a) and (8b) differ in meaning. In (8a), the speaker asks about the places *x* such that the addressee believes there is a plausibility ranking of *x* according to which one can get gasoline in *x* at 3 o'clock in the night. (8b) is syntactically flawless but semantically odd because the speaker asks about the places *x* such that there is a plausibility ranking of the addressee's *believing* that one can get gasoline in *x* at 3 o'clock in the night. The oddity comes from the question's pragmatic inappropriateness. If *schon* would raise to the matrix clause, the seat of illocutionary force, (8a) and (8b) would have the same meaning,

and (8a) would be as awkward as (8b). However, (8a) is not awkward at all. We can conclude from this that the DiP takes scope exactly in the surface position in which we see it. Notice secondly that LF-movement is known to be clause bound. Raising the DiP across the CP-boundary would be highly unexpected. A good theory should try hard to avoid it. In our account, the DiP is a functional head. Functional heads do not move around. In (8a), LF-movement of the DiP toward Force would be trans-clausal head-movement. But head-movement is known to stay within the CP-phase.

Fortunately, there is an alternative. As has first been suggested in Bayer and Obenauer (2011) (see also Bayer 2012; Bayer, Häussler and Bader 2016 and other researchers who adopted this proposal) DiP may access Force via probe-goal agreement. Under successive cyclic *wh*-movement as in (8a), the Q-sensitive DiP *schon* can be probed by an uninterpretable interrogative C as indicated by the dotted lines in (9).⁷

- (9) *Wo glaubst du* [_{CP} ~~*we*~~ *daß man hier ...* [_{PrIP} ***schon*** [_{VP} ~~*we*~~ *Benzin bekommt*]]]]?
-

In the absence of long *wh*-extraction, the interpretation of *schon* as a DiP is unavailable. Why? Short *wh*-extraction as seen in (10) and its analysis in (11) leaves the DiP in the CP-phase without offering a chance to probe it from the edge of this CP.

- (10) *Wer glaubt, daß man hier nachts um 3 Uhr schon
 Who believes that one here at.night at 3 o'clock already
 Benzin bekommt?
 gasoline gets
 ‘Who believes that one can get gasoline here already as early as 3 o’clock in
 the night?’*

- (11) *Wer glaubt ~~wer~~* [_{CP} *daß man hier ...* [_{PrIP} ***schon*** [_{VP} *Benzin bekommt*]]]]?
-

Notice that (10)/(11) is grammatical but only under an interpretation of *schon* that is irrelevant in the present discussion; *schon* can only be understood as the temporal adverb ‘already’, not as the homophonous question-sensitive DiP. As a temporal adverb, *schon* does not depend in any obvious sense on a particular clause type

⁷ If C is +*wh*, it must be uninterpretable. If it were interpretable, selection of the CP by the verb *glauben* would lead to a semantic conflict.

and the illocutionary force of the utterance. It is not a root phenomenon. The syntactic inaccessibility graphically depicted in (11) predicts that the interpretation of *schon* as a DiP is excluded in this case.⁸

1.5 Probe/goal agreement

The next question is how DiPs can contribute to the semantic composition of Force. As we have shown, it does not happen by anything like movement, LF or otherwise. As already said in the previous section, my proposal is that Force is linked to the DiP by probe-goal agreement. This relation enables the left-peripheral representation of illocutionary force to team up in a syntactically defined local domain with features of the DiP that provide information about the speaker's hypothesis about the speech situation and the epistemic state of the addressee. Moving to a more technical level, assume that DiPs have an uninterpretable and unvalued clause-type (CT) feature, here abbreviated as $uQ[]$. This is well motivated because DiPs are clause-type sensitive. The DiPs under consideration have this feature among others. At the same time, illocutionary interpretability never resides in the DiP but in a potential Force/CT head which c-commands the DiP. Thus, the DiP is plausibly probed by a CT-head, here $Q[]$. $Q[]$ must ultimately be interpretable but may at an intermediate stage of the derivation also be uninterpretable. This is possible in the feature sharing theory of probe/goal agreement proposed in Pesetsky and Torrego (2007), which I adopt here. There is good motivation for splitting up Force in CT and speech act (SA).⁹ Speas and Tenny (2003), Haegeman (2002), Haegeman and Hill (2013),

⁸ It may be important to know that long *wh*-extraction as seen in (8)/(9) does not *enforce* the interpretation as a DiP. The example allows the interpretation of *schon* as a temporal adverb as well. Thus, (8)/(9) is ambiguous whereas (10)/(11) is unambiguous.

⁹ Notice that in German, the ASS(ertion)-sensitive DiP *ja* can co-occur with the Q-sensitive DiP *denn* in a question if *ja* belongs to a separate clausal or quasi-clausal domain as in

- (i) *Wo hast du* [_{DP} *diesen* [_{AP} *ja unwahrscheinlich begabten*] *Pianisten*] *denn gehört?*
 Where have you this JA incredibly gifted pianist
 DENN heard
 'Where did you hear this indeed incredibly gifted pianist? (I'm wondering)'

The speaker who takes responsibility for the adequacy of *ja* is identical with the speaker who takes responsibility for the adequacy of *denn*. The AP is quasi by default an "assertive" CT but does not constitute an SA. It must be linked to the speaker of the SA of the root clause (see Hinterhölzl and Krifka 2013; Struckmeier 2014; Viesel 2017). It is the speaker of the root clause who also takes responsibility of the DiP inside AP.

Miyagawa (2012), Coniglio and Zegrean (2012) and others argue for the syntactic representation in the form of a speech act phrase (SAP). The derivation for licensing a Q-sensitive DiP under cyclic *wh*-movement runs as in (12), where we symbolize valuation by 1.

- (12) a. [_{VP} wh [_{VP} ... wh ...]] ⇒ MERGE Prt ⇒
 b. [_{PrtP} Prt_{uQ}] [_{VP} ... wh ...]] ⇒ MOVE *wh* ⇒
 c. [_{CTP} CT_{uQ}] [_{CP} wh C [_{TP} ... [_{PrtP} Prt_{uQ}] [_{VP} ... wh ...]]]] ⇒ AGREE ⇒
 d. [_{CTP} CT_{uQ}[1] [_{CP} wh C [_{TP} ... [_{PrtP} Prt_{uQ}[1] [_{VP} ... wh ...]]]]]] ⇒ MOVE *wh* ⇒
 ...
 e. [_{SAP} SA_{uQ}] [_{CTP} CT_{iQ}] [_{FinP} wh [_{Fin'} V_{fin} [_{TP} ... [_{CTP} CT_{uQ}[1] [_{CP} wh C [_{TP} ... [_{PrtP} Prt_{uQ}[1] [_{VP} ... wh ...]]]]]]]]]] ⇒ AGREE ⇒
 f. [_{SAP} SA_{uQ}[1] [_{CTP} CT_{iQ}[1] [_{FinP} wh [_{Fin'} V_{fin} [_{TP} ... [_{CTP} CT_{uQ}[1] [_{CP} wh C [_{TP} ... [_{PrtP} Prt_{uQ}[1] [_{VP} ... wh ...]]]]]]]]]]]]

Agreement between CT and Prt guarantees that the CT is of the type that results from the application of Prt to CT. Provided that (12d) is part of a dependent clause, CT is formally present – consider the notion of an intermediate *wh*-trace – but nevertheless uninterpretable.¹⁰ Here, CT agrees with Prt. Further *wh*-movement leads to (12e). Since *wh* stops in SpecFinP of the root clause, CT is interpretable. The root clause is not only a proposition but in addition a speech act. By transitivity, agreement between SA and CT guarantees that the root clause is an interrogative speech act enriched with the specific respective “flavors” of Prt that had been exemplified in (2) above.¹¹

Importantly, the DiP (Prt) itself does *not* move. It stays precisely in the pre-*vP* position in which it was merged in (12b); in other words, it stays in its irreversible scope position. Thanks to cyclic *wh*-movement, the root clause’s CT/SA can stretch out its fingers to grab the distant DiP without committing a crime against conditions of syntactic locality.

In the next section, we shall provide evidence to the effect that the unmarked pre-*vP* DiP-position is a CRITERIAL position in which movable

¹⁰ This amounts to the claim that a CP which served as a transit for *wh*-movement is in fact “interrogative”. This feature does not do any harm because it is uninterpretable. It is only formally present.

¹¹ Egg and Mursell (2017) develop a theory in which CT/SA probes the *vP*-related focus domain rather than the DiP. The DiP has an unvalued focus feature which is valued by the interpretable focus feature on *vP*. Thus, the relation between CT/SA and DiP is at best an indirect relation. It remains to be seen how the CT-dependency of DiPs can follow.

elements of the right type undergo CRITERIAL FREEZING. This finding will then be taken up again in section 4 to show how, within the theory developed so far, a natural account of focus particles follows almost automatically. At this stage, it will become clear that the syntax of DiPs and the syntax of focus particles rests on the same basic architecture.

2 Discourse particles *ex situ*

One of the classical diagnostics for DiP-status is their immobility (see Thurmair 1989 and arbitrary further work on DiPs). We interpreted this as following from their status as functional heads. According to this analysis, DiPs are on a par with *v*, T, Neg, C, Fin, Force etc. There is T-to-C movement, and functional elements occasionally undergo cliticization. In general, however, functional heads stay put; it is lexical heads and not functional heads which move to functional heads. Given that they can be probed from a c-commanding position, DiPs are heads for which there is no *prima facie* reason to move. As heads, they would not qualify for A'-movement to save the V2-constraint.¹² Thus, although DiPs are traditionally understood as “idiosyncracies” of German, they turn out to be part of the functional grid on which clause structure rests, and they conform to its rigid order of constituents.

12 As Cardinaletti (2011) points out, DiPs are not contrastable and can therefore not be questioned, and they cannot undergo coordination. It needs to be said that they share these properties with certain higher adverbs like the speaker-oriented adverb *leider* ('unfortunately'), which are clearly different from DiPs. The issue is too big to be adequately addressed within the confines of this contribution. Nevertheless, an illustrative case is that, as in most OV-languages, many light adverbs in German can be shifted to a post-verbal position.

- (i) a. Karl hat drauf verZIChtet
 b. Karl hat ~~drauf~~ verZIChtet drauf
 'Karl gave up on it.'

Functional heads such as the neg-head *nicht* never undergo such PF-related movement.

- (ii) a. Karl konnte gestern nicht KOMmen
 b. *Karl konnte gestern ~~nicht~~ KOMmen nicht
 'Yesterday, Karl could not come.'

DiPs do not pattern with light adverbs. They are on a par with *bona fide* functional heads.

2.1 DiPs travelling with *wh*-phrases

Nevertheless, even this diagnostic seems to have a hole: Unexpectedly, DiPs can be displaced to the left periphery if they co-occur with a *wh*-phrase, and they can do this even “long distance”.¹³

13 Contrary to what one reviewer suspects, also other DiPs than those discussed here can participate in this construction, e.g. *eigentlich* (‘actually’). Furthermore, one can also find DiPs that form a constituent with other elements than *wh*-phrases. Consider the DiP *eben* (lit. ‘even’) that occurs in assertive clauses. Instead of the expectable *das ist eben ...*, both Schiller and Grillparzer use the following stylistically more elaborate and exciting forms.

- (i) *Das eben ist der Fluch der bösen Tat, daß sie, fortzeugend,*
 this EBEN is the oath (of) the evil deed that it procreatingly
immer Böses muß gebären.
 always evil must create
 J.C. Friedrich Schiller, *Wallenstein*, 1800.
- (ii) *Das eben ist der Liebe Zaubermacht, daß sie veredelt, was ihr*
 this EBEN is the love’s magic.power that it ennobles what its
Hauch berührt, ...
 breath touches
 Franz Grillparzer, *Sappho*, 1819.

The demonstrative pronoun must be emphatically accented, and the preverbal position is by all means occupied by a single constituent. Systematic searches reveal also examples in current ordinary language. Here are two examples with *eben* and *wohl*, the latter of which may appear in assertive clauses as well as in questions.

- (iii) *Manche eben können es nicht*
 Some EBEN can it not
 ‘Some can just not do it’
[https://epetitionen.bundestag.de/petitionen/_2011/_04/_11/Petition_17637/forum/Beitrag_135586.\\$\\$.batchsize.10.tab.2.html](https://epetitionen.bundestag.de/petitionen/_2011/_04/_11/Petition_17637/forum/Beitrag_135586.$$.batchsize.10.tab.2.html) (26.01.2017)
- (iv) *Manche wohl können nur kalt sein, obwohl niemand was für*
 some WOHL can only cold be although nobody something for
seinen Hauttyp kann.
 his skin.type can
 ‘Some can perhaps only be cold although nobody is responsible for his/her type of skin’
<http://www.akne.org/threads/gro%C3%9Fe-poren-auf-der-nase.36463/>

It is so far not clear to me why these cases are less frequent and perhaps also less systematic than those in *wh*-questions.

- (13) a. [*An wen **denn***] *könnte er sich* [~~*an wen **denn***~~] *gewandt haben?*
 at who DENN could he REFL turned have
 ‘Who on earth could he have turned to?’
- b. [*An wen **denn***] *glaubst du*, [[~~*an wen **denn***~~] *dass er sich* [~~*an wen **denn***~~] *gewandt haben könnte*]?
 ‘Who on earth do you believe that he could he have turned to?’

As my use of square bracket suggests, *whP* + DiP form a constituent. If not, the V2-constraint would be violated. The examples in (13) come across as nothing else but standard cases of *wh*-movement. No degradation in grammaticality can be noticed. However, if this is true, DiP is really *ex situ*, outside its rigid scope position we have been arguing for, and in blatant violation of the general semantic requirement that a DiP is like any other operator supposed to take scope over a proposition. Notice that according to standard assumptions, *vP* embraces the external argument and therefore represents the minimum of a proposition, in other words, what Chomsky (1986), with binding theory in mind, considers to be a COMPLETE FUNCTIONAL COMPLEX.

A second scandal emerges in connection with rigid order. The strict hierarchy that had been diagnosed in the previous section, e.g. *denn* > *wohl* > *schon* in the examples in (7), seems to be disrupted in the well-formed example

- (14) [*An wen **schon***] *wird er sich damals **denn** gewandt haben?*
 ‘Who on earth will he have turned to after all in those days?’ (the answer is obvious)

In (14), the surface order of the DiPs is *schon* > *denn*. This order is normally strictly excluded (see (15a)), even across a CP-boundary (see (15b)):

- (15) a. **[An wen]* *wird er sich **schon denn** gewandt haben?*
 b. **[An wen]* *glaubst du **schon**, dass er sich damals **denn** gewandt haben wird?*

The pertinent questions are (i) how can phrases like *wh*+DiP emerge, and (ii) how can one account for the rather alarming exception to word order and scope? My answer will be, as I will shortly show in detail, that in (15), the DiPs *schon* and *denn* are “in-situ”, i.e. in scope positions, and that these are irreversible. The DiPs have, so to say, been merged into positions where they are frozen from the start. In (14), however, only *denn* is in a scope position while the DiP *schon* is part of a complex *wh*-phrase. The latter particle is “ex-situ”.

This gives reason to believe that the ex-situ DiP may have actually taken scope lower than the in-situ DiP. With this hypothesis, we are on the right track, as I will show. In the following, my account is presented in six steps. The important aspect of the particle's scope variability will be first addressed in (II) and then developed in detail.

2.2 The core of the account

- (I) DiPs do have a fixed position in the functional cartography of the clause as has been shown in section 1. This generalization will remain untouched.
- (II) However, DiPs can *alternatively* be merged with a *wh*-phrase. This operation yields what Bayer and Obenauer (2011) have dubbed 'SMALL PARTICLE PHRASE' (SPrtP). This reminds us of a possibility that plays a role in various accounts of focus particles. In research about focus particles, there is one camp which essentially prevents focus particles from attaching to any non-proposition phrase. The motivation for this is throughout semantic in nature.¹⁴ There is another camp according to which focus particles may undergo free merger with arbitrary major constituents: DP, PP, CP, next to the standard case *v*P.¹⁵ We will take up the issue in more detail in section 4. For the time being, let us assume here that the latter camp is right, and that the finding that DiPs can be merged with a *wh*-phrase adds new syntactic support for this theory. It is important to know that the particle in a SPrtP is not in a scope position, and that, as a consequence, a SPrtP has to undergo movement to a scope position in the sense of (I).
- (III) Assuming that a DiP can form a constituent with an arbitrary *wh*-phrase, what could be the motivation for this? Word order alternations do not arise without reason, as we have learned. Following Bayer and Obenauer (2011), DiPs are heads of type *Prt*^o which may undergo merger with a *wh*-XP and then force *wh* to raise to their left. The reason for this is that *Prt*^o may bear a feature for EMPHASIS. In fact, all these constructions share a special expressive property of excitement. The *wh*-phrase in the *wh*+*Prt* construction bears distinctive phonetic prominence, and questions with this construction are interpreted as *exclaimed* constituent questions, i.e.

¹⁴ See Jacobs (1983), with a somewhat different orientation Buring and Hartmann (2001), Kleemann-Krämer (2010), and more recently Hole (2015).

¹⁵ This view has been defended in Bayer (1996, 1999) and in Reis (2005) for German, and in Barbiers (2014) for Dutch.

questions which are uttered with an enhanced level of excitement by the speaker. Trotzke and Turco (2015) support this impression with experimental data that show a distinct acoustic signature for this construction as compared with a) the non-adjacent position (*wh ... Prt°*) and b) to the adjacent position of a PP (*wh+PP ...*, e.g. [*Wo bei euch*] *kann ich heute ... ?* ‘Where at your place can I ...?’). In the Trotzke and Turco study, the onset of the *wh*-word, /vo/, and the following vowel are significantly longer in the SPrtP. As in the study by Niebuhr (2010), the intensifying emphatically pronounced words are not realized with steeper pitch slopes than corresponding non-emphatic words. This suggests the existence of a specific phonetic correlate that distinguishes emphatic fronting from correlates of information structure.¹⁶ In technical terms, we assume that the derivation of a SPrtP runs as in (16), where 7 is an arbitrarily chosen agreement index. The head *Prt°* bears an uninterpretable feature of emphasis that is valued and subsequently deleted by a *wh*-phrase with a corresponding interpretable feature of emphasis.

- (16) a. $\text{Prt}^\circ_{i\text{Emp}} [] \text{ wh }_{i\text{Emp}} []$ ⇒ MOVE ⇒
 b. $[\text{wh }_{i\text{Emp}} [] [\text{Prt}^\circ_{i\text{Emp}} [] \text{ wh }_{i\text{Emp}} []]]$ ⇒ AGREE ⇒
 c. $[\text{wh }_{i\text{Emp}} [7] [\text{Prt}^\circ_{\#i\text{Emp}} [7] \text{ wh }_{i\text{Emp}} [7]]]$

The interested reader may consult Bayer and Trotzke (2015) for further discussion of this analysis and a remarkable extension that integrates the attachment of multiple DiPs as can be seen in examples like *an wen denn wohl schon* (‘to who DENN WOHL SCHON’), which are by all means part of a single constituent.

16 Although this could not be systematically explored so far, there is a strong impression that SPrtPs need to be fronted and cannot stay in situ in multiple questions. Consider the contrast between (i) and (ii).

- (i) *An wen denn könnte er sich wann gewandt haben?*
 at who DENN could he REFL when turned have
 ‘Who on earth could he have turned to when?’
- (ii) *?*An wen könnte er sich wann denn gewandt haben?*
 at who could he REFL when DENN turned have
 ‘Who could he have turned to when on earth?’

The contrast is reminiscent of Pesetsky’s (1987) observations about multiple *what-the-hell* questions.

- (IV) Given the phrase structure in (6), SPrtP cannot be derived from this structure. Movement of *wh* to the right of the head of the particle phrase (PrtP) would among other violations violate the EXTENSION CONDITION, see Chomsky (1995), that requires that syntactic operations may extend the tree only at the root. Furthermore, moving away the scope-bearing pre-*v*P particle would violate scope freezing as assumed throughout, see (I).¹⁷ Let us therefore keep to the insight that the scope of a DiP that has been merged into a scope position is immune to further derivational manipulation. Thus, an alternative derivation is needed by which the SPrtP is mapped onto the phrase structure in (6).
- (V) The alternative is to build SPrtP in a separate workspace WS2 and to add it to the numeration that serves workspace WS1 to build VP, *v*P and its structural extensions. SPrtP is first merged in *v*P. Being a *wh*-phrase, it needs to undergo

17 Reis (1992) suggests in passing that the DiP may cliticize to the *wh*-phrase from its base position. This would, however, amount to extraction of the DiP from its otherwise irreversible scope position, and it is unclear why the process of cliticization may target exactly a *wh*-phrase and nothing else. One reviewer suggests that the assumption of a SPrtP could be unnecessary because the *wh*-phrase may move through the specifier of the PrtP in the course of which Prt could cliticize to it. The *wh*-phrase could land in SpecPrtP in order to value the uninterpretable Prt-feature *uQ[]* under Spec-head agreement. Like Reis (1992), this proposal misses the important point that DiPs are functional heads but no clitics. Interestingly, there is one exception: *denn* has also a clitic form, namely *-n*. As shown in Bayer (2012) and Weiß (2013), *-n* undergoes Wackernagel-cliticization in various dialects and spoken varieties. Even more interesting is the fact that cliticization to a *wh*-phrase leads to severe ungrammaticality. Compare the difference between (i), a variant of (2a), and (ii).

- (i) *Wo wohnt-n der?*
 where lives -N he
- (ii) **Wo -n wohnt der?*
 where-N lives he

Apart from this, it would be quite implausible for a trisyllabic element like *eigentlich* to behave like a clitic. Nevertheless, there are examples like (iii).

- (iii) *Von wem eigentlich hat er das abgeschrieben?*
 from who EIGENTLICH has he this copied
 ‘Who did he actually copy this from?’

Thus, we can be sure that cliticization of Prt to the *wh*-phrase offers no viable alternative to the explanation suggested here.

A'-movement and is in a first step moved to the phase-edge of *vP*. In agreement with the copy-theory of movement, the *SPrtP* leaves a copy behind. As the derivation proceeds, the functional head *Prt* is merged with *vP* and projects a *PrtP*. *Prt* is normally an empty head.¹⁸ This is in full analogy to the merger of an empty *C*-head in *wh*-movement constructions. *Prt* has at this stage the uninterpretable unvalued feature *uPrt*[]. The *SPrtP* moves into the specifier of *PrtP* and values *uPrt*[]. At this point, the particle is de-activated and its scope is frozen.¹⁹

- (VI) The *SPrtP* is, of course, also a *wh*-phrase whose *wh*-feature is still active. It cannot be de-activated before the upper clausal periphery (here *SpecFinP*) has been reached. Thus, the *SPrtP* moves out of *SpecPrtP* again. [*Wh*+*Prt*] is a syntactic constituent in which the phonetic occurrence of *Prt* is pied-piped along with the *wh*-XP. The corresponding functional head stays and marks the particle's frozen scope. It is important to see that at this stage the *Prt* of the *SPrtP* has no core grammatical function any longer. This is in agreement with the classical observation that *DiPs* are immobile. Their displacement to the left periphery is simply an epiphenomenon of pied piping. (17) gives the derivation (features sometimes suppressed for readability):

- (17) a. [(...) *V*] ⇨ MERGE *SPrtP* ⇨
 b. [_{*vP*} ... *SPrtP* (...) *V*] ⇨ MOVE *SPrtP* ⇨
 c. [_{*vP*} *SPrtP*<sub>[*vP*] ... ~~*SPrtP*~~ (...) *V*]] ⇨ MERGE *Prt* ⇨
 d. [_{*PrtP*} *Prt*_{*uPrt*[]} [_{*vP*} *SPrtP*<sub>[*vP*] ... ~~*SPrtP*~~ (...) *V*]]] ⇨ MOVE *SPrtP* ⇨
 e. [_{*PrtP*} *SPrtP*_{*iPrt*[]} [_{*Prt*} *Prt*_{*uPrt*[]} [_{*vP*} *SPrtP*<sub>[*vP*] ... ~~*SPrtP*~~ (...) *V*]]]]] ⇨ AGREE ⇨
 f. [_{*PrtP*} *SPrtP*_{*iPrt*[9]} [_{*Prt*} *Prt*_{*uPrt*[9]} [_{*vP*} *SPrtP*_[*vP*] ... ~~*SPrtP*~~ (...) *V*]]]]]</sub></sub></sub>

18 See however Bayer (forthcoming) and Barbiers (2010; 2014), as well as the brief discussion at the end of this section.

19 Saying that *Prt* has the uninterpretable unvalued feature *uPrt*[] that gets valued by a *SPrtP* moving into *SpecPrtP* is a mechanical consequence of the feature valuation mechanism. Depending on the clause type in which a *DiP* occurs, the particle has also a “contentive” feature, in the case of interrogatives the feature *uQ*[]. If *uQ*[] is part of the *SPrtP*, it will become part of the *Prt*-projection it is attracted to. From there, it will be valued by Force as shown in the derivation in (12). *DiPs* that attract a *wh*-phrase to their left have in addition the feature *uEmp*[]. This feature gets valued by a *wh*-phrase that bears an interpretive feature of emphasis. Keeping track of the different features is difficult, and I tried to represent only those which play a role in a certain process. Thanks to one reviewer who asked for clarification.

Peter Culicover (p.c.) asks whether merger of the empty *Prt*-head could take place with a particular *vP* from a series of *vP*-shells in which the different verbs form a *V*-cluster. I did not find a way how to trace potential semantic differences. Thus, I assume for the time being that *Prt* is merged with the upmost *vP*-shell.

(17f) is the stage at which the particle of the SPrtP is deactivated and frozen. Due to the concomitant decomposition of SPrtP into Prt and the *wh*-phrase proper, the semantic problem of scope failure is solved. The DiP has clausal scope despite the formation of a SPrtP.²⁰

Further movement raises SPrtP, which is, of course, also a *wh*-phrase, into SpecFinP etc.

- g. $[_{\text{FinP}} \text{SPrtP}_{i\text{wh}[12]} [_{\text{Fin}'} \text{Fin}_{i\text{wh}[12]} \dots [_{\text{PrtP}} \text{SPrtP}_{i\text{wh}[12]}; i\text{Prt}[9] [_{\text{Prt}'} \text{Prt}_{i\text{Prt}[9]} [_{\text{VP}} \text{SPrtP} [_{\text{VP}} \dots \text{SPrtP} (\dots)\text{V}]]]]]]]$

This concludes the core of my proposal. We can now see the merits it has. One merit is that the account respects natural constituency as could be observed in movement and observance of the V2-constraint. Another one is that it offers a motivation of the construction. The *ex-situ* example (13a), *An wen denn könnte er sich gewandt haben?*, is not synonymous with the *in-situ* example *An wen könnte er sich denn gewandt haben?*. The former expresses a degree of exclamation and excitement of the speaker that is missing in the second one. According to the present account, the examples rest on different derivations on the basis of the same lexical items. A third merit is that it solves the problem of apparently wrong order in a straightforward way. Recall that example (14) is well-formed but shows the linear order *schon* > *denn*, which is banned otherwise. The present theory declares the surface order as irrelevant because *schon* has taken scope below *denn* before it moved along with the *wh*-XP *wen*. Scope freezing is visualized in (18) with ✓.

- (18) $[_{\text{FinP}} [_{\text{An wen schon}] \text{wird er sich damals} [_{\text{PrtP}_1} \text{denn} [_{\text{PrtP}_2} [_{\text{an wen schon}] \text{Prt} \checkmark} [_{\text{VP}} \dots [_{\text{an wen schon}] \text{gewandt haben}]]]]]]]$?

Schon is scopally irrelevant in its surface position but relevant in the medial position. In the medial position it takes scope via agreement with the bold-faced functional category Prt, and this position is below the DiP *denn*, as it

²⁰ Arguing against this analysis would be like arguing against *wh*-phrases which are of sub-propositional size and move to a position in which they attain scope over a proposition. I know of no linguist who has proposed that *which man* cannot be a DP because the inherent *wh*-operator does not scope over DPs.

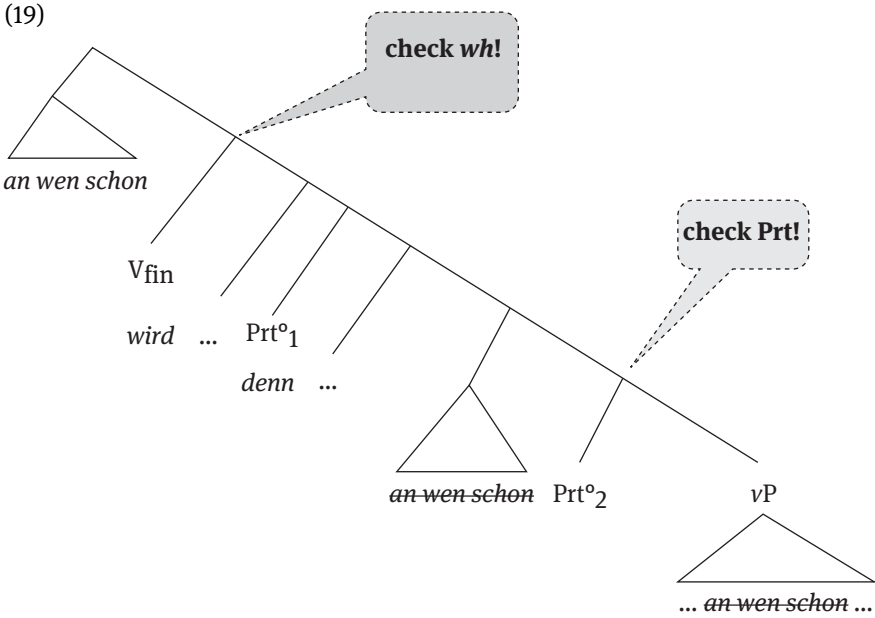
should be. Thus, the relevant order is exactly the attested one, namely *denn* > *schon*.

As one reviewer correctly notes, the transition from (17f) to (17g) is not compatible with the Criterion approach as formulated in Rizzi (2006: 112). According to Rizzi, *a phrase meeting a criterion is frozen in place*. What is important here is the *a* in both *a phrase* and *a criterion*. The principle as formulated here stops a unique phrase XP with a unique feature F in some criterial position whose head matches F. No further movement obtains because F has ceased to be active. As we have seen, however, the SPrtP is actually composed of two phrases. It is a *wh*-phrase that is immediately dominated by a shell that is headed by a particle. Due to this dominance relation, the SPrtP is at first a particle phrase. As such it is raised to the specifier of the silent Prt-head where it is deactivated. So far, this is exactly what Rizzi (2006) suggests. Since the SPrtP involves next a *wh*-phrase with an active *wh*-feature, and since this *wh*-feature cannot be de-activated in SpecPrtP, the SPrtP must move on to the left edge of the clause where *wh*-checking takes place. The only question I see here is why the derivation pied-pipes the SPrtP instead of using sub-extraction of the *wh*-phrase. Although I do not have a watertight answer, the reason seems to be that sub-extraction of the *wh*-phrase would disrupt the emphatic construction that motivates the formation of a SPrtP in the first place. Apart from the pied-piping issue, the logic of the derivation seems to be completely in line with the Criterion approach and Criterial Freezing.²¹ (19) visualizes the word order and reconstruction consequence of my account.

21 As Abels (2012: 83ff) shows, there are various other cases which argue against an overly rigid understanding of Rizzi's Criterion approach. A well-known example is the variant of (i) in (ii) that has been detected and discussed in Reis and Rosengren (1992).

- (i) *Stell dir vor, wen Peter besucht hat!*
 imagine REFL Prt who.ACC Peter visited has
 'Imagine who Peter visited!'
- (ii) *Wen stell dir vor, dass Peter besucht hat!*
 who.ACC imagine REFL Prt that Peter visited has

It can be argued that the movement that lifts *wen* into the root clause is not *wh*-movement that could interfere with the *wh*-criterion but rather a form of topicalization of the *wh*-phrase. If so, the case would be analogous to the one under discussion. A detailed discussion of freezing effects and their theoretical accounts would go far beyond the scope of this contribution as the discussions in Müller (2010) and in other contributions to the present volume show.



SPrtPs move like *wh*-phrases, the difference being that there is yet another feature to take care of. If we are right, the head of the SPrtP is Prt. The *wh*-phrase is embedded in SPrtP. Given this dominance relation, it is expected that the SPrtP moves first to a position where it values the functional category Prt°, which is in (19) Prt°₂. From this point onwards, the DiP *schon* of the SPrtP *an wen schon* is inactive. The head Prt°₁ which hosts the DiP *denn* is irrelevant and would anyway be skipped because the features of *schon* and *denn* are distinct. This makes the SPrtP transparent for the *wh*-feature, and it can move on to a destination in which it values the *wh*-feature which for the sake of the present discussion we assume resides in Fin.

The combination of copy movement with the fact that DiPs are optional elements predicts ambiguities. Since Prt is merged optionally, and since SPrtP moves cyclically through SpecCP, SPrtP may value a silent Prt-head either locally or at a distance. Consider (20).

- (20) [Vor wem **denn**] glaubst du, dass sich James Bond **schon**
 from who DENN believe you that REF James Bond SCHON
fürchten würde?
 fear would
 ‘Who do you believe that James Bond would be afraid of?’ – Of no one, of course!

Since the freezing point of the SPrtP may be in the matrix clause or in the embedded clause, an ambiguity is expected. This ambiguity is real as corresponding examples with *denn* in situ reveal.

- (21) a. *Vor wem glaubst du, dass sich James Bond **denn schon** fürchten würde?*
 b. *Vor wem glaubst du **denn**, dass sich James Bond **schon** fürchten würde?*

The meaning of (21a) is that there is a common ground CG between speaker and hearer such that the speaker asks the hearer rhetorically who James Bond would be afraid of in relation to CG. The meaning of (21b) is that there is a common ground CG between speaker and hearer such that the speaker asks the hearer rhetorically who in the world of the hearer's beliefs James Bond would be afraid of in relation to CG. The difference may be subtle, but our discussion of (8) above has shown that it is likely to be real. The important fact is that (20) embraces both of the readings expressed in (21).

2.3 Particle doubling

The account of SPrtPs in terms of a dual structure gives rise to new questions. Since the SPrtP must cycle through a type-corresponding and scope-bearing PrtP, it could in principle be possible that the head of PrtP is not silent but equally spelled out. Barbiers (2010; 2014) finds such data in Dutch focus particle constructions and gives an account for them which is close to what I am proposing here.²² One of his examples is (22).

- (22) ***Maar** een boek ken ik **maar***
 only one book know I only
 'I know only one book.'

Here, [*maar een boek*] is a constituent which has passed through a particle projection in which the lower particle *maar* is in its scope position. Searches on the internet could spot many examples of DiP-doubling in which the structure is arguably the same as in (19) with the difference that the head-position Prt^o₂ is

²² If it appears that Dutch has FP doubling while German has DiP doubling, this would be a strange parameter. In fact, I believe, both languages have both. For some discussion see Bayer (forthcoming). However, the issue awaits further research.

lexically filled with the DiP whose scope we are claiming gets frozen in this position.²³

- (23) a. *Warum **nur** seid ihr **nur** sooo gehässig?*
 why NUR are you_{PL} NUR so spiteful
 ‘Why on earth are you so bitchy?’
http://www.purkersdorf-online.at/komm/_da.php?ar=7&num=02046-00001-00001-00002-00001-00001-00000-00000-00000-00000 (25.01.2016)
- b. *Warum **nur** war er **nur** so unerreichbar für mich?*
 why NUR was he NUR so unreachable for me
 ‘Why on earth is he so unreachable for me?’
<https://www.wattpad.com/78507062-i-wish-larry-german-au-kapitel-19> (25.01.2016)
- c. *Wer **wohl** ist **wohl** der Typ mit dem Doppelkinn, und der spärlichen Frisur?*
 who WOHL is WOHL the guy with the double chin and the sparse hair
 ‘Who may be the guy with the double chin and the sparse hair?’
<http://www.wrestling-infos.de/board/showthread.php?t=25441> (23.01.2016)
- d. *Vor was **denn** ist er **denn** geflüchtet?*
 from what DENN is he DENN fled
 ‘What did he flee from, I’m wondering’
<http://www.trennungsschmerzen.de/verlassen-mit-baby-wer-noch-t604.html>
 (24.01.2016)
- e. *Wer **schon** hätte **schon** Lust gehabt, seine Freunde zu verpfeifen?*
 who SCHON had_{SUBJ} SCHON mood had his friends to squeal-on
 ‘Who after all would have been in the mood to squeal on his friends? – (No one!)’
<https://books.google.de/books?id=r4QhCwAAQBAJ&pg=PT1870&lpq=PT1870&dq=%22wer+schon+h%C3%A4tte+schon%22&source=bl&ots=WILJ9Odk19&sig=qQwFZxfSv c4qpJc4kee052vyK8U&hl=de&sa=X&ved=0ahUKEwiX8vLkjMDKAhWEGCwKHcqxDnA-Q6AEIHZA#v=onepage&q=%22wer%20schon%20h%C3%A4tte%20schon%22&f=false>
 (23.01.2013)

²³ My thanks to Verena Simmler for running these searches. A detailed discussion of particle doubling is offered in Bayer (forthcoming). One reviewer expects that the second occurrences of the DiPs are different from the stand-alone versions of these particles. While this is a possibility, I believe the two DiPs in the present examples are the same, the second one being the spell-out of the Prt-head that is otherwise empty.

There is no reason to assume doubling in a semantic sense. The interpretable occurrence of the DiP is in each case the lower one. The emphatically marked *wh*-phrase cycles through the criterial position in which it agrees with the Prt-head before it continues to move on with the *wh*-phrase for *wh*-checking. The phonetically high occurrence of the DiP in (23a) through (23e) has no semantic significance for the computation of its scope.

2.4 WYSIWYG is wrong

This concludes part of my thoughts about the integration of German DiPs into the syntactic framework of minimalist syntax. The important message is that WHAT YOU SEE IS WHAT YOU GET (WYSIWYG) is very likely to be wrong. Once a DiP has teamed up with a *wh*-phrase, *wh*-movement superficially obscures the fact that the DiP has been de-activated before the complex phrase has reached its surface position. Thus, a DiP may phonetically appear in a place which is irrelevant for its scope. In the following section, the debate about focus particles will be reconsidered in this light as I believe the present account has a lot to recommend about focus particles as well.

3 Integrating focus particles

The syntax of focus particles (FP) like *only* and *even* and their correspondents in other languages is up to now highly controversial. There are essentially two camps, the “adverb camp” and the “mixed camp”. At least for the study of German, the “adverb camp” owes a lot to the groundbreaking work of Jacobs (1983). Buring and Hartmann (2001) integrated Jacobs’ analysis into more recent assumptions about syntactic architecture and the questions of syntax-to-semantics mapping. A core assumption of this approach is that the FP – syntactically an adverb – always adjoins to a propositional domain, i.e. essentially a *vP* or a *CP*. The reason is supposed to be that the FP must take propositional scope.²⁴ Adjunction to arguments, DP, PP and CPs with an argument role is excluded. The “mixed camp” as represented by Bayer (1996, 1999), Reis

²⁴ *Only* has an effect on the truth conditions of a sentence such as *John only sleeps*. In a suitable context it means that all the relevant activities that John is engaged in are sleeping activities, and that other potentially salient activities are excluded.

(2005), Barbiers (2014) and a few others acknowledges adjunction of FP to the propositional domain vP but admits also adjunction to other major constituents such as DP, PP and CP. One problem with this account is that adverbs do not freely adjoin to arbitrary constituents. In German, the examples in (24) are ungrammatical.

- (24) a. **[Oft [an meine Versicherung]] schreibe ich Briefe*
 often to my insurance write I letters
 ‘I often write letters to my insurance’
 b. **[Leider [meiner Versicherung]] muss ich oft schreiben*
 unfortunately my_{DAT} insurance must I often write
 ‘Unfortunately, I often have to write to my insurance’

These examples would be parsed as inadmissible V3 sentences.²⁵

3.1 Focus particles as functional heads

According to Bayer (1996, 1999) and the spirit of the account of DiPs in the preceding sections FP is not an adverb but a syncategorematic head which projects either a vP or some other major constituent, i.e. DP, PP, an argumental CP etc. The result is a particle phrase whose lexical category is identical with the lexical category of the XP that the particle has been merged with. FP+DP, FP+PP etc. are then SPrtPs as they have been motivated in the previous section. The assumption in Bayer (1996, 1999) was that the SPrtP which is formally headed by FP is a quantifier. As such it undergoes quantifier raising (QR) to a scope position. It is but a small step to translate this insight into the theory of the Minimalist Program, an issue I will return to below.

English shows that FPs may form smaller constituents than predicted by the adverb theory. The restrictions of adverb adjunction are comparable to those seen in (24). **Often syntax is what I teach*, **I did not pay enough attention to unfortunately statistics* etc. are highly deviant. For FPs this is not the case. The widely known examples in (25) – cf. Taglicht (1984) and Rooth (1985, 1992) – do

²⁵ German does have limited access to V3 as Müller (2003; 2005) has shown, but this possibility must not be equated with the more or less unconstrained combination that FP-attachment would imply.

not only show that FP+DP must be a constituent but also that this constituent targets a propositional domain.

- (25) a. *We are required to* [_{vP} *study* [_{DP} *only SYNTAX*]] AMBIGUOUS
 scope of *only* unfixed
- b. *We are required to* [*only* [_{vP} *study SYNTAX*]] UNAMBIGUOUS
 scope of *only* fixed
- c. *We are* [*only* [_{vP} *required to study SYNTAX*]] UNAMBIGUOUS
 scope of *only* fixed

The scope of the FP in (25a) is unfixed and can be fixed in two ways, either by association with the lower vP or by association with the higher vP. The former amounts to the reading shown in (25b), the latter to the reading shown in (25c), with clearly different truth conditions. While the “adverb camp” has to admit that (25a) presents an exception, the “mixed camp” has the advantage of explaining why the FP’s scope is frozen in (25b,c) and explaining why it is not in (25a). The technical implementation of scoping has been a matter of debate.²⁶ Nevertheless, the data in (25) speak in favor of a dual system as proposed by the “mixed camp”.

A widely known problem for defenders of the adverb theory of FPs is its incompatibility with word order in German main clauses. Rigid assumption of surface scope forces the adoption of unconventional phrase structure according to which a clause-initial FP has scope over FinP and associates with the adjacent XP with which it must, of course, not form a constituent.

- (26) [_{FinP} *Nur* [_{FinP} *EINER* [_{FinP} *hat* [_{TP} *die Polizisten angegriffen*]]]]
 only ONE has the policemen attacked
 ‘Only ONE person attacked the policemen’

The structure declares the FP *nur* to be an AdvP that is adjoined to the V2-clause *Einer hat die Polizisten angegriffen*. Since there is no prosodic break between the FP and the rest of the clause, such examples should be genuine V3 structures. This is strange because examples of this kind do not show the slightest markedness. Another problem is association with focus. The FP must c-command the

²⁶ While Bayer (1996) proposed QR, Kayne (1998) suggested overt movement which is “obliterated” by later steps of remnant movement. With respect to analogous cases of negation, Blaszczyk and Gärtner (2005) suggested an account of what they call *extended scope taking* in terms of a requirement of prosodic continuity.

focus. If this was all there is to say, (26) could also come out as **Nur einer hat die POLIZISTEN angegriffen*. But this focus association is impossible. Büring and Hartmann (2001: 276) offer a principle which requires FP “to be maximally close to the focus within a given extended projection”. But even this proviso is not tenable, as pointed out in Reis (2005: 470 ff.). As long as FP c-commands the focus-bearing XP, FP and focus can sometimes be separated by an intervening non-focal XP. Under the mixed theory and the assumption of FP as a Prt-head that projects a SPrtP, (26) changes to (27).

(27) $[_{FinP} [_{SPrtP} \textit{Nur EINER} [_{Fin'} \textit{hat} [_{TP} \textit{die Polizisten angegriffen}]]]]]$

Here, FP does not c-command the structure below Fin'. So focus association is under tight control. In addition, there is, of course, no reason to assume V3.

Notice next that there is a word order alternative to (26)/(27) in which according to the structure in (28b) the focus would not even be c-commanded by FP.

(28) a. *EINER nur hat die Polizisten angegriffen*
 b. $[_{FinP} \textit{EINER} [_{FinP} \textit{nur} [_{Fin'} \textit{hat} [_{TP} \textit{die Polizisten angegriffen}]]]]]$

Büring and Hartmann (2001: 240) express doubts about the acceptability of these inverted word orders. However, standard reference grammars of German mention such constructions (cf. Zifonun, Hoffmann and Strecker 1997: 1010), and authentic examples can easily be found.²⁷ Notice here also the widely known English example *JOHN even understands* “*Syntactic Structures*”. For theories which insist

27 (i) *Einer nur kann sie erlösen, und dieser Eine ist nur durch die Liebe zu gewinnen*
 one only can her redeem and this one is only through the love to win

‘Only one person can redeem her, and this person can only be won by love’

http://dl.bertha-dudde.org/books/TB_DE_118.pdf (22.01.2016)

(ii) *Alle anderen gingen in Begleitung und sie nur sollte alleine gehen wie ein Hund ohne Herrn?*
 all others went in company and she only should alone go like a dog without master

‘All the others went in company, and only she should go by herself like a dog without its master’

quoted in Bayer and Obenauer (2011).

on scope taking of the FP in its surface position – and adverb theories tend to fall in this class – cases like (28) present an unsurmountable problem. The FP occupies a scope position from which it should c-command a focus XP. But as (28b) shows, this could work only if c-command is relaxed to m-command. But even if more exceptions and relaxations of this sort are admitted, it remains unclear why examples like (28a) should occur in the first place.

3.2 Emphatic fronting

In the present context, it cannot be overlooked that preposing of the focal XP to the left of the FP has essentially the same signature as the ex-situ construction of DiPs that had been under investigation in section 2. Adopting the gist of my earlier work in Bayer (1996, 1999), FPs are not only heads in potential scope positions but possibly also the Prt-head of a SPrtP. In the latter case, the FP may optionally be endowed with an uninterpretable feature for emphasis. If so, the focal XP moves to the specifier of SPrtP (SpecSPrtP) and values the uninterpretable emp-feature on FP. Let me propose that in analogy to (16), there are derivations in which FP forms an SPrtP together with a focal non-interrogative XP of type NP, DP, PP etc. We start out with the SPrtP [FP+XP] such as [*nur EINER*], ‘only ONE’ or [*sogar an die REGIERUNG*], ‘even to the GOVERNMENT’. If FP is a Prt head which is endowed with the feature $uEmp[]$, the derivation in (29) is expected.

- (29) a. $Prt^{\circ}_{uEmp []} XP_{iEmp []}$ \Rightarrow MOVE \Rightarrow
 b. $[XP_{iEmp []} [Prt^{\circ}_{uEmp []} \cancel{XP}_{iEmp []}]]$ \Rightarrow AGREE \Rightarrow
 c. $[XP_{iEmp [19]} [Prt^{\circ}_{\#Emp [19]} \cancel{XP}_{iEmp [19]}]]$

An Emp-marked FP-constituent in the style of (28) such as [*an die REGIERUNG sogar*] will then raise like any other SPrtP to the criterial pre-vP in which it agrees with the standard empty particle head. As in the case of SPrtPs with DiPs, this move freezes the scope of the FP. Nevertheless, the SPrtP can move on to satisfy whatever further feature needs to be satisfied in the upper position of the

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- (iii) *Heute nur ist das noch möglich*
 Today only is this still possible
 ‘Only today is this still possible.’

http://www.archive.org/stream/3569904/3569904_djvu.txt (27.01.2016)

Notice that all of these are markedly emphatic expressions in comparison with their counterparts in which the FP precedes the focal XP: *nur einer*; *nur sie*; *nur heute*.

declarative sentence clause. In standard cases such as (28a), *EINER nur hat die Polizisten angegriffen*, the SPrtP satisfies the V2-constraint, but this movement has nothing to do with the role that the FP plays. FP has been deactivated before the SPrtP moves on to SpecFinP. If I am right, it would be hard for the adverb theory (a) to make sense of the focus+FP word order and (b) to derive the emphatic reading described above.

A challenging question is why in FP-constructions two word orders are permitted (*nur EINER* vs. *EINER nur*) whereas in DiP-constructions only the inverted one is permitted (*AN WEN denn* vs. **denn AN WEN*). My explanation is that the FP-construction is based on focus association. Here the FP needs to c-command the focal associate. The focus needs to be “bound” as some researchers used to say. Once the FP, however, carries an Emp-feature, this feature lives its own life, and the focal XP has to raise to its specifier to check the Emp-feature. The situation in DiP-constructions is different because they do not – at least not according to standard assumptions – associate with a focal XP. However, they can have a feature of emphasis. Assuming that Emp can only be checked under fronting, which seems to be strongly supported empirically, DiP-constructions display only one word order, namely the “inverted” one. The order DiP+wh has no grammatically motivated existence and will not be spelled out after first merge.

3.3 Long-distance dependency

In (20) and (21) of section 3, we could demonstrate that a SPrtP, e.g. *vor wem denn*, can have left a copy in the embedded clause or in the matrix clause. The DiP can have undergone Criteria Freezing in the lower CP or in the higher CP. This explains the ambiguity. Do we find something similar in connection with FPs? Yes, we do. The example in (30), which was provided by an anonymous reviewer, is ambiguous between the two readings displayed in (31).

(30) *Nur den PETER hat die Maria gesagt, dass sie liebt.*
 only the Peter.ACC has the Maria said that she loves

- (31) a. *Die Maria hat nur gesagt, dass sie den PETER liebt*
 the Maria has only said that she the Peter.ACC loves
 ‘Maria only said that she loves PETER (she didn’t say anything else)’
 b. *Die Maria hat gesagt, dass sie nur den PETER liebt*
 The Maria has said that she only the Peter.ACC loves
 ‘Maria said that she loves only PETER (she said she loves nobody but PETER)’

The reading in (31b) is very easy to get. In the present account, this follows immediately. If there is a PrtP in the embedded CP of (30), the SPrtP *nur den PETER* cycles through its specifier and takes scope at this point. Thus, the reading in (31b) is derived. Alternatively, the PrtP could also have been in the matrix clause. In this case, the SPrtP *nur den PETER* cycles through the specifier of the matrix PrtP and takes scope at this upper destination. If in (30) *nur* would be in a WYSIWYG-style scope position as the adverb theory claims, we could derive the reading in (31a) but not the one in (31b), contrary to fact. This is good news for the present account. Another piece of good news is that the grammar of DiPs and the grammar of FPs seem to have substantial properties in common. This conceptual aspect will be taken up again in section 5.

3.4 Relative scope

Let us finally turn to one of the cornerstones of the adverb theory, namely the treatment of relative scope. The adverb theory makes it a point that the FP takes scope in its surface position because (32a) is supposed to show only surface scope and not the reconstructed scope that we see in (32b).

- (32) a. *Nur seine₁ Mutter liebt jeder₁* ONLY > EVERY
 only his Mother-ACC loves everyone-NOM
 b. *Jeder₁ liebt nur seine₁ Mutter* EVERY > ONLY
 everyone-NOM loves only his Mother-ACC

The argument is that in (32a) the FP *nur* and its focus-associate *seine Mutter* cannot form a constituent. If they would, the FP would be reconstructed below the universal quantifier together with the DP *seine Mutter*, and then show the unattested reading of (32b); cf. Büring and Hartmann (2001: 260ff) and Sternefeld (2006: 336).²⁸ There are two arguments which militate against this conclusion, one is empirical, the other

²⁸ Hole (2015) adopts the adverb theory but finds a way to circumvent the consequences it has for constituency. He draws a sharp line between exclusive *only* and evaluative *only*. If I understand his proposal correctly, the V2-problem is avoided by the assumption that the FP in the topicalized part is always an “ad-focus marker”, that it corresponds to the evaluative use of the FP, and that in this use it is “semantically void” (p. 58). I must admit I have a hard time getting a semantic difference between the topicalized and the middle field occurrence of the FP. According to my intuitions, exclusive and evaluative interpretations are equally accessible in both construction types. As I have argued in Bayer (1996), exclusive and evaluative *only*, previously known as “quantificational” vs. “scalar”, derive from the domain in which *only* is merged and should therefore not be taken as primitives of a semantic theory.

is theoretical. The empirical argument is that in its crude form the judgment is wrong. As soon as the accent on the head noun *Mutter* is strengthened, not only the DP but also the FP is understood as being in the scope of *jeder*, exactly as in (32b). Thus, the low reading of the FP cannot be excluded *a priori*. Of course, the wide-scope interpretation of *nur* exists too and appears to be the more accessible one. If so, what does this interpretive difference follow from? My proposal is that it follows from a distinction that Fanselow (2002), Frey (2005) and Fanselow and Lenertová (2011) have identified as FORMAL FRONTING (FF) versus FOCUS FRONTING or CONTRASTIVE FRONTING (CF). FF takes the highest XP from the middle field (which in German may be in TP but in all likelihood also in vP) and moves it to SpecFinP, an information-structurally neutral position in the left periphery. Applied to (32a), this means that the object DP has been scrambled before it was moved to its ultimate destination in SpecFinP. Retaining the assumption that FP is part of the DP, the relevant structure is shown in (33).

(33) [_{vP} [_{DP} *nur seine Mutter*] [_{vP} *jeder* [_{DP} ~~*nur seine Mutter*~~] *liebt*]]

Given our assumption of a pre-vP functionally grounded scope position, it is but a small step to (34). In (34), the DP *nur seine Mutter* is in a criterial position in which its scope is fixed once and for all, as indicated by ✓.

(34) [_{PrTP} [_{DP} *nur seine Mutter*] [_{PrT'} Prt_{uFP} ✓ [_{vP} [_{DP} ~~*nur seine Mutter*~~] [_{vP} *jeder* [_{DP} ~~*nur seine Mutter*~~] *liebt*]]]]]

At this point, the DP under discussion can move on to SpecFinP. According to Fanselow, Frey and Lenertová, it is FF-style movement, i.e. essentially an upwards copying of the upper position of vP in (35) in order to satisfy the V2-constraint.

(35) [_{FinP} [_{DP} *nur seine Mutter*] [_{Fin'} *liebt* [_{PrTP} [_{DP} ~~*nur seine Mutter*~~] [_{PrT'} Prt_{uFP} ✓ [_{vP} [_{DP} ~~*nur seine Mutter*~~] [_{vP} *jeder* [_{DP} ~~*nur seine Mutter*~~] *liebt*]]]]]]]

PrTP is the relevant phrase in which the FP *nur* of the SMALL PARTICLE PHRASE (SPPrTP) *nur seine Mutter* values Prt_{uFP}. PrTP is lower than SpecFinP but it is higher than the quantifier *jeder*. This derives the prominent and unmarked interpretation of (32a), and it does so without the assumption that the FP is an adverb, let alone an adverb which is adjoined to FinP (alias CP). In the same way as in the previous section where we considered discourse particles *ex-situ*, the particle *nur* in its function as an FP is not interpreted in its clause-initial position but rather in a much lower position.

The second observation was that, as a marked option, the FP may still have access to a narrow scope interpretation in relation to the universal quantifier. An important part of this observation was that in this case the fronted DP bears extra heavy stress. Let me understand this as an indication of contrastive fronting (CF). Unlike FF, which may start from a scrambled position, CF starts from vP or a closely vP-related focus position. Assuming that the anti-focused quantifier *jeder* is in a higher position, the relevant representation is as in (36).

- (36) [_{FinP} [_{DP} *nur seine Mutter*] [_{Fin} *liebt* [_{PrTP} [_{DP} *nur seine Mutter*] [_{PrT'} Prt_{uFP} ✓ [_{vP} [_{vP} *jeder* [_{DP} *nur seine Mutter*] *liebt*]]]]]]]]]

The checking station for *nur* remains exactly the same as in (36). The difference is simply that *jeder* is in a slightly higher position due to the fact that the SPrtP *nur seine Mutter* has not been scrambled across *jeder*. CF is a marked option. Nevertheless it is a possibility. It gives rise to the reading according to which in spite of its linear order *nur* is interpreted in the scope of *jeder*.

Essentially, the same point is made in Smeets and Wagner (2016). These authors argue on the basis of Dutch and German examples for an analysis which allows the FP to reconstruct below a quantifier or below an adverb. While Büring and Hartmann (2001) propose a theory by which the FP is a one-place propositional operator that adjoins to VP or an extension of it but never to an argument, Smeets and Wagner propose that the FP *only* “takes two syntactic arguments, a constituent that corresponds to or at least contains its semantic focus (“Focus Constituent”), and a second constituent (“Remnant Constituent”), whose denotation has to compose with that of the first to form a proposition”. This is nothing new, of course. No semantic account of FP can escape the distinction between focus, the XP that the FP associates with, and scope, the domain which provides the open proposition $\lambda x p(x)$ against which the truth value can be computed. According to the present account as well as to Smeets and Wagner (2016), it is natural that this elementary distinction is reflected in syntactic structure.

A related case in point is scope inversion which is associated with the typical rise-fall contour that Büring (1997) calls “topic accent” (/) as followed by a “focus accent” (\) as in */ALL that glitters is NOT\gold*. Here, the quantifier is in the scope of negation. The reading is “it is not the case that everything glittering is gold”. As pointed out by Reis (2005: 478), scope inversion holds in constructions with FP. Consider (37).

- (37) */Nur FLEISCH aß NIE\mand* NEG > ONLY
 only meat ate no.one
 ‘For nobody it was true that he/she ate nothing but meat’

Büring and Hartmann (2001) refer to this example in their footnote 21 with the comment that “even with this intonational pattern” they would “fail to get an inverted reading”. According to my own intuitions, this is surprising because the scope inversion interpretation which they deny here is quasi the only reading that I can get. If my judgment is on the right track, however, *nur* in (37) cannot be interpreted in its surface position, and the assumption of the SPrtP *nur Fleisch* becomes unavoidable.

3.5 A glimpse at negation

With respect to negation in English, Sternefeld (2006) claims to have detected a related problem by which surface constituency appears to be in disagreement with semantic interpretation. His example is given in (38). The preferred relative scope of the logical operators of negation, modality and quantification appears in (39).

(38) *Not every boy can be above average height*

(39) $\neg (\diamond (\forall x (x \in \text{boy} \wedge x \text{ is above average height})))$

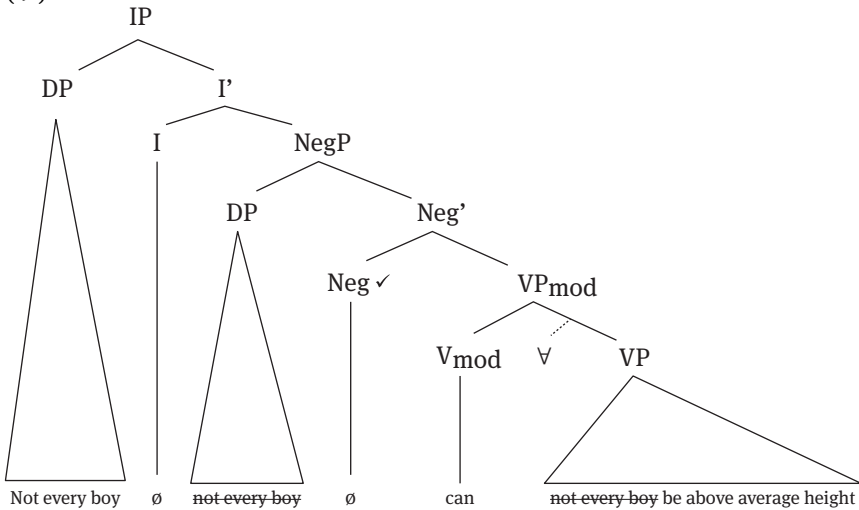
From the LF in (39) it is inferred that *not every boy* cannot be a constituent, and that in (38) *not* is in fact adjoined to IP as shown in (40).

(40) $[_{IP} \text{not } [_{IP} [_{DP} \text{every boy}]_i [_I \text{can } [_{VP} t_i \text{be above average height}]]]]]$

The PF by which *not* appears in the highest position is thought to be a direct window into the semantic representation. The disturbing fact is, however, that the syntax of negation in English is in disagreement with this proposal. We get examples like *Jim didn't wash my car* or *Jim hadn't heard anything like that before* but not **Not Jim washed/did wash my car* or **Not Jim had heard anything like that before*. Examples like *Not Jim but Tom washed my car* or *Not Jim washed my car but Tom* are special cases of so-called “term negation” and seem to have relatively little to do with sentence negation. Apart from this, *not* as a pre-IP propositional operator seems to be inexistent in English. On the other hand, natural constituency suggests that *not* and *every boy* ARE in fact part of one and the same DP [*not every boy*]. Thus, there seems to be disagreement between the syntax and the semantics of (38). How can this disagreement be resolved? The analysis that comes to mind in the context of the theory developed so far is obvious. Assume that there is an invariant and functionally determined representation of clausal

negation in the sense of the head of a NegP. Next to NegP there is the possibility of building smaller phrases which are likewise headed by Neg but in which Neg cannot be interpreted as a clausal operator. Given that examples like (38) are specimens of sentence negation, *not every boy*, *not all the girls*, *not too many kids*, *not even half of the voters* etc. appear to be small NegPs which need to associate with a Neg-head that has propositional scope. We can assume they are built in a separate workspace and are then merged wherever they belong thematically in the VP of the sentence under construction. From inside VP, the small NegP (let's call it SNegP) *not every boy* will raise to the specifier of clausal negation. Here it is in a typical spec-head agreement configuration, and as a consequence its scope gets frozen. Since the SNegP continues to be a DP that needs to check its nominative Case, it will move on to SpecIP/SpecTP essentially pied-piping the sub-constituent *not* along. If so, the scope position of *not* is not at all what we see at the PF-side of the grammar. Its PF-appearance is rather a somewhat misleading epiphenomenon of natural constituency and pied piping. My tentative proposal for the syntactic derivation of (38) is outlined in (41).

(41)



QR is indicated by \forall for concreteness, but this is not of interest here. What is of interest is the scope of negation. The checking site of the Neg-head of the SNegP *not every boy* is signaled by \checkmark . This is the freezing point of negation. Beyond this freezing point, *not* is inactive. Movement to SpecIP clearly has nothing to do with

negation. We see that a complex phrase is “decomposed” in the course of the derivation by moving to designated functional positions. The phrase moves to as many functional positions as are necessary to satisfy its relevant features. This has the consequence that what we ultimately see is not what we get. We get much more than what meets the eye.

I am sure that many questions remain but a more thorough treatment would fall outside the scope of this article. My goal was rather to indicate that my analysis of particles, DiPs as well as FPs, may have relevance for domains of grammar that are normally not associated with the grammar of particles.

3.6 WYSIWYG is wrong again

We started the section on focus particles with a sketch of the opposition between the so-called “adverb camp” and the so-called “mixed camp”. What I proposed here is totally incompatible with the assumptions of the former. However, it is also only weakly compatible with the latter. The reason is that I assume FPs as well as the negator to be functional heads throughout. FPs as well as DiPs are cornerstones of the functional skeleton that builds clause structure, along with T, C, Neg, Asp and other functional categories. The theory is “mixed” only in the sense that not every occurrence of a particle is necessarily in its scope position. Those occurrences in which it is not, fall under the notion of “small particle phrase”. These phrases have a feature if not more by which they must undergo movement to a valuation position. In this way, the SPrtPs will pass through “big particle phrases” in which they undergo agreement with the particle and value its corresponding feature. This is the essence of a very simple story which, however, does justice to the grammar of FPs and maybe also to the grammar of negation. WYSIWYG theories turn out to be on the wrong track.

4 Toward a unified account

In the history of modern linguistics, FPs and DiPs have by and large been dealt with as two completely separate phenomena and therefore also separate research topics. A plausible reason is certainly that FPs occur virtually in all languages whereas DiPs were only identified in German, Dutch and closely related languages. DiPs were seen as a quirk of West-Germanic. This view has become untenable as more and more languages were found in which closer inspection reveals the existence and the

functioning of DiPs.²⁹ With respect to German, the separation of DiPs and FPs was always a conceptual problem because of the lexical overlap of the two domains; *nur*, *bloß*, *auch* and various others participate in both domains. As Hentschel (1986) and many others have shown, the current inventory of DiPs in German has developed out of lexical categories which mostly continue to exist as such. If so, one is not surprised to see DiPs developing out of FPs, and both DiPs and FPs sharing various properties. The present study has identified some of them. The more remarkable ones are that (i) both appear to be functional heads, (ii) both project next to “big” PrtP also “small” PrtPs, (iii) both show in small PrtPs the phenomenon of emphatic fronting, (iv) small PrtPs move to the specifier of a big PrtP in which their scope is frozen even if movement to further checking sites may still be and in fact often is a possibility but then for independent purposes, (v) both show the phenomenon of particle doubling, albeit, as the contrast between Dutch and German shows, not in the same frequency in each of these languages and (vi) both conform to the architecture that Rizzi (1991/1996) has identified as the configuration of CRITERIAL checking and freezing. This collection of common properties cannot be accidental. It looks very much like the reflex of a unitary system. The irreducible differences between DiPs and FPs are that (a) DiPs are clause type and illocution dependent whereas FPs are by and large clause type and illocution independent³⁰ and (b) FPs create an operator/variable relation that is not found in DiPs.³¹ Another question is why FPs occur in all languages and can mostly be translated easily whereas DiPs are much less uniformly distributed and can often not be transferred from one language into another as, for instance, Schubiger (1965) has shown for English and German. Nevertheless, the convergence between DiPs and FPs that the present analysis has revealed should be seen as a step in the right direction.

29 See various contributions in Bayer, Hinterhölzl and Trotzke. eds (2015), Bayer and Struckmeier. eds. (2017), vol. 28 of *The Linguistic Review*, edited by Biberauer and Sheehan and vol 68 of *Studia Linguistica*. There is also highly relevant work on Bangla in Dasgupta (1980, 1987, 2005); see also Bayer and Dasgupta (2016) on the Bangla DiP *je* that is homophonous with one of the complementizers of the language.

30 Not completely though. While *only/nur* or *also/auch* are fine in imperatives, *even/sogar* are not.

(i) *Give me only/also/*even beer!*

(ii) *Gib mir nur/auch/*sogar Bier!*

The pragmatic reason for this difference is obviously related to the fact that *even/sogar* implicates that beer is the least likely substance that I desire, and that this leads to a Gricean clash with the imperative, which is understood as “make it true that I have beer”. The conflict does not emerge when *also/auch* is used because the “least likely” part is missing here.

31 For focus association of DiPs see, however, Egg and Mursell (2017).

5 Conclusions

Attributing functional head status to particles, DiPs as well as FPs, opens an avenue of research that puts these elements right into core syntax. Particles occupy fixed functional positions in clause structure. These *Prt* positions have been identified as criterial positions in analogy to criterial positions that are familiar from the work of Rizzi (1991/1996) and Haegeman (1995). Particles can alternatively be merged with smaller phrases such as DPs, PPs etc. The scope of these *Small Particle Phrases* (SPrtP) is unfixed as long as the SPrtP is not in the context of a clause structure that admits the particle as a semantically fully interpretable element. The feature of the particle is active until the SPrtP has reached a matching Criterial position. It is deactivated once SPrtP passes through the specifier of a matching criterial head. The syntax of particles – DiPs as well as FPs – echoes structures and processes that are familiar from more widely studied domains of grammar, especially *wh*-movement. No construction-specific stipulations have to be added. The differences between different types of SPrtPs follow from the grammatical role that emphasis plays in SPrtP-internal fronting operations.

Let me hasten to say that the theoretical interpretation of the facts we have reached here corresponds closely to the claims that have been forwarded in Bayer (1996). The difference between this approach and the current one resides in technological differences between GB and Minimalism. In GB, SPrtPs were forced to be QR-moved to a scope position. In Minimalism, they can be assumed to raise to the specifier of a functional projection for feature valuation. Apart from this, many of the insights and generalizations remain the same.

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Michael S. Rochemont

Only syntax

Abstract: Traditionally, adverbial *only* association with focus (*John only likes MARY*) and constituent *only* association with focus (*John likes only MARY*) have received entirely distinct analyses, the former through alternative semantics (or a movement alternative where the associated phrase raises to the adverbial), and the latter through a type of Quantifier Raising. This paper argues that these two types of examples must be more closely related derivationally than traditionally thought. It is proposed that adverbial *only* generally, perhaps always, originates in constituent *only* position and is internally merged with its SpellOut position in the course of a derivation. The paper concludes with a brief argument against previous accounts of the apparent failure of *only* to associate with a trace.

Keywords: adverbial *only*, constituent *only*, focus association, criterial freezing, Taglicht sentences, *only* Raising

1 Introduction

In the half century of the study of *only* in the generative literature, it has been accepted since Anderson (1972)¹ that when *only* occupies an adverbial position at the beginning of vP, as in (1a), it must have been base generated there, thus ruling out any transformational analysis (e.g. Kuroda 1965, 1969 and Fischer 1968) of the relation between examples (1). In what follows, I will refer to scope marked *only* as it appears in (1b) as ‘adverbial *only*’ and to *only* when it is merged in a non-scoped position in an example like (1a) as ‘constituent *only*’.

- (1) a. John likes only Bill_F.
b. John only likes Bill_F.

A transformational analysis of the relation between (1a,b) is initially appealing because it appears to solve two problems at once: first, *only* must be related to a prosodically prominent focus associate (whose position is represented by a

1 Anderson explicitly discusses *even* rather than *only*, but suggests that his arguments extend to the syntactic analysis of *only* as well. I will not discuss *even*, but what I say extends to it as well. My proposal will not address the distinction between *only* and *even* that the latter can associate with a preceding subject from adverbial position while the former cannot (Jackendoff 1972). See Erlewine (2014) for an analysis of this distinction that is consistent with my proposal.

subscripted F on the prosodically marked focus, as in (1a)), and second *only* must also mark a scope domain, as it does overtly in (1b). Merging *only* as a constituent with its associate as in (1a) solves the first problem; raising *only* to a vP edge scope position as in (1b) solves the second. Presumably, *only* can raise also at LF, which satisfies the scope requirement for (1a) in the same way as for (1b). This analysis might also extend to cases like (2/3), which illustrate the Taglicht effect. Taglicht's (1984: 150) central observation is that while *only*'s scope interpretation is restricted to the embedded clause in (2/3a) or the matrix clause in (2/3b), the (c) examples are ambiguous, being equivalent in meaning to either (2/3a) or (2/3b). For instance, (3c) can mean either that the instructors require that the only language we speak is Spanish (equivalent to (2a) – we can speak no other language), or that the only requirement the instructors make is that we speak Spanish ((2b) – we can speak other languages so long as we also speak Spanish).²

- (2) a. They advised us to only learn Spanish_F.
 b. They only advised us to learn Spanish_F.
 c. They advised us to learn only Spanish_F.
- (3) a. The instructors require that we only speak Spanish_F.
 b. The instructors only require that we speak Spanish_F.
 c. The instructors require that we speak only Spanish_F.

In a raising analysis, the ambiguity of the (c) examples is captured if we assume that adverbial *only* originates as constituent *only* and LF raises to the most local vP edge (2a) or to a higher one (2b). This analysis must assume, rather implausibly, that *only* can raise across a clausal boundary to derive (2b) from (2a). But even were we to insist on this analysis with the implausible assumption of *only* raising across clauses, it would be to no avail. Anderson levels several arguments against such a transformational

² English speakers seem to differ in the syntactic contexts which can give rise to Taglicht ambiguities. Partee (1999), for instance, specifically excludes Taglicht ambiguities in simple declarative complements, and Kayne (1998) restricts these readings to subjunctive and infinitival complements. Taglicht, on the other hand, mentions no contextual restrictions of this sort, and gives examples like (i), where the ambiguity is present even in a simple declarative complement. My own judgments correspond to Taglicht's.

- (i) a. I knew he had learnt only Spanish. (I knew he hadn't learnt any other language.)
 b. I knew he had learnt only Spanish. (I didn't know he had learnt any other language.)

analysis of *only* and its relation to a focus associate. The most persuasive of these³ rests on the observation that it is implausible that *only* raises from an externally merged position as sister to its focus associate, for example in (4b), to its scope-taking position at a higher vP edge (4a,d). In a transformational analysis, this would require raising *only* out of an island, and Ross' Complex NP Constraint (together with its successors) prevents any transformational relation between a position within a relative clause island and one external to it.

- (4) a. The police *only* arrested the man who killed Bobby_F Kennedy.
 b. The police arrested the man who killed *only* Bobby_F Kennedy.
 c. The police arrested the man who *only* killed Bobby_F Kennedy.
 d. The police *only* said that they arrested the man who killed Bobby_F Kennedy.

Anderson proposes instead that *only* in relevant examples in (1–4) is merged in its surface position, where it marks its scope without any need for movement. Further, since *only* cannot raise from its constituent position in (3b), how does it acquire a relation with its focus associate in (3a)? Again, the Complex NP Constraint would restrict LF extraction of the associate from a strong island. The ready conclusion is that the focus/associate relation must be given by an interpretive rule that allows this relation too to be established without recourse to movement.

This general approach, with adverbial *only* merged in situ and related to its associate across an unbounded domain, has been adopted in many influential analyses since, including those of Rooth (1985, 1992), Kratzer (1991), Bayer (1996, 1999), Beaver & Clark (2008). Rooth (1985), for example, proposes a mechanism whereby the *only*/associate relation in (1b) is given by a compositional semantics that recursively computes ordinary and alternative semantic values in situ, with no need for movement of either adverbial *only* or its associate. Unfortunately, the mechanism does not extend to the constituent *only* cases exemplified in (1–4). Consistent with Anderson's conclusions, Rooth

³ Anderson also observes that a transformational analysis is denied by the observation that a focus particle may associate with more than a single phrase, as in *John only introduced Bill_F to Mary_F*. In such cases it is at least possible that *only* is externally merged with VP rather than either of V's complements. Since I will adopt Drubig's (1994) proposal that associates must LF raise to the specifier of adverbial *only*, nothing inherently restricts *only* from having two specifiers at LF (as noted by many others), among other possible responses. The force of Anderson's argument is thereby weakened.

proposes that *only*'s scope is fixed when it overtly occupies a scope position (as in (1b), and the (a) and (b) examples of (2/3)) but when it does not (as in (1a, 2/3c)), it achieves scope as an operator under QR, which raises [*only DP*] to a sentence peripheral scope position. For (2/3c) QR can raise the associate to this scope position either in the embedded clause (for readings equivalent to the (a) examples), or in the main clause (for readings equivalent to the (b) examples). Either position satisfies *only*'s need to mark a scope domain for its proper interpretation. In Rooth's proposal, only the QR route can lead to any ambiguity.⁴ Even if QR can operate across clauses, as would be required for the (2/3b) examples, cross-clausal QR is blocked for (4b), correctly predicting a lack of ambiguity here: (4b) can only be synonymous with (4c) and not also with (4a).

As noted, the apparent failure of both *only* raising and LF associate movement leads Rooth (1985, 1992), Kratzer (1991) and others to seek an in situ account of the generation and interpretation of examples like (4a,d). On the other hand, Drubig (1994) contests the necessity to abandon the LF analysis and resurrects it, on the basis of the proposal that it is the island containing the F-marked associate (in Drubig's terms the "focus phrase") that raises to adverbial *only* at LF in (4a) rather than the prosodic focus. He gives several arguments in defence of this proposal. The analysis is further bolstered by additional arguments from Krifka (2006), Wagner (2006), and Erlewine & Kotek (2014, 2016). One telling observation, made in a general way as early as Brugman (1986), is that when we consider the meaning of (4a,d), the alternatives that *only* quantifies over and for which it asserts an exhaustive selection are alternatives to men (specifically Kennedy killers) who the police arrested rather than alternatives to members of the Kennedy family. That is, it is indeed the focus phrase that *only* associates with in its identification of alternatives and not the "focus exponent" (the word/phrase that most immediately bears prosodic prominence).⁵

4 The dependence on QR is problematic. QR is generally thought to be clause bound, but its use here requires raising the *only* phrase across a clausal boundary to derive the b readings in (2–3) from the c examples. The landing site in the upper clause for this operation of QR may be vP or IP, but the result is the same – an exceptional operation of QR. Rooth (1985) likens this instance of QR to wh movement, a rule he also treats as a type of QR. But wh movement is now commonly believed to be feature driven, unlike QR. The reliance on QR is therefore suspect. We will see below, however, that there are other alternatives, the LF equivalents of Topicalization/Affective Inversion with *only*. Erlewine and Kotek (2016, section 5) argue that LF focus movement is preferable to QR; LF focus raising is another possible alternative if this single operation can both raise an associate to adverbial *only*'s scope domain and assign scope to an overt constituent *only* phrase.

5 In a hybrid proposal, Krifka (2006), while adding further support to Drubig's analysis that it is the island that LF raises, argues to keep the in situ analysis as well, for interpreting the pivot on which the alternatives to different men arrested by the police are drawn (that is, the alternatives

The movement account of the *only*/focus associate relation is a competitor to the in situ proposal from Alternative Semantics. Several empirical considerations weigh in favor of the movement account and against the in situ proposals of Rooth and others, if we accept the arguments from the authors cited (though see the amendment offered by Krifka (2006) discussed in footnote 6). However, both proposals are compatible with an in situ analysis of adverbial *only*, and both accounts have been implemented this way. Both accounts share the need to supply an analysis of constituent *only* cases like (1a) and the (2/3c) examples from the Taglicht paradigm. As noted above, Rooth's in situ semantics invokes QR for these cases, with special considerations for it to behave in the manner of LF wh movement rather than classic QR (since the latter is generally thought to be clause bound). The associate movement account must take a similar approach in which the constituent *only* phrase raises in toto to a sentence peripheral scope position, relying on some mechanism that yields an unbounded dependency between the overt position of the constituent *only* phrase and its target scope domain, constrained by island effects. There is no need for either approach to rely on QR since a possible overt movement predecessor is the Affective Inversion construction as it applies in *only* conditioned cases (AI-*only* – for example, *Only Bill does John like; Only Spanish do the instructors require that we learn*, etc.). Such cases show us that constituent *only* phrases may overtly raise in the required unbounded fashion. Whatever the mechanism, it seems that both accounts have recourse to the same alternatives.

At first glance, the sentences in (5) present no problem for the QR (or equivalent) analysis of the respective examples in (2–4).

- (5) a. They advised us only to learn Spanish_F.
 b. The instructors require only that we speak Spanish_F.
 c. The police arrested only the man who killed Bobby_F Kennedy.
 d. The police said only that they arrested the man who killed Bobby_F Kennedy.

consist of men who have killed a member of the Kennedy family). When an island that contains an associate of *only* occurs within another island, there is no evidence of iterated associate movement of some sort. The topmost island is what restricts the alternatives excluded by *only*, as expected under Krifka's mixed analysis. In Kratzer's (1991) example below, only alternatives to specific questions are excluded, not alternatives to women (or to boards).

- (i) They only investigated the question whether you know the woman who chaired the ZONING BOARD.

These examples illustrate a seemingly innocent correlation, that each example of adverbial *only* corresponds to an example with a local constituent *only* equivalent for it that is either the same as or contains the F-marked associate. Under the in situ analysis of adverbial *only* it is not unexpected that this correlation holds, since *only* must c-command any phrase that bears or contains a focus associate relation to it (Tancredi's 1990 Principle of Lexical Association – PLA). For (5b) for instance, proponents of the in situ treatment of adverbial *only* might argue that the observation of this correlation confuses two distinct structures, as given in (6), which distinguishes two separate meanings for (2b): one where *Spanish* is *only*'s focus associate, and another where *that we speak Spanish* is. The implied claim is that (5b) is equivalent in meaning only to (6b).

- (6) a. The instructors only require [that we speak [Spanish]_F]
 b. The instructors only require [that we speak Spanish]_F

But the problem is that (5b) allows the same interpretations as the equivalent adverbial *only* example (2b). In other words, (5b) too allows the association relations present in (6), as in (7).

- (7) a. The instructors require only that we speak [Spanish]_F
 b. The instructors require only [that we speak Spanish]_F

The AI-*only* construction can be used as a diagnostic to confirm the scope interpretations claimed for these examples.⁶ Sentences (2b, 5b) are equally ambiguous, both consistent with either of the scope interpretations AI-*only* creates in (8).

⁶ Though I will not provide an analysis of AI-*only*, I think the construction is implicated in the discussion here in that it provides an overt alternative to scope marking for constituent *only*. AI-*only* is potentially unbounded, like Topicalization, and the surface landing site determines unambiguously *only*'s sentential scope. See (i).

- (i) a. Only Bill did John think that Mary would marry.
 John only thought that Mary would marry Bill_F.
 b. John thought that only Bill would Mary marry.
 John thought that Mary would only marry Bill_F.

For extensive discussion of the relation between Topicalization and Affective Inversion, see Drubig (1992).

- (8) a. Only Spanish do the instructors require that we speak.
 b. Only that we speak Spanish do the instructors require.

Similarly, both examples (2b, 5b) are consistent with both sets of continuations in (9).

- (9) a. They advised us only to learn Spanish ...
 ... we can speak other languages so long as we also speak Spanish.
 ... they don't require anything else.
 b. The instructors require only that we speak Spanish ...
 ... we can speak other languages so long as we also speak Spanish.
 ... they don't require anything else.

The observation that the constituent *only* variants in (5) have the same interpretations as the sentences in (2/3b) poses a serious difficulty for the in situ account of adverbial *only*, whether one adopts an Alternative Semantics or an LF movement account of the *only*/associate relation. The reason is that, as just noted, both accounts require that constituent *only* cases like (1a, 2/3c) be treated through a special mechanism of potentially unbounded focus raising, whether by Rooth style QR or some equivalent mechanism, which LF raises constituent *only* with its sister to a sentence peripheral scope position, as already noted. This allows for the proper interpretation of cases in which constituent *only*'s sister is also *only*'s focus associate (e.g. 7b), but not for cases where constituent *only*'s sister merely contains *only*'s focus associate (7a). In these latter cases, constituent *only* does not form a constituent with the embedded focus associate, so there is no source for the analysis where constituent *only* raises with its associate (as for example in (1a)) to a sentence peripheral position for scope. Specifically, in representations like (7a) *only* and its associate do not, and by our assumptions cannot, form a constituent. A ready analysis to capture the interpretive parallels between adverbial *only* and constituent *only* in such cases is to invoke a process of *only* LF raising from constituent to adverbial position, then relying on the analysis of the adverbial *only*/associate relation to create the parallels.⁷ This result might seem more plausibly consistent with the LF movement account of this relation than

⁷ I emphasize that it is not an alternative to simply raise the constituent *only* phrase in such cases. Unlike (4a), the constituent *only* phrase in the cases in (5) is semantically inactive in the interpretation where the focus associate is taken to be the embedded phrase and not *only*'s sister. In other words, constituent *only*'s sister can be a focus phrase solely in the case of (5c).

the Alternative Semantics account, since the former already invokes movement in the syntax of association with *only*, while the Alternative Semantics account specifically eschews movement. Still, in principle either account could incorporate an appropriately configured raising analysis for adverbial *only* with no further distinguishing consequence for empirical adequacy.

2 *Only* Raising

We have seen evidence in the previous section that *only* must be allowed to LF raise from constituent to adverbial position.⁸ If this operation applies at LF, then it must also be able to apply in the pre-SpellOut derivation when motivated. This is what gives rise to the overt alternation we see in English (but not in some other languages) between constituent and adverbial *only*.⁹ The argument in the last section left open at least two immediately relevant questions: (i) whether any motivation remains for an unbounded LF operation for determining scope in cases where *only* remains overtly in constituent position (QR or some equivalent mechanism, as discussed earlier); and (ii) whether *only* is ever externally merged in adverbial position. Considering (i), LF *only* raising suffices for cases like (1a), but in more complex examples, like the Taglicht sentences in (2/3c), such LF raising of *only* will not suffice, for the reason given earlier: cross-clausal raising from an adverbial or constituent position in a lower clause to one in a higher clause would violate island constraints in cases like (4b). I will therefore maintain the expectation that *only* never raises across a clausal boundary and argue that *only* raising is a strictly local operation. If so, there still remains a need for an unbounded LF movement of the *only* phrase for examples like (2/3c). In regard to question (ii), nothing I have said so far prevents the merger of *only* directly in adverbial position with the relation

⁸ See Kayne (1998) for an alternative use of raising in the syntax of association with *only*.

⁹ For instance, in German, constituent *nur* (*only*) is strictly disallowed inside the VP and can only be adverbial in such cases. Yet it appears that constituent *nur* freely appears in VP external positions (for discussion see e.g. Jacobs 1983, Büring & Hartmann 2001, Reis 2005). A raising analysis provides a possible solution to this long standing problem. Briefly, unlike English, German does not tolerate constituent *nur* within the VP domain, though such phrases appear freely in subject, scrambled, and topicalized positions; only adverbial *nur* appears when the associate is contained within the local VP. This situation is readily analyzed by constituent *nur* raising to adverbial position, but, in contrast to English, obligatorily before PF SpellOut, with no possible covert alternative. This analysis does not address the closeness effect, of course.

between focus operator and associate given by either Alternative Semantics or LF movement of the associate to the adverbial operator. However, the correlation between adverbial *only* and the availability of an equivalent constituent *only* source seen earlier is entirely general: for every instance of adverbial *only* there is also a local constituent *only* source for it that is either the same as or contains the focus associate, as the examples above and below attest, with no change in the possibilities for association with *only*.¹⁰ In many cases, this correlation does not rule out direct merger of *only* in adverbial position, but it does render it redundant. Since *only* raising offers an alternative account that is independently required, it would be preferable to maximize its use than to appeal to a redundant operation. For cases in which *only* multiply associates within its predicative sister (complex focus, for instance), *only* may be adjoined to VP and raised to vP (see also footnote 14).

The examples seen so far are consistent with the claim that the constituent source correlate of adverbial *only* must be in the same local domain as the adverbial. The % marking on the (c) examples in (10) – (13) below are intended to signal a lack of interpretive correspondence with the (a) and (b) examples. Consistent with the examples above, (10) to (13) show that to be a constituent source for adverbial *only*, constituent *only* must occur in a domain that is “close” to its target adverbial position. In (10, 11, 13), *only* cannot raise out of an adjunct, clausal or not, and nor can its associate. In (12), *only* cannot raise from the prenominal position in DP, a position also known to resist extraction generally.

- (10) a. John *only* left because he hates Bill_F.
 b. John left *only* because he hates Bill_F.
 c. %John left because he hates *only* Bill_F.
- (11) a. John can *only* cook with chopsticks_F. (# He can cook other ways as well.)
 b. John can cook *only* with chopsticks_F. (#He can cook other ways as well.)
 c. %John can cook with *only* chopsticks_F. (He can cook other ways as well.)
- (12) a. Mary *only* approached the student_F at the party.
 b. Mary approached *only* the student_F at the party
 c. %Mary approached the *only* student_F at the party.

10 The inverse correlation (that constituent *only* always gives rise to an adverbial *only* equivalent) is false, as can be seen in the (c) examples of (11–13).

- (13) a. John might only be upset with his sister_F in the house.
 b. John might be upset only with his sister_F in the house.
 c. %John might be upset with only his sister_F in the house.

These cases show us more clearly what it means for adverbial and constituent *only* to be “close” to one another: DP and adjuncts in addition to clauses are barriers to the affiliation of constituent *only* with the adverbial position. The scope of *only* in such cases is limited to the DP, adjunct, or clause, respectively. Using the contrast between AI-*only* and Topicalization as a diagnostic for sentence-level scope for *only*, examples (14) respectively confirm that the (c) examples of (10–13) cannot mark sentence-level scope for *only*, while the (b) examples must.

- (14) a. *Because he hates only Bill_F did John leave.
 Because he hates only Bill_F, John left.
 Only because he hates Bill_F did John leave.
 *Only because he hates Bill_F, John left.
 b. *With only chopsticks_F can John cook.
 With only chopsticks_F, John can cook.
 Only with chopsticks_F can John cook.
 *Only with chopsticks_F, John can cook.
 c. *The only student at the party did Mary approach.
 The only student at the party, Mary approached.
 Only the student at the party did Mary approach.
 *Only the student at the party Mary approached.
 d. *With only his sister_F in the house might John be upset.
 With only his sister_F in the house, John might be upset.
 Only with his sister_F in the house might John be upset.
 *Only with his sister_F in the house, John might be upset

As a first approximation of the required analysis, I propose that the relation between constituent *only* and its adverbial target is conditioned by the phase. Specifically, the operation of *only* raising from constituent to adverbial position is local in the sense that it arises strictly in the same phase as the adverbial. Further, adopting the LF movement analysis of the *only*/associate relation, a focus associate must LF raise from a position embedded within or equal to the source constituent *only*'s sister. If the former, the embedded focus associate can raise to adverbial *only* solely if it is not contained within an island (as in (2/3b)); if it is contained within an island, then the island will serve as the focus phrase and raise to the adverbial, with the consequence that the focus phrase serves as the associate, determining the set of alternatives that serve as *only*'s restrictor, its adverbial position determining its scope, as in (4).

The preceding sketch of an analysis requires that adverbial *only* always has a local constituent *only* source, and that the constituent that *only* is externally merged with may but need not function also as its focus associate.¹¹ If the latter, then the local constituent source for adverbial *only* must contain its focus associate. To maximize the use of *only* raising, adverbial *only* cannot be externally merged in adverbial position. Some further motivation for this claim is that although *only* has the form of an adverb, it resists being externally merged as one.¹² For instance, *only* can appear between a verb and its object; adverbs cannot (15a). Adverbs, even some exclusive adverbs, generally tolerate modification; *only* does not (15b). *Only* can make a constituent with almost any category, including DP, CP; adverbs cannot (15c).

- (15) a. I read only newspapers.
 *I read always newspapers.
 b. John quite exclusively reads newspapers.
 *John quite only reads newspapers.
 c. *John said exclusively/always that he was tired.
 John said only that he was tired.

In part to address these properties, I adopt Bayer's (1996) proposal taking *only* to be designated a minor functional head (MFH – Rothstein 1991). A MFH cannot project categorial features of its own; instead it extends the categorial features of the constituent that it is externally merged with. A MFH also has subcategorization features but no theta grid. Bayer assumes that *only* can be a MFH on any category. I

11 A reviewer points out that this story would be hard to adapt to the facts in some languages, where there may only be an “adverbial” form of the operator or a constituent form, or there are different morphological forms for the “adverbial” type and the constituent type. Note 9 shows that the raising analysis may find some cross-linguistic validity in German. As well, Kwak^wala exclusives, as described in Littell (2016, chapter 7.3), give evidence of a language where the form of the exclusive operator reflects the syntactic category of its scope (subject, predicate, or locative), not the category of its associate, a system that closely reflects the raising analysis I have given for English. I leave for future work what the range of variation may be and what it signifies.

12 Not so concessive *only*. I treat the discourse marker *only* (and its equivalent *nur* in German) as a concessive adverb that is itself a full maximal projection [_{AdvP} *only*], and as such apparently incapable of focus association.

- (i) The police say that Bill is guilty, only (=but/though) everyone knows he isn't.

In English, concessive *only* must appear at the farthest edge of the left periphery in root sentences only. German *nur* in this use can trigger V2 in root clauses, as a maximal projection, and apparently also without any focus association.

assume instead that *only* subcategorizes for either maximal lexical or fully extended lexical projections (DP, NP, PP, CP, VP, AP etc.). For our purposes here, the most significant consequence of this subcategorization restriction is that *only* cannot be externally merged with vP, or IP as these are not fully extended projections from V, but only non-maximal functional projections between V and C.¹³ The subcategorization restriction against merger with IP is a long recognized restriction on the distribution of *only*, generally unaccounted for but accommodated under this proposal. The restriction against merger with vP will require that *only* merged with vP must have raised from VP, to achieve a scope interpretation.¹⁴ By these assumptions, *only* is consistent with categorization as a MFH. I will assume that the focus operator *only* also has a subcategory feature as a quantificational adverb/adjective. These assumptions will allow constituent *only* to raise to the position of adverbial *only*, but force it to be externally merged as a MFH on a maximal (extended) lexical projection.¹⁵ As we have seen, *only* does not pattern with other VP level adverbs.¹⁶ It also patterns differently than *not* and even than some other exclusive adverbs, such as *exclusively* and *merely*, as seen in (16).

- (16) a. John likes *not / only Mary.
 b. John likes *exclusively / *merely / only / just / solely Mary.

13 I take PP with a DP complement to be an extended projection of DP, thereby prohibiting a strictly exclusive interpretation for *only* in such cases as (i) (PP supplants DP as the scope bounding node). Compare (ii). (See Kayne (1998) for a different view of such examples.)

- (i) ??He gave the book to only Mary. / He gave the book only to Mary.
 ??She bought socks for only the girls. / She bought socks only for the girls.
 (ii) He gave the book to only one girl.

14 When *only* can only associate with constituents from the VP constituent *only* position (eg. multiple focus, or focus on the V head), then it must merge as a MFH with VP and then raise to the adverbial *only* position at vP.

15 MFH *only* hosts a specifier position which is apparently filled by *only*'s complement in cases of right edge constituent *only*, as in (i). (Small caps mark positions of mandatory prosodic prominence.)

- (i) John likes MARY ONLY.
 I predict that JOHN ONLY will get along with Bill.

Full analysis of this construction must await future exploration. See Brennan (2008) for a preliminary investigation.

16 Note that *only* retains its adverbial form even in its adjectival use, unlike many other exclusive adverbs (e.g. *mere* vs. *merely*, *sole* vs. *solely*, *exclusive* vs. *exclusively*).

What differentiates these others from *only*? I take these data to show that some exclusive adverbs are MFHs, others are not. *Not* is neither a MFH nor an adverb.

- (17) John does not like Mary. / *John not likes Mary.
 *John does only like Mary. / John only likes Mary.

With this background, we are ready to propose a specific analysis of *only* Raising.

The relation between (1a,b) is reminiscent of the behavior of *beaucoup* in French, first discussed by Obenauer (1983, 1976, 1994).

- (18) a. *Il a mangé beaucoup de gateaux.*
 he has eaten a.lot of cakes
 'He has eaten a lot of cakes'
 b. *Il a beaucoup mangé de gateaux.*
 he has a.lot eaten of cakes
 'He has eaten a lot of cakes'

Laenzlinger (1998) proposes that *beaucoup* is a quantificational adverb that occupies a Criterial (scope marking) position in (b), and relates to its s-selected complement *de gateaux* from a distance. As Rizzi (2010) observes, evidence of a criterial freezing effect lies in the fact that further raising of *combien*, the wh equivalent of *beaucoup*, is blocked under covert movement (at LF) when *combien* occupies the criterial scope position (b).

- (19) a. *Il a mangé combien de gateaux?*
 He has eaten how.much/many of cakes
 'How many cakes has he eaten?'
 b. **Il a combien mangé de gateaux?*
 he has how.much eaten of cakes

I propose to adapt such an account to the paradigm in (1). Concretely, the discourse/scope position is externally merged with vP as a silent quantificational adverb that has an unvalued operator feature (perhaps as well as an affixal feature; Culicover 1991) that attracts the MFH *only* to it by head raising. The derivation proceeds as follows.

- (20) a. Build vP with predicate internal subject, *only* a MFH on *Bill*:
 [_{vP} John [like [only [Bill]_F]]]

b. Add silent quantificational adverb O, head-raise *only*:

[O + *only* [_{vP} John [like [_{t_{only}} [Bill]_F]]]]

c. Build the rest of the sentence:

PF output: “John *only* likes [Bill]_F”

In step b, *only* raises and values [O], satisfying the scope criterion under head adjunction (Laenzlinger 1998; Rizzi 2007, 2010). Because this is a criterial position, no further movement of *only* is possible, even at LF. Importantly, *only*'s chain has two positions, its initial Merge position and its surface scope position, as required by the Criterion analysis. This provides for the character of the Taglicht examples, in which once *only* occupies a vP edge scope position, it is frozen (2/3). What of (2/3c), in which constituent *only* has not raised to adverbial position? We could assume that this same raising analysis applies covertly, so providing a Criterial scope interpretation for the MFH *only*. But while this may suffice in many instances (such as (1a)), it will not suffice for Taglicht sentences such as (2c), in which constituent *only* can have either a local or a non-local interpretation. This is what urges Rooth to propose QR for such cases. I have suggested instead that a covert equivalent of Topicalization/Affective Inversion applies to give the clause external interpretations that arise, just as the overt application of this process does. The clause internal cases can all be handled by *only* raising.

3 Association with focus

I noted earlier that examples like (4a,d), slightly modified below, have been used to argue not only against a raising analysis for adverbial *only*, but also against a LF raising analysis to establish the *only*/focus associate relation.

- (21) a. The police *only* arrested [the man who killed Bobby_F Kennedy].
 b. The police *only* said that they arrested [the man who killed Bobby_F Kennedy].

To repeat, since *Bobby Kennedy* appears to successfully instantiate a well formed relation to *only* out of the bracketed relative clause island, it cannot be that this relation is established by covert (LF) raising of the focus to adverbial *only*, as such raising would violate the Complex NP Constraint (Ross 1967).

I have adopted the LF raising analysis here. Consistent with the *only* raising analysis we have been pursuing, I suggested that the source for (21a) is (22).

- (22) The police [O] (said that they) arrested [only [the man who killed Bobby_F Kennedy]]

Consider now how the derivation of (22) proceeds.

- (23) a. Build matrix vP with predicate internal subject, *only* a MFH on *Bill*:
 [_{vP} the police [arrested [only [the man who killed [Bobby]_F Kennedy]]]]
 b. Add silent quantificational adverb O, head-raise *only*:
 [O + *only* [_{vP} the police [arrested [t_{only} [the man who killed [Bobby]_F Kennedy]]]]]
 c. Build the rest of the sentence:
 PF output: “The police *only* said that they arrested [the man who killed [Bobby]_F Kennedy]”
 d. At LF, move *the man who killed Bobby_F Kennedy* to [O±*only*]:
 [[[the man who killed Bobby_F Kennedy] O+*only*] [[_{vP} t_{the police} [arrested [t_{only} t_{the man who killed [Bobby]_F Kennedy]]]]]}

In step (23b), *only* raises from its MFH position in (23a) to [O], the matrix clause internal scope position for *only*. [O+*only*] probes and attracts the F-marked associate to its spec at LF, pied piping as much structure as it needs to satisfy PF Spell Out requirements (Chomsky 1995), in this case pied piping not only [_{DP} *Bobby_F Kennedy*] but also the island [_{DP} *the man who killed Bobby_F Kennedy*] that contains it. Since it is this latter DP that occupies *only*'s spec position at LF, it is this phrase that functions as *only*'s semantic restrictor and determines the range of alternatives that *only* exhaustively ranges over. A parallel analysis holds for (21b). There is no principled redundancy between *only*'s requirement to select an XP as complement and its requirement for a focus associate: the former is satisfied by External Merge, and the latter by a phrase raised by Internal Merge to the SPEC of *only* at LF, a goal attracted by adverbial *only* from its scope position. So long as the complement to constituent *only* does not itself contain an island, an F-marked phrase contained in that complement is free to associate directly with adverbial *only* or the complement itself may be interpreted as the associate. In either case, no violations are incurred whichever associate raises to adverbial *only* (though of course the meanings will vary). It is worth noting that the LF raising analysis of the associate immediately accounts for two widely noted but underived properties of association with *only*: (i) the phrase that serves as the focus associate of *only* is always a maximal projection, and never a head for example (Bayer 1996; Wagner 2006); and (ii) *only* must c-command its associate in order to attract it (Tancredi's 1990

PLA). Notably, the feature structure and head status of [O] determines that there can be no overt movement of the constituent *only* phrase to adverbial *only*'s clause internal scope position.

- (24) a. *John [only Bill] likes $t_{\text{only Bill}}$.
 b. *John [Bill only] likes t_{Bill} .

By assumption, raising of the associate to O+*only*'s spec is an LF operation however implemented, and cannot be overtly realized (24).

4 Freezing effects

Earlier I appealed to Rizzi's Criterial Freezing proposal to restrict *only* raising to just the most local candidate target. Once *only* is merged with the quantificational silent adverb at ν P edge, it satisfies a criterial scope-discourse property and is frozen in place.¹⁷ The LF raising analysis of *only*'s focus associate might also be seen to provide for an account of the restriction on extraction of *only*'s associate, widely cited (cf. (25)).¹⁸ Since the LF position of the associate is plausibly also a criterial position, this restriction is to be expected. In (25) for example, under no circumstances can *what/John* be interpreted as *only*'s associate. (See Beaver & Clark 2008: chapter 7 and references listed there.)

- (25) a. *What do you think Bill only gives his MOTHER?
 b. *FISHSTICKS, I believe Kim only EATS.
 c. *JOHN is the sort of person that Bill only LIKES.

The usual account of such data is that a focus operator cannot associate with the trace of a focus. Rizzi's Criterial Freezing proposal provides a natural account of these data under the analysis I advance here. The essence of Rizzi's proposal is that a constituent goal that raises to a probe expressing a scope-discourse property (Chomsky 2000) thereby satisfies a criterion (Rizzi [1991] 1996), and this criterial position terminates the chain created by movement of that constituent,

¹⁷ Other proposals to express the freezing of adverbial *only* are of course possible.

¹⁸ Though it is not usually observed, these data are delicate, in that judgments most reliably mirror the claims in the literature if prosodic prominence falls in a particular position in examples cited. To promote the desired pronunciations I will mark words with prosodic prominence in small caps.

effectively freezing it in the scope-discourse position (Rizzi 2006; Rizzi & Shlonsky 2007). Thus, the criterial internally merged position marks the endpoint of a chain whose initial position is the externally merged position of the constituent, the position in which its c-/s-selectional properties are expressed. The criterial goal is frozen, though in principle further sub-extraction from it may be allowed (Rizzi 2007, 2010).

A fundamental problem for this approach is that the data are only reliable under certain pronunciations. Consider (25b), a case of Topicalization. Topicalization is characterized by the presence of two intonational phrases, and hence at least two instances of prosodic prominence – one for each phrase. In this, Topicalization in (26b) contrasts with Focus Preposing (26a). In the latter there is but a single intonational phrase and a single prosodic prominence, the prominence appears on the preposed focus, and the rest of the sentence is deaccented. (This seems to be a characteristic of Focus Preposing in many languages, e.g. Italian (Bocci 2013)). When (25b) is pronounced as a Focus Preposing construction (27b), with a single prosodic prominence on the preposed phrase and the rest of the sentence deaccented, association of the preposed phrase with *only* is considerably easier to accept, if not perfect. This appears to be true of the other examples in (25) as well.

- (26) a. {A: Bill only likes Mary. B: That's not true! ...} JOHN Bill only likes.
 b. #JOHN, Bill only LIKES.
- (27) a. What do you think BILL only gives his mother?
 b. FISHSTICKS I believe Kim only eats.
 c. John is the sort of person that BILL only likes.
 d. FISHSTICKS, I believe KIM only eats.

Notice that (27d) too is improved, even though this is still an instance of Topicalization. Evidently, markedness arises in those cases where *only* is followed by a prosodic prominence that does not mark the intended focus associate. I suggest that Criterial Freezing provides a worthy account of some of the data, but collapses when presented with the full array of prosodically controlled data. The resulting contrasts remain unanalyzed. If the source of the apparent freezing effect is indeed the presence of a prosodic prominence in the domain following adverbial *only*, then perhaps a processing/parsing explanation of the effect would have greater success.¹⁹

¹⁹ So far as I have tested, the same distribution of judgments holds also for unbounded extraction from the domain of *even*. Given that adverbial *even* in restricted circumstance does

5 Conclusion

I have argued that despite long standing agreement in the field that adverbial *only* is base generated in situ, there is substantial reason to propose that adverbial *only* must in at least some cases be raised to adverbial position from a local constituent *only* position. I have presented an analysis of *only* raising where in fact every instance of adverbial *only* originates in a constituent *only* position, and thus that a transformational analysis of the relation between (1a,b), repeated below, is not only possible, but necessary.

- (1) a. John likes only Bill_F.
 b. John only likes Bill_F.

This conclusion holds regardless whether one promotes an Alternative Semantics account of the *only*/associate relation or a LF movement account. I have implemented the analysis using a LF movement account of this relation, in which adverbial *only* always occupies a derived position, whether covertly or overtly, and its focus associate covertly occupies a derived position in the immediate domain of the adverbial operator. I have concluded that a widely discussed freezing effect related to the *only*/associate relation is not plausibly analyzed by Criterial Freezing and is more likely due to a processing constraint that prohibits a sole prosodically prominent phrase in the complement of adverbial *only* that is not its intended associate.

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Maria Polinsky

Freezing and phi-feature agreement: On the role of [PERSON]

Abstract: This paper investigates the empirical and theoretical relationship between two nominal phenomena: phi-agreement and subextraction. Previous accounts have proposed that nominals that undergo phi-agreement are frozen for subextraction. Building on that work, this paper begins by identifying several factors that must be controlled in order to accurately assess the proposed agreement–freezing connection. In particular, we emphasize the importance of limiting our attention to linguistic situations that involve genuine subextraction and genuine agreement. Many DPs that enter phi-agreement also move, making it difficult to tease apart agreement and movement as potential triggers for freezing to subextraction. We argue that, although controlling for such variables results in a smaller language sample, the resulting data pool is also cleaner than the sample produced in a large-scale investigation of agreement and freezing. Building on this background discussion, we identify several languages in which agreement appears to induce freezing (Basque, sign languages) and some in which it does not (primarily Tsez and Hindi). The resulting paradox paves the way for the analytical contribution of the paper, in which we argue that a DP that contains a [Person] feature is opaque to subextraction, regardless of whether this DP determines phi-agreement. It is the person specification that renders a DP opaque to subextraction. We conclude that the connection between agreement and subextraction is indirect and more abstract than has previously been argued.

Keywords: agreement, Basque, blocking effects, clitics/cliticization, Hindi, phi-features, sign languages, split NPs, subextraction, Tsez

1 Introduction

This paper examines the phenomenon of subextraction (also referred to as subscrambling), in which a subconstituent is displaced out of a nominal constituent. This process is exemplified below:

(1) Which candidate_i did MSNBC offer [new revelations on t_i]?

Subextraction is not always possible, as illustrated by the ungrammatical (2); in this example, the DP *a candidate of x party* is considered frozen (opaque) for subextraction:

<https://doi.org/10.1515/9781501504266-009>

- (2) *Which party_i did you send [a candidate of t_i] your brochures?

It is important to distinguish subextraction from the process of *extraction*, which displaces an entire constituent. Subextraction and extraction are subject to different constraints which I will not review here (Lohndal 2011; Polinsky et al. 2013; Chesi and Bianchi 2014). To give just one example, locality restrictions tend to apply more rigidly to subextraction than to extraction (Lohndal 2011; Corver 2016). The received wisdom is that subextraction from a nominal constituent fails when (i) that constituent enters a checking domain (for instance, for case or the EPP) or (ii) that constituent participates in phi-feature agreement (Boeckx 2003, 2008; Lohndal 2011). In such instances, the host of subextraction undergoes *freezing*: it is no longer transparent for subextraction.

Until recently, constraint (ii) on subextraction was subsumed under (i), based on the intuition that case-checking follows agreement. On the assumption that there is a significant overlap between movement for case and movement for agreement (Baker 2008; 2013), phi-feature agreement (ii) and movement for case (i) do not need to be separated: any nominal constituent that participates in phi-feature agreement is expected to be frozen.¹ This intuition is formalized in Chomsky's (2000; 2001) Activity Condition:

(3) *Activity Condition*

If an element α undergoes A-movement, it gets frozen: neither it nor any of its parts can undergo further movement operations. In its derived position, α is rendered φ -complete, and it cannot participate in any other computational operations.

However, in the past decade, important arguments have been advanced that favor either a complete separation of case-checking and agreement (Nevins 2004; Bobaljik 2008; Halpert 2012), or the inverse of the activity condition, in which agreement follows case-checking (Levin and Preminger 2015). Assuming that recent hesitancy toward the activity condition is well-founded, it is important to separate freezing attributed to case-checking and more generally movement to a checking domain (under the family of constraints in (i)) and freezing attributed to phi-feature agreement (under constraint (ii) above).

In this paper, I concentrate on the latter, examining the role of phi-feature agreement in constraining subextraction. In zeroing in on this phenomenon, (direct) objects, which do not have to leave their base position to participate in

¹ That still leaves us with nominal constituents that undergo A-bar movement, under constraint (i), but such movement is not relevant for the present discussion.

agreement, are going to be particularly informative. As Lohndal writes, there is a “strong correlation between agreement and lack of sub-extraction. Notice, though, that since the direct object itself has not entered a checking domain, movement of the entire object is still possible. Thus there are now two ways in which sub-extraction of a DP becomes impossible: either by entering a checking domain (the case of subjects), or if there is agreement (in phi-features) between a verb and the DP (the case of objects)” (Lohndal 2011: 45). The general idea is that verb-object agreement makes the direct object φ -complete, which in turn leads to freezing. If this is on the right track, direct objects are particularly useful in allowing us to dissociate the effects of movement to a checking domain and the effects of agreement without such movement.

As internal arguments, direct objects invite a comparison with subjects of unaccusatives, which often differ from other subjects in being either completely or relatively transparent (Chomsky 2008). But since unaccusative predicates may be introduced by a functional head with properties different from the transitive functional head v , it is expedient to ponder the agreement-related properties of direct objects first.²

In the considerations of object opacity, it is φ -feature agreement in the narrow sense that induces opacity to subextraction, rather than the more abstract operation Agree, which can create a number of dependencies (for instance, Pesetsky and Torrego 2007 propose a theory of Agree which does not involve phi-feature agreement at all). This distinction between agreement and the more abstract Agree operation is important. In a large body of research, the abstract operation Agree is viewed as a necessary condition on extraction (Richards 2001; Rackowski and Richards 2005; Pearson 2005; van Urk and Richards 2015). On this approach, island effects arise when a higher functional head cannot enter into an Agree relation with the extraction domain. To reiterate, this line of inquiry is concerned with Agree as an abstract operation, which is much broader than the agreement in phi-features discussed in this paper. Furthermore, most of the work on this approach has concentrated on extraction, rather than subextraction; in fact, the languages most often used to argue for the connection between Agree and transparency (Tagalog, Malagasy, Dinka) lack subextraction altogether.

² Adding unaccusatives to a cross-linguistic study would lead to another set of practical complications; unaccusativity diagnostics are not universally available, and it was only recently that researchers started paying attention to differences in subextraction between subjects of unaccusatives and all other subjects. As a result, the range of data available cross-linguistically is incomplete at best.

On the other side of the debate, researchers have argued that certain languages need to suspend agreement (not Agree!) before extraction of a particular clausal constituent can proceed; anti-agreement is the clearest case of this phenomenon (Baker 2008; Boeckx 2003; Ouhalla 1993, 2005; Schneider-Zioga 2007, a.o.).³ Data from Basque, in particular, suggest that agreement between the extraction domain and *v* or T may block subextraction (Boeckx 2003; 2008; Lohndal 2011; Gallego 2010). It is this generalization, formalized in (4) below, that I explore in this paper:

- (4) If an element α participates in phi-feature agreement, it gets frozen for subextraction

To fully investigate this generalization, we need to assemble both empirical and conceptual evidence. Empirically, we need observations on subextraction across languages. I tackle this task in sections 3 and 4; section 3 examines empirical cases that confirm (4), while section 4 presents empirical data that contradict this generalization. Conceptually, we need to thoroughly examine the relationship between agreement and movement out of a domain. Section 5 scrutinizes this relationship and argues that the connection between agreement and freezing, as stated in (4), is too general and needs to be refined. The refinement I propose, based on the amassed empirical evidence, establishes a connection between freezing and *person* agreement specifically.

Before proceeding to these tasks, however, it is crucial that we first establish a clear and consistent understanding of the phenomena we are trying to link: phi-feature agreement and subextraction. These two phenomena are discussed in section 2.

2 Agreement? Subextraction?

An old saw compares the act of engaging in philosophical inquiry to standing in a dark room and looking for a black cat that isn't there (Doniger 2011: 32–33). In the present paper, agreement and subextraction are the two cats we are after. All possibilities may look alike in the dark, so before we proceed, it is important that we shed some light on the situation and make sure we're all in the right room.

While *agreement* is a mechanism by which the features of a particular DP get transferred to another constituent, not all phenomena that meet this criterion

³ I will discuss anti-agreement further in section 5.

constitute agreement; feature transfer can be achieved by a variety of other means, including concord (Norris 2014), binding, coindexation (Reuland 2011), and cliticization/clitic doubling (Arregi and Nevins 2008; Woolford 2006; Preminger 2009; Nevins 2011; Oxford 2014, a.o.). The distinction between clitic doubling and morphological agreement, in particular, can be quite subtle, although the driving forces behind the two phenomena are decidedly different (Harizanov 2014, Anagnostopoulou 2006). It is therefore important, especially in our initial examination, to ensure that the data we investigate truly instantiate the relationship of agreement, not cliticization, as the latter takes us back to abstract Agree and away from the more specific and narrowly defined ϕ -feature agreement.

The difference between morphological agreement and cliticization is especially pertinent with respect to apparent object agreement, which is notoriously heterogeneous (cf. Siewerska and Bakker 1996: 117–118; Baker 2013: 25). For instance, in a recent discussion of Amharic, Kramer (2012; 2014) draws together a number of criteria to illustrate that object markers in that language are best classified as doubled clitics. Assuming the validity of this analysis, Amharic is irrelevant for the examination of freezing in subextraction under the condition introduced in (4) above. Likewise, object (absolutive) agreement is found across Mayan languages, and in fact in some of these languages subextraction from objects is possible (Tzotzil: Aissen 1996; Chol: Coon 2009), which may seem to challenge the generalization in (4). In Mayan, however, the absolutive markers invariably bear a formal resemblance to freestanding pronouns and appear in variable positions within the verbal complex (while ergative morphemes do not resemble pronouns and have a fixed prefixal position). The consensus is that Mayan object (absolutive) markers are clitics (Coon et al. 2014).

In general, numerous diagnostics allow us to distinguish between agreement and clitic doubling (Zwicky and Pullum 1983; Anderson 2005; Harris 2002; Nevins 2011; Preminger 2009, a.o.), so there is little excuse to assume a language exhibits agreement without checking its performance on these diagnostics first.

Next, it is important to determine whether or not subextraction from noun phrases is possible in a given language. A main outcome of subextraction is a “split,” whereby two non-string-adjacent expressions appear to be linked to a single clausal position. Because the main focus here is on nominal (non-clausal) internal arguments, I will be referring to such splits as “NP-splits”.⁴ NP-splits do not always arise through movement out of a single constituent (*subextraction* or *subscrambling*:

⁴ I use NP here atheoretically, without intending any significant contrast between DPs and NPs. However, see some discussion of the possible relationship between DP theory and subextraction in section 5 below.

(5a)); they may also occur as a result of ellipsis from two separately occurring constituents. This latter phenomenon is often referred to as *discontinuous constituency* (Fanselow and Cavar 2002; Ott 2012; Fanselow and Féry in prep.), which encompasses both partial ellipsis within two referentially linked constituents, without any movement involved: (5b), and scattered (partial) ellipsis of both copies of a single constituent (post-movement: (5c)). The latter case takes us back to extraction of an entire XP, a phenomenon I have set aside for the purposes of this paper.⁵

- (5) a. $X_i \dots [_{DP} \dots t_i]$ subextraction proper
 b. $[X \text{ WP}]_k \dots [X \text{ WP}]_i$ discontinuous constituency without movement
 c. $[X \text{ WP}]_i \dots [X \text{ WP}]_i$ discontinuous constituency with scattered deletion

It is easy to imagine contexts where subextraction and discontinuous constituency may be in complementary distribution. For example, in languages that observe the left-branch condition (Ross 1986),⁶ the separation of left-branching modifiers from the head can serve as a clear sign of discontinuous constituency. The left-branch condition is far from universal, however (Corver 2016), and dislocated constituents outside the left branch of a noun phrase may be amenable to both analyses – so it is not always obvious what the right analysis for a given language may be.⁷

Luckily, as with agreement vs. cliticization, sufficient diagnostics exist to allow us to separate subextraction from other types of noun-phrase discontinuities. In particular, subextraction proper is expected to be sensitive to syntactic islands, to follow locality constraints, to obey cyclicity, to be unavailable if the specifier of the host DP is filled (6), and to manifest connectivity effects.

5 The unavailable environments for extraction are a subset of the unavailable environments for subextraction (Rizzi 2004). To reiterate, this subset relationship follows from the locality conditions: since subextraction is expected to be always as local or less local than extraction, contexts where subextraction is allowed but extraction is not, are unlikely to occur (but see Rizzi 2010 for possible counterexamples).

6 Ross's Left-Branch Condition states that left-branch elements in the nominal and adjectival domains are inaccessible to movement processes.

7 For instance, Gallego (2010: 304–315) examines a set of Spanish examples containing apparent subextraction and negation, as in (i), and argues that when such constructions are interpretable (only under a *de re* interpretation), they actually involve scattered deletion rather than subextraction:

- (i) De qué autora no sabes [qué traducciones está a la venta...]
 of what author NEG know.2SG what translations be.3PL at the sale
 'Of which author don't you know what translations are on sale...'
 (example due to Juan Uriagereka).

Furthermore, on the assumption that subextraction is A-bar movement, we can expect to observe reconstruction effects and no new binding possibilities.

(6) *Who_i did Peter like [_{DP} Mary [_D's [_{NP} picture of t_i]]?

Languages that do not decisively exhibit subextraction cannot be used as data sources for the present investigation, whether or not they have agreement. For instance, although there is good evidence that person marking of objects on the verb in Algonquian is indeed agreement (Bruening 2009; Oxford 2014), the numerous discontinuous constituents in this language family are most likely base-generated (Reinholz 1999; Lochbiler 2012, a.o.), and thus do not meet our criteria. Georgian, too, has rich object agreement (Anderson 1984; Harris 1981; Foley 2015), but its pervasive NP-splits resist a subextraction analysis (Nash 2002; Fanselow and Féry in prep.). And Warlpiri fails to meet either of the methodological criteria set up here: its person/number cross-referencing is accomplished by clitics, not agreement (Legate 2008), and it has discontinuous constituency rather than subextraction (Legate 2011).

The mention of Warlpiri brings up yet another confounding factor. Warlpiri is a polysynthetic language. A scan of the sample of languages that have apparent object agreement shows that a number of them exhibit polysynthesis, for example, Mapudungun (Smeets 2008; Zuñiga 2000), Mohawk (Baker 1996, 2003, 2008). All other factors being equal, subextraction is outright impossible or highly questionable in such languages, which further limits the sample under consideration. In Northwest Caucasian languages, which also show polysynthesis (Testelefs 2009), there appears to be subextraction (Caponigro and Polinsky 2011: 86–87), but then these languages are likely to have clitics rather than agreement.

In the discussion below, I will rely on languages for which independent evidence of subextraction from a single constituent is available. The result is a much smaller sample (an issue I address below), but also a cleaner sample. By imposing these rigid limitations on the data set, we may be looking in fewer rooms – to return to the missing-black-cat metaphor alluded to at the beginning of this section – but we will be certain that our cats are to actually be found in the rooms we do search.

3 Agreement with objects leads to freezing: Empirical evidence

It was Basque that offered the initial inspiration for the proposal that objects which enter into phi-feature agreement with the verb are not transparent for

subextraction (Goenaga 1985; Uriagereka 1999: 395; Boeckx 2003: 72). Basque verbs agree with their subject and object in person/number. However, while Basque objects can freely A-bar move, subextraction out of these objects is impossible, reiterating the contrast between extraction and subextraction that I mentioned in the beginning of this paper. (7b) shows the subextraction of a *wh*-word, and (7c,d), topicalization.^{8,9} (In the ungrammatical examples, the verbal complex moves leftward over the object, and the object DP stays in its base position: Uriagereka 1999; Elordieta 2001, a.o.)

- (7) a. *pro* [Karlosi buruzko zurrumuru-ak] entzun
 Karlos.OBL about rumor-ABS.PL hear
 dituzu. *Basque*
 AUX.2SG.SUBJ.3PL.OBJ
 ‘You have heard rumors about Karlos.’
- b. *[Nori buruzko]_i *pro* entzun dituzu
 who.OBL about hear AUX.2SG.SUBJ.3PL.OBJ
 [_{t_i} zurrumuru-ak]?
 rumor-ABS.PL
 (‘Who did you hear rumors about?’)
- c. *[Karlosi buruzko]_i *pro* entzun dituzu
 Karlos.OBL about hear AUX.2SG.SUBJ.3PL.OBJ
 [_{t_i} zurrumuru-ak].
 rumor-ABS.PL
 (‘About Karlos, you heard rumors.’)
- d. *Karlos_i *pro* entzun dituzu [_{t_i} buruzko
 Karlos.OBL hear AUX.2SG.SUBJ.3PL.OBJ about
 zurrumuruak _{t_i}].
 rumor-ABS.PL
 (‘Karlos, you heard rumors about.’)

The freezing of Basque objects has received two explanations. One account holds that Basque objects must move to receive case (Vicente 2005); evidence in support of this movement-first account comes from adverb placement (manner adverbs follow the object and precede the verb) and scope facts. Once moved for case-licensing reasons, the objects are frozen for subextraction. If

⁸ Example (7c) is similar to the example provided in Vicente (2005: 363), but his version lacks the locative genitive marker *ko*, which is a linker-like element (Laka 1996: section 4.1).

⁹ Example (7d) can be ungrammatical for independent reasons, namely, the impossibility of postposition stranding in Basque.

this account is on the right track, Basque is simply not informative for the discussion here, since agreement alone is not responsible for the freezing of its objects.

However, there are empirical and conceptual reasons to question Vicente's account of the Basque facts. On an empirical level, the adverb placement data are not as clear-cut as presented in Vicente (2005) (as he himself acknowledges) and it remains unclear whether the adverbs can serve as reliable road-posts for object movement (Itziar Laka, pers. comm.). Furthermore, the fact that Basque disallows subextraction from subjects in base position (i.e. subjects of unaccusatives) casts doubt on the freezing-through-movement account.

- (8) **[Nori buruzko]_i gaur goizean [t_i zurrumurrua]*
 who.OBL about today morning rumor.ABS
beldugarria da? *Basque*
 frightening AUX.3SG.ABS
 ('Who was the rumor about scary this morning?')

Conceptually, Vicente's analysis of Basque encounters a challenge from recent arguments supporting the idea that agreement and case are less closely linked than previously thought (and that, if anything, agreement follows case). As alluded to in section 1, several scholars have recently argued that case licensing (i.e. assignment) happens first, after which the agreeing probe inspects the landscape of already-case-marked nominals, searching for an appropriate goal (Bobaljik 2008; Baker 2012; Preminger 2014; Levin and Preminger 2015). If we accept that Basque objects do not need to move for case, the principle in (4) ("Phi-feature agreement leads to freezing") may offer the best explanation for Basque object freezing (Boeckx 2003, 2008; Baker and Collins 2006). If so, the Basque facts are relevant, in that the agreed-with nominal may in fact be frozen for subextraction.

Sign languages offer some novel and noteworthy examples of freezing associated with agreement. In Italian Sign Language (LIS), a head-final language, we observe a type of subextraction where the base DP appears in its original structural position and the wh-word is moved to the right periphery. This contrast is illustrated in the following examples from Branchini et al. (2015: ex. (10a,b)):¹⁰

¹⁰ The superscript —^x indicates a non-manual sign, for example, eyebrow raise or head tilt, marking a particular type of expression (wh-question, topic, etc.).

- (9) a. LAURA t_i CHOOSE [CAR WHICH] $_i$ _____wh
LIS
- b. LAURA [CAR t_i] CHOOSE WHICH $_i$
‘Which car did Laura choose?’

Unfortunately for our purposes, all the subextraction examples cited for LIS in Branchini et al. (2015) involve non-agreeing verbs; I do not have more extensive data on LIS.

American Sign Language (ASL), however, definitely does display agreement. ASL is an SVO language (Liddell 1980, a.o.) with three classes of verbs differentiated by agreement: spatial verbs, plain verbs, and agreeing verbs (Padden 1988).¹¹ In what follows, I will concentrate on the two latter classes. Plain verbs include a number of predicates expressing perception or cognition, such as MEMORIZE or WANT. Agreeing verbs include a large number of regular transitive and ditransitive predicates: EAT, BLAME, ASK, WATCH, GIVE, etc. Simplifying things somewhat, agreement with the subject of an agreeing verb is signaled manually, by directing toward a location in the signing space that is associated with the person and number of the subject and object (Emmorey 2002). In addition, eye gaze, a non-manual sign, is used to index object agreement (see Thompson et al. 2006, 2009 for details and for a critical analysis of the literature). Plain verbs, conversely, do not index agreement with the subject and do not require eye gaze for object agreement (*pace* Bahan 1996; Neidle et al. 2000).

ASL does not show left-branch condition effects (Boster 1996), but it does exhibit subjacency effects (Lillo-Martin 1991). The language demonstrates at least two types of NP-splits (Boster 1996); one of these appears to be an instance of discontinuous constituency with a topicalized noun-phrase (QP-Topicalization, in Boster’s terminology), and will not concern us here. The other is what Boster calls a Wh-NP-split (1996: 190ff.), illustrated in (10b) below. In both examples in (10), the non-manual wh-sign spreads over the entire utterance; crucially, no part of that utterance is topicalized. We can tentatively analyze (10b) as having subextraction out of the object DP:

- (10) a. YOU WANT BOOK WH-MANY _____wh
ASL
- ‘How many books do you want?’

11 I will return to the nature of ASL agreement below.

- _____wh
- b. WH-MANY_i YOU WANT [BOOK t_i] ASL
 ‘How many books do you want?’ (Boster 1996: 161)

Within the division of classes illustrated above, we find that ASL subextraction is possible with objects of plain verbs, as shown in (10), but ungrammatical with objects of agreeing verbs, as shown in (11):

- (11) a. _____wh
 *WH-MANY_i YOU_a WATCH_b [MOVIE t_i]_b ASL
 (‘How many movies did you watch?’)
- b. _____wh
 *WH-MANY_i JEFF_a GIVE-YOU_b [BOOK t_i]_b
 (‘How many books did Jeff give you?’)

It should be noted that there remains some controversy in the ASL literature concerning the nature of the language’s (apparent) agreement; if true agreement is limited in ASL, the examples above may be dismissed. However, even the skeptics agree that a narrowly construed version of agreement, confined to [+human] objects, is attested in the language (see Mathur 2000; Mathur and Rathmann 2012: Ch. 9, for an insightful discussion). Even if we limit our examination to such objects, the relevant contrast still emerges:

- (12) _____wh
 WH-MANY_i YOU WANT [STUDENT t_i] ASL
 ‘How many students do you want?’

- (13) _____wh
 *WH-MANY_i MARY_a TEACH_b LAST-YEAR [STUDENT t_i]_b
 (‘How many students did Mary teach last year?’)

In this section, I have presented evidence from several languages in which agreement with an internal argument blocks subextraction from that argument in the base position. In general, finding clear evidence of freezing for subextraction is not easy: in discussions of subextraction, linguists naturally focus on those languages that allow, rather than disallow, this phenomenon. For example, Corver’s (2016) overview includes data from Germanic, Slavic, and Romance languages, with an occasional smattering from Hungarian. With the exception of Hungarian, none of the languages in his sample even has object agreement, and in Hungarian, those objects that determine agreement clearly undergo movement (Kiss 1987), which

renders them irrelevant to the present discussion.¹² Given this natural gap in the discussion on subextraction, amassing support for the generalization in (4) amounts to establishing negative evidence for a relatively rare phenomenon in an already circumscribed set of languages: those that demonstrate object agreement.

This natural limitation takes us back to a question raised in section 2 above: how common is phi-feature object agreement, narrowly defined? In their paper surveying subject and object agreement across languages, Siewerska and Bakker (1996) identify 125 languages with object agreement, many of them quite exotic and under-described.¹³ Perhaps half of these languages might have genuine agreement, and half of that half might exhibit genuine subextraction – this seems a reasonable estimate, given that split nominals are not that common. If we are lucky, then, we may be able to compile a sample of thirty languages, and only a small subset of those will offer informative data.

As far as I can tell, languages that have reliable object agreement and resist subextraction from agreed-with objects include the Austronesian languages Palauan (Nuger 2016 and pers. comm.) and Rotuman (Kissock 2003; den Dikken 2003; Fanselow and Fery in prep.), the Papuan language Ranmo (Jenny Lee, pers. comm), the Siberian isolate language Ket (Georg 2007; Edward Vajda, pers. comm.), and the Paleo-Siberian language Itelmen (Jonathan Bobaljik, pers. comm.). Little is known about the status of agreed-with objects in these languages, including the question of whether these objects underwent movement.

Object agreement is common in Bantu languages, but there two additional complications arise. First, in several Bantu languages object agreement can only occur with a dislocated, never in situ, object (see Zeller 2015 for Zulu, Ranero 2016 for Luganda, a.o.). Second, even if we set these languages aside, there is no consensus among Bantu scholars as to whether or not object markers on the verb are manifestations of agreement or clitics (Bresnan and Mchombo 1987; Riedel 2009; Diercks et al. 2015, a.o.). If Bantu object agreement is cliticization, the absence of subextraction may be irrelevant to the discussion here.

12 Similarly, in Turkish, freezing to subextraction is also limited to those objects that undergo movement (Kornfilt 2003).

13 In particular, the authors pinpoint Barai (Papuan) and Warao (isolate spoken in Venezuela) as two languages with object agreement only (Siewerska and Bakker 1996: 123). The data on Barai are so limited that it is impossible to draw any generalizations; Warao does not seem to have any agreement whatsoever (Romero-Figueroa 1985), so the attribution of object agreement to Warao by Siewerska and Bakker may be due to misunderstanding.

4 Agreement with objects does not lead to freezing: Empirical evidence

In this section, I consider several examples of languages that have agreed-with objects which are nevertheless transparent to subextraction. Tsez (Nakh-Dagestanian) is one such language. Tsez is a morphologically ergative head-final language with relatively free word order in root clauses. The verb agrees with the absolutive argument in gender (indicated in Roman numerals in the glosses) and number, so object agreement is obligatory. There are four genders in the singular and two in the plural (indicated as (n)IPL in the glosses below). The verbal exponent of agreement is always a prefix, although agreement is marked only on a subset of vowel-initial verbs (Polinsky and Potsdam 2001; Polinsky 2003).

In (14a), the verb agrees with the absolutive subject, and in (14b), with the absolutive object.

- (14) a. Aw yalbac'yo- λ -äy b-ok'e λ -si. *Tsez*
 mouse.ABS.III mousetrap-SUB-ABL III-set.out-PST.EVID
 'The/A mouse escaped from the mousetrap.'
 b. K'et'-ä aw b-iqir-si.
 cat-ERG mouse.ABS.III III-obtain-PST.EVID
 'The/A cat caught the/a mouse.'

Tsez does not follow the left-branch condition on extraction, cf. (15b); ergative and absolutive arguments alike can be split. The appearance of split arguments is associated with various interpretive effects (mainly contrast), which are not relevant for the discussion below (I have tried to make these effects explicit in the translations that follow).

- (15) a. [Ne λ γ^{ws} ay-ä] [pat'i-s k'et'u] han-si. *Tsez*
 this dog-ERG Fatima-GEN cat.ABS.III bite-PST.EVID
 'This dog bit Fatima's cat.'
 b. Pat'i-s_i ne λ γ^{ws} ay-ä [t_i k'et'u] han-si.
 Fatima-GEN this.OBL dog-ERG cat.ABS.III bite-PST.EVID
 'Fatima's cat, this dog bit.'
 c. γ^{ws} ay-ä_i pat'i-s k'et'u [ne λ t_i] han-si.
 dog-ERG Fatima-GEN cat.ABS.III this.OBL bite-PST.EVID
 'Of dogs, this one bit Fatima's cat.' (Polinsky 2015)

At least three pieces of evidence confirm that Tsez NP-splits arise through subextraction: case connectivity, limitation of the discontinuity to ergatives and

absolutives (which would be impossible to explain under an ellipsis analysis, as in (5b,c) above), and sensitivity to negative islands.¹⁴ For the last of these factors, consider the following examples, which are very similar to the French *combien*-splits (Obenauer 1984; Abrusan 2011; Spector 2005; a.o.). Just as in French, where *combien* cannot subextract out of objects under negation (whereas regular extraction is licit), Tsez does not allow subextraction out of absolutive objects or the subjects of unaccusatives under negation.

- (16) a. [Combien de voitures]_i n'a-t-il pas conduit t_i? *French*
 how.many of cars not.has-LINKER-he not driven
 'How many cars didn't he drive?'
 b. *Combien_i n'a-t-il pas conduit [t_i de voitures]?
 how.many not.has-LINKER-he not driven of cars
 ('How many cars didn't he drive?')
- (17) a. [Dice mašinabi]_i nesä t_i r-egir-x-ānu? *Tsez*
 how.many cars.ABS.NIPL he.ERG NIPL-send-PRS-NEG
 'How many cars does he not drive?'
 b. *Dice_i nesä [t_i mašinabi] r-egir-x-ānu?
 how.many he.ERG cars.ABS.NIPL NIPL-send-PRS-NEG
 ('How many cars does he not drive?')

Based on these data, we can conclude that Tsez allows subextraction out of agreed-with objects. Although we do not have comparably detailed data on subextraction in the other, quite numerous, Nakh-Dagestanian languages (most of which have verb-absolutive agreement in number and gender), the data we do have suggest that they allow NP-splits as well (Forker 2013: 737–738 for Hinuq; Dmitry Ganenkov, pers. comm. for Lak). If Tsez is not alone in its family in allowing subextraction out of objects under agreement, we may have the opportunity to slightly expand our overall sample of languages that attest both object agreement and subextraction.

Hindi is another language that allows subextraction from agreed-with objects. Hindi is a split-ergative language whose verbs agree with the highest unmarked argument in person, number and gender (Kachru 2006: 163ff.), so when the subject is ergative (in the perfective) or dative (with experiencer verbs),

¹⁴ A somewhat unusual property of Tsez is that it does not allow cross-clausal A-bar movement; movement takes constituents only as far as the periphery of the original clause (Polinsky and Potsdam 2001: 603). This situation limits the domains that can be tested for movement.

the verb can agree with the object. For third-person noun phrases, agreement distinguishes two genders in the singular: masculine and feminine. The default agreement is third-person masculine singular.

Like Tsez, Hindi is not subject to the left-branch condition, so prenominal possessors and modifiers can move out of the noun phrase forming NP-splits. Evidence in support of subextraction comes from locality. In particular, locality effects are observed on possessor extraction out of noun phrases: possessors cannot be extracted over the clausal expletive *yeh*, (18a), whereas entire noun phrases can cross this expletive under A-bar movement, (18b):¹⁵

- (18) a. *Ram=kii_i(=to) mujhe yeh lagtaa hai [ki tumheN
 Ram-GEN.F-TOP 1SG.DAT EXPL seem AUX.F that 2SG.DAT
 [_{t_i} pehlii kitaab] pasand aaegii]. *Hindi*
 first book.F like come.FUT.F
 ('I think you will like Ram's first book.')
- b. [Ram-kii pehlii kitaab]_i mujhe (?yeh) lagtaa hai
 Ram-GEN.F first.F book.F 1SG.DAT EXPL seem AUX.F
 [ki tumheN _{t_i} pasand aaegii].
 that 2SG.DAT like come.FUT.F
 'Ram's first book, it seems to me that you will like.'

How does this subextraction process in Hindi interact with object agreement (see also Alok 2016)? It turns out that agreeing subjects and objects are equally transparent to subextraction. Compare the ungrammatical example in (18), where *yeh* acts as the intervener, and the grammatical example below, where the agreed-with object is transparent to subextraction:

- (19) Ram=kii_i=to mujhe lagtaa hai [ki tumheN
 Ram-GEN.F-TOP 1SG.DAT seem AUX.F that 2SG.DAT
 [_{t_i} pehlii kitaab] pasand aaegii]. *Hindi*
 first book.F like come.FUT.F
 'As for Ram, I think you will like his first book.'

Alok (2016) shows that overtly case-marked objects (with *ko*) are islands for subextraction, but it is precisely these objects that do not participate in phi-agreement. On Alok's analysis, overtly marked (DOM) objects constitute islands because they raise to a higher position (at the edge of the phase), whereas

¹⁵ I am grateful to Rajesh Bhatt for bringing this contrast to my attention.

unmarked objects stay in situ. Thus, the Hindi data not only show the dissociation of agreement and case-checking, but also demonstrate that agreement does not necessarily block subextraction, contrary to (4).

(20) Hindi object marking, agreement, freezing, and movement

	Descriptive properties			Analysis
	Has overt case marking	Participates in agreement	Frozen for subextraction	Moves for case
Unmarked object	No	Yes	No	No
Object marked with <i>ko</i>	Yes	No	Yes	Yes

Mosetén, an isolate spoken in Bolivia, is another language that seems to contradict the generalization in (4). Mosetén is a head-final language with pronominal clitics that cross-reference person on the verb (Sakel 2004: 117–119): the verb agrees with third-person objects in gender and number (Sakel 2004: 81–91). The status of subextraction is not as clear in Mosetén as it is in Hindi or Tsez, but it appears that subextraction out of PPs is impossible in this language, whereas subextraction out of subjects and objects is permitted (Sakel 2004, and pers. comm.).

It is hard to build a robust theory of subextraction on such a small sample, but I will suggest here that the difference in object transparency between these languages and those discussed in Section 3 has to do with the type of phi-features that participate in agreement in each language. In languages where agreed-with objects are frozen for subextraction, agreement tracks [PERSON] (as well as other categories which are irrelevant for now). In Hindi, Tsez, and possibly in Mosetén, object agreement is in gender/number, but not [PERSON]. I discuss this distinction further in the next section.

5 The status of [PERSON]

5.1 Person is special

The starting generalization I explored in the opening sections of this article was the proposal that a noun phrase in its base position is an island for subextraction if it participates in agreement. This generalization now appears to be too strong; as the data in this section will show, [PERSON] seems to be the only phi-feature

blocking subextraction under agreement. The special status of [PERSON] is not new. In their feature geometry of referring expressions, Harley and Ritter (2002) identify [PERSON] (as related to the Participant node) as the highest feature – the one that needs to be recognized before any other features are identified. Indeed, a number of different (syntactic and extra-syntactic) approaches to phi-agreement identify agreement in [PERSON] as exceptional in its pertinence to the verbal domain and its necessity for predication (Corbett 1979; 1983; Baker 2008). [PERSON] is the feature that is probed first by an agreeing category and it stands out, compared to number and gender, in its need for licensing (at least for first and second person) (Bejar and Režac 2003, 2009; Baker 2008, 2011; Preminger 2014; Ackema and Neeleman 2016).

Simply identifying [PERSON] agreement as “special” does not constitute an explanation for its relationship with subextraction. Before I flesh out a possible explanation, I wish to review certain other contexts where the presence of the feature [PERSON] has strong syntactic effects. At least three sets of contexts come to mind.

The first place where [PERSON] plays a critical role is in the domain of anti-agreement. Anti-agreement is a phenomenon under which argument–verb agreement is altered or suspended when the argument is extracted (Henderson 2009; Ouhalla 1993, 2005; Schneider-Zioga 2007, a.o.). Anti-agreement is quite common cross-linguistically and takes different forms in different languages. Crucially, some languages suppress all phi-features under anti-agreement (as in Somali, Afro-Asiatic, Stoyanova 2008: 67–85, or in Matsigenka, Arawakan, Baier 2016: 16–18), while some languages suppress only [PERSON] under anti-agreement (as in Bantu: Henderson 2009), but there are no languages that suppress number and gender to the exclusion of [PERSON] in this context (see Baier 2016 for similar observations). This generalization stands regardless of the analysis of anti-agreement, which can vary both empirically (Henderson 2009) and conceptually, being tied variously to locality restrictions on binding (Ouhalla 1993), movement (Schneider-Zioga 2007; Cheng 2006), and agreement as such (Boeckx 2003; Henderson 2009).

Next, the feature [PERSON] is implicated in the Person-Case Constraint (PCC) also known as *me-hui* constraint (Perlmutter 1971, Bonet 1991, Haspelmath 2002, a.o.): the requirement that in a ditransitive clause in which both internal arguments are realized as phonologically weak elements, the direct object must be a third person. There are many variations on the PCC, but crucially for the present discussion, there is no Number-Case Constraint or Gender-Case Constraint. It is all about person.

The final set of contexts where [PERSON] plays a robust role concerns the island status of expressions that are inherently specified for this feature; opacity

happens regardless of whether such expressions participate in agreement or not. So far, all the examples I have discussed involved agreement in third person, the subcategory of [PERSON] that shows the greatest amount of variation in its specification (I will return to this issue below). If the presence of the feature [PERSON] in general causes freezing, we should expect first- or second-person expressions to be islands for subextraction, regardless of whether they are agreed with or not. This prediction is not easy to test because pronouns expressing first and second person often resist the type of modification needed for subextraction. Instead, they may combine with appositives (Postal 1966; Delorme and Dougherty 1972), act as determiners (Postal 1966), or participate in partitive constructions, as shown in the following three examples, respectively:

- (21) a. you honest politicians...
 b. we, the poor judges of character,...
 c. many of us...

Setting such structures aside as uninformative, some possibilities still avail themselves. In Russian – which lacks determiners, allows subextraction (especially in the more colloquial registers), and conveniently does not obey the left-branch condition (Bošković 2005; Corver 2016) – it is possible to test the distinction between first- and second-person pronouns and all other expressions with respect to subextraction. Russian objects are transparent when they appear in base position (Polinsky et al. 2013). Keeping the base position constant, then, we can observe a clear contrast between subextraction from noun phrases that include a third person expression, nominal or pronominal alike, and those that include a first or second person. NP-splits are particularly common in exclamatives, where the WH-expression must be fronted (Zimmermann 2008), and that's the context used in the examples below. Note that the modifier *skol'k-* is adjectival and agrees with the head noun in number, confirming that it is generated as a modifier and not as an adverbial:

- (22) a. [Skol'kix durakov]_i po televizoru priglašajut
 [how.many idiots].ACC.PL on TV invite.PRS.3PL
 vystupat' *t_i*! Russian
 present.INF
 b. Skol'kix_i po televizoru priglašajut vystupat'
 how.many.ACC on TV invite.PRS.3PL present.INF
 [*t_i* durakov]!
 idiots.ACC.PL
 'How many idiots they invite to talk on TV!'

- (23) a. [Skol'kix vas]_i po televizoru priglašajut
 [how.many 2PL].ACC.PL on TV invite.PRS.3PL
 vystupat' t_i! (Russian Nat'l Corpus)
 present.INF
 'How many of you they invite to talk on TV!'
- b. *Skol'kix_i po televizoru priglašajut vystupat' [t_i vas]!
 how.many.ACC on TV invite.PRS.3PL present.INF 2PL.ACC
 ('How many of you they invite to talk on TV!')

In English, the closest parallel to these Russian examples can be found in contexts that seem to induce island effects no matter what; even in these cases, however, we still observe a pronounced difference between first- and second-person pronouns, on the one hand, and all other expressions, on the other:

- (24) a. He was pointing to [_{DP} the children [_{PP} in silly hats]] on the screen.
 b. ?What kind of hats_i was he pointing to [_{DP} the children [_{PP} in t_i]] on the screen?
- (25) a. He was pointing to [_{DP} us [_{PP} in silly hats]] on the screen.
 b. *What kind of hats_i was he pointing to [_{DP} us [_{PP} in t_i]] on the screen?

In sum, [PERSON] stands out among the other phi-features in its ability to induce island effects in a particularly consistent and pronounced way. Why? I take this central question up in the next section.

5.2 Why [PERSON] is special and how that can be modeled

Let me start by tackling the intuition behind the special status of [PERSON], before this intuition is formalized. The basic idea is very simple: [PERSON] makes the expression that it combines with functionally complete, converting it from a property denotation to an individual denotation. Hence, the connection between [PERSON], as an abstract feature, and pronouns, as carriers of this feature: essentially, the presence of [PERSON] makes a noun-phrase pronoun-like. Taking this notion one step further, consider the well-known parallel between pronouns and tenses (Partee 1973; Kratzer 1998). Pronouns and tenses share indexical, anaphoric, and bound variable uses and neither can denote or name their referents (Partee 1973). Just like [PERSON] turns property denotations to individual denotations (i.e. denotations that can be referred to by pronouns) (Longobardi 2005), [TENSE] turns

predications into propositions; in each case, the end result is a functionally complete entity (Harder 1996; Rothstein 2001). However, these are all semantic considerations. The real challenge is in figuring out how to convert these considerations into syntactic mechanisms. I do not have a full-fledged solution here, but I would like to offer some considerations that may help us in constructing one.

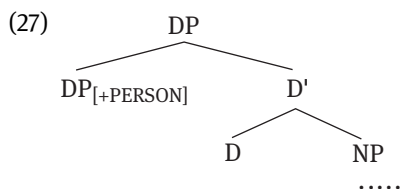
Building on the parallels between tenses and pronouns, we can ask two more specific questions: (i) what structural building blocks can bear the feature [PERSON], and (ii) how can these elements of structure be responsible for the fact that person-marked expressions are frozen to subextraction?

The answer to question (i) has been explored by a number of researchers, whose work converges on the idea that the [PERSON] feature is either included on the D head of nominal expressions (Benmamoun 2000; Roberts 2010; Miyagawa 2010) or constitutes the unique content of such D heads (Longobardi 1994, 2005, 2008). It is of course possible to establish a separate projection πP at the top of the nominal expression (something I will return to below), but the crucial generalization remains the same: the head that makes nominal expressions complete includes the [PERSON] feature. In contrast, number and gender features are projected lower in the noun phrase.

If the highest projection in nominal expressions bears the feature [PERSON], the next question we should ask – essentially a more targeted and specific variant of (ii) above – is how exactly the DP, with its status as a phase and a syntactic island, becomes frozen. A variety of proposals have been put forward concerning the modeling of island properties of DPs, and for the purposes of this paper, they may all be adequate. The solution I explore here has two analytical ingredients:

- (26) [PERSON] in the DP
- a. location of [PERSON] in the DP
 - b. parametric variation in third-person expressions

The [PERSON] feature may be represented in the DP as a separate projection, above all other projections, or it may be included in the featural content of the DP; here, I am assuming the latter representation, primarily out of economy considerations:



In DPs that denote participants, the specifier of the DP is always filled with the relevant pronominal element; this configuration ensures that participant-DPs are islands *regardless of agreement* – a claim supported by the impossibility of subextraction out of pronominal expressions (see section 5.1). To put it differently, if DPs (in a given language, or more generally) have an escape-hatch position, that position is blocked by the expression encoding person. The blocking effect of person is essentially the same as the blocking effect of possessor in English, as shown in example (6) above (cf. Szabolcsi 1983, 1994; Gavruseva 2000).

If the idea that [PERSON] is represented in the left periphery of a DP is on the right track, we can expect that the presence of that feature may induce blocking effects. At least two data points, drawn from Mandarin Chinese and Russian, suggest that this may be the case.

In Mandarin Chinese, the long-distance reflexive *ziji* cannot be bound by a further antecedent in the presence of a first- or second-person pronoun, as schematically illustrated below (Huang and Liu 2001; Pan 2001):

- (28) a. 1person/2person_i ... 3 person_k *ziji*_{i/*k}
 b. 3person_i ... 3 person_k *ziji*_{i/k}
 c. 3person_i ... 1person/2person_k *ziji*_{k/*i}

The expression *zai-xia* ‘your humble servant (lit.: located below)’, although not specified morphologically for person, induces the same blocking effect as the regular first- and second-person pronouns (James Huang, pers. comm.):

- (29) Lisi_i bu xihuan wo_k/zai-xia_k guan ziji_{k/*i} de
 Lisi not like 1SG/humble-servant interfere self LINKER
 shi. Mandarin
 matter
 ‘Lisi does not like me interfering in my/*his business.’

In Russian, the equivalent speaker-referencing circumlocution is very similar to the English ‘your humble servant’ or ‘yours truly’. When used to denote a non-participant, this expression is transparent, but when used in reference to the speaker, subextraction is impossible. Presumably, there is a more structure there, as shown in (31a), and that extra structure blocks subextraction:

- (30) a. Včera xvalili [_{DP} vašego starogo prijatelja]. Russian
 yesterday praised.3PL [your old friend].ACC

- b. Prijatelj_i včera xvalili [_{DP} vašego starogo t_i].
 friend.ACC yesterday praised.3PL [your old].ACC
 ‘They praised your old friend yesterday.’
- (31) a. Včera xvalili [_{DP} [važego pokornogo slugu]].
 yesterday praised.3PL [your obedient servant].ACC
 (i) ‘They praised your obedient servant yesterday.’ (DP only)
 (ii) ‘They praised me yesterday.’ ([PERSON] projected)
- b. Slugu_i včera xvalili [važego pokornogo t_i].
 servant.ACC yesterday praised.3PL [your obedient].ACC
 (i) ‘They praised your obedient servant yesterday.’
 NOT: (ii) ‘They praised me yesterday.’

These observations confirm that agreement with an expression which is a syntactic island is not *the source* of islandhood, but just a *symptom*: an indication that the relevant expression includes the [PERSON] feature and this feature is projected in the syntax of the DP. An expression specified for first and second person can be an island in the absence of agreement. On the other hand, default person agreement with a non-participant expression is not sufficient for that expression to be opaque to subextraction.

Turning to non-participant DPs, let us start with the case where the feature [PERSON] is absent. In the absence of [PERSON], a probing head can continue scanning the DP for other phi-features (for example, number and gender). The derivation may still proceed; whatever agreement morphology is observed on the probe may be indicative of the obligatory default. Here I understand the default as the absence of a particular feature (rather than feature structures that do not force an interpretation, as in Ackema and Neeleman 2016). However, a DP denoting a non-participant (“third person”) may still have a [PERSON] feature requiring agreement, in which case the syntactic structure of third person expression remains as in (27). This feature, expressed in the specifier of the highest projection in the DP, will determine the opacity of that agreed-with DP.

With that in mind, we can now revisit and revise the generalization in (4).

- (32) (Revised from (4): All factors being equal, if an element α participates in non-default person-feature agreement, it becomes an island for subextraction

The new generalization in (32) entails that the transparency of a DP varies depending on whether [PERSON] is projected. Earlier work has shown that that

status of DPs as islands or phases is ambiguous with respect to various diagnostics of phasehood (Matushansky 2005). We are now in a position to explain the ambiguity of these diagnostics; those DPs that include a projection of [PERSON] are frozen, and those that do not, are transparent.

5.3 When is [PERSON] projected?

I suggested that objects that do not undergo any movement are islands for subextraction if they explicitly include the feature [PERSON]. The main reason for their island status is the presence of that feature, not agreement. Since agreement is just a symptom indicating that a [PERSON] feature is present, we should not expect a one-to-one correspondence between the two; for instance, agreement in a language with a [PERSON] feature may be disrupted by syntactic interveners or may be unavailable for non-syntactic reasons.

Third-person expressions in particular cover a wide range of denotations and may vary widely – both within and across languages – in terms of whether or not they explicitly include the feature [PERSON] (cf. Citko 2014: Ch. 4; Torrego and Laka 2015). If the structure of a third-person denotation includes the [PERSON] feature, the generalization in (32) predicts that the respective DP should be frozen for subextraction and may be agreed with by the probing head. This is what happens with agreed-with third-person internal arguments in Basque and ASL.

Let me conclude by examining a possible correlation between transparency of noun phrases to subextraction and the classification of a given language as NP- rather than DP-type (Corver 1990, 1992; Bošković 2005, 2008, 2009). Even more perspicuously, the connection between the D head and the [PERSON] feature is known, and as I mentioned above, some researchers (most notably Longobardi 1994, 2005, 2008) directly equate D and that feature. In the small sample of languages discussed in this article, the predicted correlation seems to hold: all the languages that display [PERSON] agreement with objects instantiate the DP-type, including Basque, and (less clearly) the sign languages (see Abner 2012 for a discussion of ASL determiners). On the other end of the spectrum, Hindi, Tsez, and Mose'tén lack overt determiners. So it may seem that we are back to the correlation between the absence of determiners and the possibility of left-branch extraction.

There are at least two sets of arguments against correlating the NP/DP-type distinction with transparency to subextraction: empirical and conceptual. On the empirical side, I will consider data Chamorro, a DP-language, with clear determiners. Chamorro has verb-subject agreement in person and number; in addition, it also has wh-agreement, extensively documented by Sandra Chung

(Chung 1998 and earlier work referenced there). Wh-agreement is of interest here because it is a type of agreement that does *not* involve φ -features such as person or number; instead, verb is indexed for the case of a moved Wh-phrase. For the purposes of the current discussion, it is relevant that the matrix verb is marked for the case of the entire CP out of which Wh-movement has most immediately occurred. For instance, an unaccusative verb may take a sentential subject agreeing with it in standard φ -features, but if subextraction takes place out of that sentential subject, the φ -feature agreement is superseded by wh-agreement – in other words, φ -feature agreement is suspended.

There is no object agreement in φ -features in Chamorro, but if subextraction takes place out of a sentential complement in the direct-object position, the matrix verb must be marked for wh-agreement with that sentential complement. In (33), the sentential complement does not determine agreement; the verb only agrees with the subject in φ -features; in (34), on the other hand, the verb must show wh-agreement with the embedded sentential object because subextraction has taken place out of that sentential object:¹⁶

- (33) Guahu yä-hu [na bai u-gäi-atungu' taiguennao
 1SG like-1SG that 1SG-have-friend like.that
 giya hagu]. *Chamorro*
 LOC 2SG
 'As for me, I like that I have friends like you.' (Chung 1998: 29)

- (34) Hayi_i si Antonio sinangane-nña nu hita [na ma'a'nño gui'
 who DET Antonio tell-WH.AGR.OBJ OBL us that afraid 3SG
 ha-chiku t_i]?
 WH.AGR.OBJ-kiss
 'Who did Antonio tell us that he is afraid to kiss?' (Chung 1991: 92)

Crucially, person agreement is absent whenever subextraction out of a sentential complement takes place, either by superseding the person agreement with the sentential subject (not shown above) or by adding dedicated wh-agreement as in (34).¹⁷ These facts suggest that it is not the DP/NP distinction itself that is responsible for transparency of an object but the presence or absence of φ -feature agreement, and more specifically, agreement in [PERSON].

¹⁶ The verbs in the embedded clause itself also show wh-agreement in (34), but that is not relevant for the present discussion.

¹⁷ In addition to subextraction from sentential complements, Chamorro also has subextraction of possessors, with similar agreement effects (Chung 1998: 255).

Let's assume that Chamorro facts may be explained in some other way, for instance, by appealing to some kind of detransitivization. In that case, we are still left with a more general argument suggesting that the correlation between object transparency and lack of determiners may be spurious. The DP/NP parametric division, as proposed by Bošković, is associated with a cluster of properties of which several are empirically problematic; for example, polysynthetic languages are predicted to be of the NP-type, but Adyghe has clear determiners (Smeets 1984; Testelefs 2009), while only DP-languages are predicted to have clitic doubling, yet such doubling is found in determinerless Slovenian (Marušič and Žaucer 2010). In terms of the internal structure of the noun phrase, putative NP-languages are not that different from languages with determiners, which suggests that explanations based on surface properties are not always accurate (cf. Pereltsvaig 2007 on Russian, Gillon and Armoskaite 2015 on Lithuanian, both languages lacking determiners, and Watanabe 2006, for extensive arguments that Japanese does have DP structure). It is possible that the proposed DP/NP distinction is not as categorical as has sometimes been claimed. The explanations proposed here are more targeted and less general; that in turn makes them more sustainable.

6 Conclusions

This paper has examined subextraction out of noun phrases in light of the putative relationship between island effects and agreement, taking as a starting point the generalization, proposed by a number of researchers, that phi-feature agreement alone can render noun phrases inaccessible to subextraction. In order to investigate this claim, I first separated out dubious candidate languages from definite candidate languages by pinpointing those object arguments that necessarily remain in the base position and undergo no feature-driven movement.

A closer examination of in-situ agreed-with noun phrases showed that the original hypothesis – that agreement in phi-features renders a noun phrase frozen for subextraction – is too strong. Subextraction from agreed-with object arguments in the base position is possible in several languages. In response to these findings, I proposed that the real subextraction–agreement connection is between a noun phrase's opacity to subextraction in base position and its agreement in only one feature: [PERSON]. The feature [PERSON] is also responsible for the opacity of nominals that do not enter morphological agreement with a governing category. Such opacity is observed in nominals

denoting first- and second-person participants regardless of their role in agreement. In other words, agreement in [PERSON] is not the *cause* of freezing, but simply a *symptom*, one of several indications that the presence of the feature [PERSON] on the nominal spine renders the noun phrase an island for subextraction.

There are many reasons to believe that the feature [PERSON] stands out among other phi-features and is structurally superior to them. While specification of the feature [PERSON] in expressions denoting participants is clear, there is strong cross-linguistic variation in the expression of this feature on noun phrases denoting non-participants. Moreover, at this stage of our knowledge, it is hard to tell what the underlying situation is: is the [PERSON] feature always present but not always specified, or is it only projected at all under certain conditions? This feature may even be relativized to particular syntactic structures, but not entire languages. Overall, this remains a large open question, one that is well beyond the scope of the preliminary generalizations drawn in this paper.

Finally, I would like to comment on the sheer numerical limitations on the languages that are relevant for the generalizations discussed here. At the outset, I proposed that we needed to carefully disentangle two main confounds in the data on agreement and subextraction: (i) the difference between arguments that move for a feature (for example, undergoing object shift) and arguments that stay in base position, and (ii) the difference between agreement and cliticization (since only the former is relevant to the purposes of this discussion). Once these initial cuts were made, we were left with a relatively small sample of languages, which was further pared down by excluding all the potential cases of non-subextraction (discontinuous constituency). Although the resulting sample is quite small, it is crucially constrained, and therefore allows us to arrive at meaningful correlations. Large-scale surveys that do not distinguish between subextraction and discontinuous constituency, or between agreement and cliticization, may be more impressive numerically, but stand too great a chance of missed generalizations.

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Balázs Surányi and Gergő Turi

Freezing, Topic Opacity and Phase-based Cyclicity in Subject Islands

Evidence from Hungarian

Abstract: This paper reports on an acceptability rating study of long *wh*-extraction from transitive and unaccusative subjects and objects in Hungarian, designed to test the predictions of competing etiologies of the islandhood of subjects. It is found that the (im)permeability of the three types of NP arguments tested is determined by their base position, and it remains unaffected by syntactic movement to a topic position.

These findings cast doubt on the feasibility of monolithic accounts that propose to explain the islandhood of subjects as a case of ‘freezing by movement’, or as a case of ‘topic opacity’. Our results provide striking support for Chomsky’s (2008) phase-based approach to cyclicity, according to which licit *wh*-subextractions can proceed from the base copy of topicalized NPs, while constituents in phase edges, such as the occurrence of an external argument subject in the edge of *vP*, are impenetrable. We argue that in argument topicalization ‘topic opacity’ precludes subextractions from the occurrence of the argument in the topic position, but not from the copy in its base position. The general opacity of arguments undergoing topic fronting in English and German stems from the fact that in these languages a left-peripheral topic creates a topic-island for long subextractions launched from within the base copy of topicalized phrases.

Keywords: freezing, subject island, topic, opacity, subextraction, *wh*-movement, phase, cyclicity, Hungarian

1 Introduction

Phrases functioning as grammatical subjects have been among the first to be identified as strong islands, i.e. syntactic domains from which subextraction is not permitted (see Chomsky’s 1973 Subject Condition):

- (1) *Who did a picture of __ create a scandal?

While the unacceptability of subextraction from subjects may indeed be robust in many cases, empirical research has uncovered that the islandhood of subjects

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exhibits a surprising amount of variability both across and within languages.¹ A great portion of this variability has been ascribed to three factors. The most prominent one of these is the presence or absence of movements that subjects undergo in the course of their derivation, such as raising to a Case-related or topic position. In particular, it has been argued that subject phrases are rendered non-permeable by any (or by some) syntactic movements that they undergo, following the conception that movement operations give rise to a ‘freezing’ effect (see Wexler and Culicover 1977, 1980). Second, the vP-internal base position of subjects has also been claimed to play a role in the variation in their opacity, reflecting a complement–non-complement asymmetry familiar from Huang’s (1982) Condition on Extraction Domains (CED). Finally, a non-syntactic factor that some of the relevant variation has been blamed on is the information structural status of subjects. Specifically, it has been argued that constituents with a topic role are generally opaque to subextraction (Erteschik-Shir 1973; call this generalization Topic Opacity). As some but not all subjects are interpreted as topics, variation in their permeability to movement is expected.

The present study is an empirical investigation of these main factors, and their potential interaction, in Hungarian. Thus we explore the predictions of three different current syntactic approaches to subject islands (and some of their potential combinations): (i) those based on a conception of movement-induced freezing, (ii) generalized and phase-relativized descendants of the CED, and (iii) those based on Topic Opacity. These alternative approaches, construed broadly, make conflicting predictions with regard to expected patterns of subject opacity. We have conducted an acceptability rating experiment to address some of these predictions in Hungarian. This language offers an ideal testing-ground in that it permits (non-focused) subjects both to remain *in situ* (post-verbal) and to be fronted to the pre-verbal field, independently of their base position. In preview, the results of our rating experiment suggest that the base position of subjects is the primary factor contributing to their opacity, in which fronting plays no role. This finding provides striking support for Chomsky’s (2008) phase-relativized reformulation of the CED embedded in his phase-based approach to cyclicity, according to which within a single phasal domain subextraction from a moved phrase can proceed from its base copy.

1 This paper is concerned with variation among and within configurational languages in which subject phrases of transitive verbs are base-generated higher than objects. Special abbreviations used in glosses: PRT=verbal particle, SUBJ=subjunctive, DEM=resumptive distal demonstrative pronoun. We are grateful to two anonymous reviewers and the editors for constructive questions and comments, which led to many improvements in the final version of our paper. Work on this study was partly supported by HRSF grant no. 84217.

The paper is structured as follows. Section 2 presents a review of the three types of approaches to the islandhood of subjects noted above, fleshing out their relevant implications. On the basis of this, we formulate the specific questions that our empirical study seeks to address, and review relevant results from previous experimental work. Section 3 provides the essential background on the syntax of subjects in Hungarian, outlining the specific predictions made by the previously reviewed theories regarding their opacity. Section 4 then presents the rating experiment and the results. Section 5 discusses the outcomes of the experiment in light of the competing approaches. Finally, Section 6 contains a summary of the main conclusions.

2 Competing approaches and previous experiments

2.1 Competing approaches to subject islands

A prevalent account of the islandhood of subject noun phrases in the period of the Government and Binding Theory held that the opacity of subjects is due to the nature of the syntactic position in which they are located. In particular, subextraction is licensed only from properly governed syntactic domains, like lexically governed complements (Huang 1982: 505, Condition on Extraction Domains; see also Cinque 1977). Since subjects (and adjuncts) are in a non-governed non-complement position, extraction of an element from within them is illicit. Some minimalist accounts (most notably, Uriagereka 1999) essentially reconstitute and generalize this CED-type account of subject islands, albeit without relying on the notion of government. Uriagereka's (1999) linearization-based approach requires structurally complex non-complements, including subjects, to be spelled out separately from the rest of the structure, which has a 'generalized CED' effect: it renders the internals of specifiers and adjuncts unavailable for movement (see also Nunes and Uriagereka 2000; Nunes 2004; Johnson 2003).

This view of specifiers may in principle also cover what have come to be called the 'freezing' effect of movement. According to the assumption of Generalized Freezing, formulated schematically in (2), no element may be subextracted from a constituent subjected to movement (= Wexler and Culicover's 1977, 1980 Raising Principle; see Browning 1991). This generalization is intended to capture the perceived opacity of constituents that undergo a movement operation such as topicalization, (certain types of) scrambling and extraposition.

(2) Generalized Freezing

* B ... [... t_B ...]_A ... t_A

A generalized CED-type account according to which non-complements are not penetrable to movement can derive (2) as a theorem, granting that movements can only target non-complement positions (which is a consequence of the Projection Principle).

The undiversified, uniform view of specifiers as being opaque held by a generalized CED-type account is difficult to sustain, however. There is apparently a wide range of specifier elements to be found from which subextraction is acceptable. First, it is not possible to treat all dependents of a verb from which subextraction is possible as a complement, simply because there is only one complement position within a split verb phrase structure. For instance, whichever PP is taken to be a complement in (3a) (modeled after an example in Barrie 2011: 68), the other PP must be a non-complement, disallowing subextraction, contrary to fact. That the problem cannot be evaded by taking A-movement constructions, such as the passive in (3a), not to be derived by syntactic movement is evidenced by examples with two A-bar movement dependencies, such as (3b).

- (3) a. Which problem should John be talked to __ about __ ?
 b. Which problem are you unsure who to talk to __ about __ ?

Subjects of Small Clauses, analysed as specifiers, are also transparent to movement in many cases. Subjects of English *there*-existentials (4a) (Merchant 2001: 187; Lasnik and Park 2003) and subjects of verbal Small Clauses (4b) (Basilico 2003) are cases in point.²

- (4) a. Which candidate were there posters of __ all over the town?
 b. Who did you let a rumor about __ spread around the entire department?

As noted by Sheehan (2013a), the problem is only exacerbated on a Kaynean approach to phrase structure, according to which arguments of heads in head-final constructions all occupy a specifier position.

² Extraction from ECM subjects, such as (i–ii) have received mixed judgments in the literature: some authors take them to be relatively acceptable (e.g., Bošković 1997; Abels 2008; Chomsky 2008), while others judge them to be illicit (e.g., Kayne 1984).

- (i) Which topics do you expect books about __ to sell well?
 (ii) Which politician do you believe the rumors about __ to be false?

Thus reducing movement-induced freezing to the general opacity of specifiers has little to recommend itself. The reverse scenario is a good deal more conceivable, however, and indeed has been proposed in the case of subject islands. Namely, assuming the VP-Internal Subject Hypothesis, it is possible to argue that subjects occupying Spec,TP are impenetrable to movement transformations because all subject noun phrases arrive at this position by displacement from inside the verb phrase. Given the freezing generalization in (2), this renders subjects frozen.

A freezing-based approach to subject islands has been put forward in different forms; of these we make note of two influential proposals here. The first type of proposal espouses Generalized Freezing, which it derives from the conception that movement chains must be uniform. After a phrase undergoes movement, subextraction from the head of the created chain disrupts its uniformity (Takahashi 1994; Ochi 1999; Stepanov 2001, 2007). Boeckx (2003, 2008, 2012) develops what can be described as a selective freezing based alternative that ultimately takes Agreement to be the trigger of the freezing of subjects. According to his account, once (finite) T is merged and subject-raising to Spec,TP takes place, the subject A-chain is complete and TP is subjected to early spell-out (see Epstein et al. 2012 for another account in the same vein). It is this early spell-out that prevents the extraction of any material from the subject noun phrase. A-bar movements fall outside the scope of this account: it is only Agreement-related movements that are claimed to yield freezing.³

Unless further assumptions are added, both these selective freezing based analyses and generalized freezing based accounts of subject islands make the clear prediction that *in situ* subjects should be transparent. In his seminal work drawing attention to the variability in the islandhood of subjects, Stepanov (2007) argues at length that this prediction is apparently borne out in a range of languages (including English *there*-existentials like (4a)). Caution must be exercised, however. First, it is difficult to ascertain on the basis of a narrow set of examples whether in the relevant languages the apparently transparent subject noun phrases are indeed in an *in situ* non-complement position. What is even more difficult to show, and for many of the relevant languages has not been demonstrated, is that subjects are only transparent when *in situ*, but not in other (i.e., *ex situ*) positions, in line with what the generalized freezing based approach would predict.⁴

3 Miyagawa's (2010) proposal that in discourse-configurational languages it is topic/focus-features that play the role of phi-features may, however, add a particular twist to this picture. If taken literally, on that approach it would be predicted that in discourse-configurational languages topic/focus-feature driven movements lead to freezing.

4 Irrelevantly for present purposes, Boeckx's freezing-based alternative only predicts the highest (Case-marked) A-positions to be opaque; intermediate A-positions are expected to be transparent.

Second, judgments are not always as clear-cut as a generalized freezing approach to subject islands would lead one to expect; this seems to be the case in Japanese (see Jurka et al. 2011). It also contributes to blurring the picture that in some languages the evidence is apparently mixed. Müller (2011) suggests that in German transitive subjects are opaque even in their *in situ* position, a state of affairs that is unexpected on a freezing approach to subject islands. Diesing (1990: 55, 1992), Haider (1983, 1993, 1997), Jacobs (1999), Lutz (2001, cited in Jurka 2010) and Abels (2008: 76) provide examples that point in the opposite direction, however.⁵ Although Müller convincingly argues that several of these examples are actually irrelevant, there is a residue of subextractions from *in situ* transitive subjects in German, judged to be acceptable either by some or all of these authors, whose derivation remains ill-understood. Finally, external argument subjects do not behave alike in German: subextraction from unergative subjects is significantly less degraded than subextraction from transitive subjects (Jurka 2010).

Third, many of the examples that putatively support the transparency of subjects in a variety of languages involve subextraction from the theme subject of unaccusative, passive or psych predicates, occupying its base position. This happens to be the case for German (for this point, see Fanselow 2001: 422; Müller 2011) and for Hungarian (see Stepanov 2007: 90, citing an example from É. Kiss 1987; see also É. Kiss 2002 for similar examples involving internal argument subjects). Subextraction from these types of subjects is predicted to be grammatical both by freezing-based approaches (as these subjects are not moved) and by CED-type accounts (as they are complements).⁶ On both types of accounts, once these subjects raise to a *vP*-external subject position, they should no longer be transparent: either because they have undergone movement (freezing) or because they are now in a non-complement position (CED). Importantly, in these cases the opacity effect follows on the assumption that subextraction may only target the higher occurrence of the moved subject.

That is an assumption, however, that Chomsky's (2008) approach to subject islands proposes to dispense with. Adopting the view that the derivational cycle is defined by the notion of the phase (Chomsky 2001), Chomsky argues that A- and A-bar movements within the same phase may proceed in parallel (for the same view, see Hiraiwa 2005; Bošković 2008a, 2012). In

⁵ For French, see Starke (2001: 36).

⁶ See Belletti and Rizzi's (1988) unaccusative analysis of object experiencer psych verbs; see also Pesetsky (1995).

particular, he argues that a lower copy of an element forming a movement chain is available for syntactic computation throughout the derivation of a given phase.⁷ This effectively allows an A-bar movement operation to target (part of) the base copy of the subject (and, irrelevantly for our purposes, any of its non-highest copies within the same phase). A significant repercussion of this view of derivational cyclicity is that the base occurrence of an internal argument subject is predicted to be available for subextraction even in sentences in which the subject overtly raises to TP, leaving the base occurrence phonologically unrealized.⁸ Chomsky (2008) suggests that this prediction is borne out in the case of PP-subextraction from English internal argument subjects such as (5a), as opposed to subextraction from transitive subjects such as (5b).⁹

- (5) a. It was the car (not the truck) of which the driver was awarded a prize/
arrived late.
b. *It was the car (not the truck) of which the driver caused a scandal.

To rule out subextraction from transitive (and more generally, external argument) subjects, Chomsky (2008) proposes a specific combination of the CED-type and the freezing-based approaches. First, like Boeckx (2003), he assumes that A-movement to a Case position leads to freezing (the ‘Inactivity Condition’).¹⁰ Second, he stipulates that the internals of a phrase located in a phase edge, such as the edge of *vP*, are unavailable for further computation. Adopting this latter assumption in their treatment of subjects in Spanish, Gallego and Uriagereka (2007: 55) term it the Edge Condition. The Edge Condition can be conceptualized as a restricted, selective version of what we referred to as the ‘generalized CED’: it renders specifiers of some phrases (namely, phases) opaque, while it leaves

7 Arguably, this is in fact an inescapable consequence of the Internal Merge theory of movement, according to which movement “chains” are formed by the very same syntactic object entering multiple Merge operations.

8 That internal arguments should be transparent is also predicted on the assumption that all *vPs*, including unaccusative and passive *vPs*, are phases (see Legate 2003; Sauerland 2003; Deal 2009). In particular, assuming that movements proceed through phase edges, A-bar subextraction from internal arguments may take place to the edge of *vP* before the (remnant) internal argument leaves its base position.

9 For similar observations in English, see Kuno (1973) and Runner (1995: 113f.); for Italian, see Cinque (1990). For arguments that such examples involve syntactic movement, rather than base generation, of the PPs, see Sheehan (2013b) and Bianchi and Chesì (2014).

10 In Chomsky (2008), this is formulated as follows: “an A-chain becomes invisible to further computation when its uninterpretable features are valued.”

complements permeable to subextraction. These two constraints jointly derive the ungrammaticality of (5b). While the Inactivity Condition precludes subextraction from the occurrence of the subject in Spec,TP, the Edge Condition rules out subextraction from the subject in Spec,vP.

In addition to syntactic approaches a variety of non-syntactic accounts have been proposed to model subject islands.¹¹ Of relevance to our present concerns are those treatments that relate the opacity of subjects to pragmatic factors, in particular, to the topic status of subjects. It has been argued, in particular, that while focused syntactic domains are transparent to subextraction, topics are generally opaque (Erteschik-Shir 1973, 2006, 2007; Van Valin 1986, 1995; Takami 1989; Bayer 2004; Goldberg 2006, 2013; Bianchi and Chesi 2014; Winkler et al. 2016); call this generalization Topic Opacity.¹² Topic Opacity has been stated and explained in different ways by different authors. Most notably, it has been proposed to be derived from purely information structural considerations (Goldberg 2006, 2013), or from principles of the syntax-information structure alignment (Erteschik-Shir 2006, 2007).¹³

Since canonical subjects in languages like English are a default topic (Chafe 1987; Lambrecht 1994; Erteschik-Shir 1997), the common islandhood of canonical subjects follows. The approach also provides a straightforward explanation for the robust opacity of finite sentential subjects, as well as for the transparent behaviour of the subject of *there*-existentials, illustrated in (4a) above. As in the latter type of sentences the subject is not the topic, it is expected to be permeable; while finite clausal subjects are opaque in languages like English because they function as topics (Koster 1978; Takahashi 2010). Further, assuming that topic status goes together with externalization from the predicate phrase, vP-internal subjects do not normally function as topics, hence this pragmatic account predicts, just like freezing approaches, that *in situ* subjects in general should be transparent.

11 For critical discussions of processing-based approaches to a range of islands, which we put aside here, see Phillips (2006, 2013), Sprouse (2009), Sprouse, Wagers and Phillips (2012). For a plausible processing-based account of extraposition islands, see Hofmeister et al. (2015).

12 The generalization is closely related to Fiengo and Higginbotham's (1981) Specificity Condition, and to Guéron's (1980) Name Constraint, according to which specific or referential NPs cannot be subextracted from. Topic constituents are mostly taken to be strong islands (but see Meinunger 2000 for the view that they are weak islands).

13 On Goldberg's (2013) account, *wh*-extraction from a topic is anomalous because the subextracted element cannot be at once backgrounded (being part of the topic) and discourse-prominent (being the *wh*-focus). Bianchi and Chesi (2014) capture the restriction, in part, by reference to the non-reconstructability of aboutness topics to their predicate-internal base position.

That topicalized phrases are opaque has long been noted in structure-based approaches too. Most prominently, this has been analyzed as a freezing effect due to movement (see Wexler and Culicover 1977, 1980). What a movement induced freezing analysis cannot capture, however, is the opacity of base-generated topics, exemplified below with a frame-setting topic.¹⁴ Therefore, granting that fronted and base-generated topics occupy the same *type* of left-peripheral position, the opacity of topics appears to be independent of freezing.¹⁵

- (6) *Which elections do you think that [according to some reports on __] exit polls showed a neck-to-neck race between the main candidates?

An alternative structural explanation may be furnished by any theory according to which adjunct positions are opaque: namely, the opacity of topic positions could be reduced to their supposed adjunct status. While such an account may be appropriate for topics that are structural adjuncts, it is not sufficiently general. It could potentially work for languages like Hungarian, in which topics are recursive (and in this regard, adjunct-like), but it does not extend to topics that apparently occupy a (unique) specifier position. The latter is the case for instance in Verb Second languages like German (Müller and Sternefeld 1993).

It is not an objective of this paper to establish what the correct *explanation* should be for Topic Opacity (or, for that matter, for any of the syntactic restrictions reviewed above). In view of the considerations in the preceding paragraph, nevertheless, it seems fair not to take Topic Opacity to fall under either movement-induced freezing or the general opacity of structural adjuncts, but to conceptualize it instead as an independent restriction governing the syntax-information structure interface.

In addition to Topic Opacity, in the foregoing we have introduced two main types of structural restrictions pertinent to the opacity of subjects:

14 Rizzi's (2006) notion of Criterial Freezing (which freezes phrases in criterial positions) is independent of movement, therefore applies to derived and base-generated topics alike, unlike generalized freezing. Criterial Freezing is irrelevant to our present concerns, however, as it constrains the extraction of, rather than subextractions from, criterial specifiers.

15 Chomsky's (2008) phase-relativized CED account could in principle be extended to topics, on the assumption that topics are, in the relevant sense of the term, in the edge of the CP phase. The latter assumption is dubious, however, for languages like Hungarian: a variety of peripheral elements belonging to the CP-phase appear to be projected higher than fronted topics (e.g., complementizers, relative pronouns).

CED-type restrictions and freezing-based restrictions. Within each type we identified a generalized and a selective (or relativized) version. We can summarize their repercussions for the islandhood of subjects as follows. The generalized CED takes all specifiers to be opaque; while its selective version only takes specifiers in phase edges to be impermeable. The generalized freezing approach predicts all moved subjects to be islands; its selective version only takes A-movement to an agreement/Case-related position to induce freezing. The predictions are straightforward, but the empirical landscape, as we noted in this section, is not as clear-cut as one would hope.

Our purpose in this part has not been to provide a general critical theoretical and empirical assessment of these alternative approaches (for extensive discussion, see Müller 2011 and Boeckx 2012). Rather, we presented them as prominent competing – or, for Chomsky (2008), complementary – avenues of current research that in themselves make strikingly divergent predictions regarding the opacity of subjects. The aim of our study is to bring data from Hungarian to contribute to this ongoing debate.

2.2 Research questions and recent experimental results

In view of the core ideas at the heart of the theoretical alternatives reviewed above, our rating experiment seeks to address the following two general questions:

- (7) a. What role does fronting to a topic position play in the opacity of subjects?
- b. What role does the base position play in the opacity of subjects?

(7a), which we address through a comparison of subextractions from topicalized and *in situ* subjects in Hungarian, has not been studied experimentally before. To implement (7b), we investigate the acceptability of subextraction from two types of subjects: transitive subjects and unaccusative subjects, comparing them to objects as a baseline. (7b) has been explored experimentally in recent research on other languages. However, the experimental results obtained thus far, as we discuss in the remainder of this section, are not straightforward to evaluate.

The relative transparency of unaccusative (or more generally, internal argument) subjects as compared to transitive (or more generally, external argument) subjects has been recurrently noted in the theoretical literature

(e.g., den Besten 1985; Cinque 1990: note 9; Haegeman et al. 2014).¹⁶ In fact, as Fanselow (2001) points out for German and as Chaves and Dery (2014) do for English, reported violations of ‘subject islands’ typically involve internal argument subjects (e.g., Kluender 1998: 268; Hofmeister and Sag 2010: 370). Nevertheless, no systematic experimental investigation of the potential difference in permeability between unaccusative and transitive subjects was forthcoming until relatively recently.¹⁷

Here we highlight three acceptability rating studies relevant to the difference between external and internal argument subjects and movement, which have produced partially converging results in different languages. Investigating *was-für* split subextraction in German, Jurka (2013) demonstrates that extraction from *in situ* transitive subjects in AuxAdvSOV sentences is significantly more degraded than extraction from *in situ* unaccusative subjects, which are no different from *in situ* objects (Experiment 2); and unergative subjects are more opaque than unaccusative subjects (Experiment 3). While the detected differences are suggestive, two considerations complicate the picture.¹⁸

First, subjects of many unaccusative predicates (including those expressing existence, coming into existence, or continuation of a state) tend to be interpreted as non-specific, while subjects of transitives are typically interpreted as specific. Specific NPs are more difficult to subextract from than non-specific NPs (Chomsky 1973; Fiengo and Higginbotham 1981; Diesing 1992). As specificity was not independently controlled for in Jurka’s (2013) – otherwise prudently designed – experiments, it may have confounded the difference between transitive and unaccusative subjects. A second consideration derives from Winkler et al. (2016), who argue that subextraction from *in situ* transitive subjects obtained on the basis of AuxAdvSOV sentences involve a processing difficulty that is closely related to information structure (and which can thus be modulated by context). While Jurka’s findings may still reflect a genuine grammatical difference

16 One of the earliest licit examples of subextraction from an internal argument subject is noted by Ross (1967: 242):

(i) Of which cars were the hoods damaged by the explosion?

17 Attempting a different comparison, namely that of unaccusative subjects and adjuncts, Hiramatsu (1999, 2000) found subextractions from unaccusative subjects to be relatively transparent in English.

18 In addition to the fact, pointed out above, that subextractions from *in situ* subjects are frequently rejected in the literature on German (see section 2.1 for references).

between transitive and unaccusative subjects, these two issues represent possible confounds that require careful consideration.

Polinsky et al. (2013) carried out rating studies in English and Russian. In English, using *wh*-extractions with preposition stranding inside noun phrases, they found that while movement out of unaccusative subjects is better than movement out of transitive subjects, the difference did not reach significance.¹⁹ In Russian, the NPs from which subextractions are launched were either post-verbal or they were in a pre-verbal position. Unaccusative subjects and objects were rated significantly better than transitive subjects in both of these positions. The difference between the two types of subjects is relatively large both post-verbally and pre-verbally.²⁰ Nevertheless, one must exercise caution in drawing the conclusion that this difference derives from a syntactic distinction between transitive and unaccusative subjects in terms of base positions. This is because there may be independent differences between the two types of subjects, both before and after the verb, which might have affected the outcomes. One potential difference is once again related to specificity: as noted above, subjects of many unaccusative predicates tend to be interpreted as non-specific, while subjects of transitives are typically interpreted as specific, and unless this is carefully controlled for, it acts as a possible confound when comparing subextractions from these two types of subjects. Second, while unaccusative subjects are base-generated in their post-verbal surface position, there is solid evidence that transitive subjects are moved here (*pace* Polinsky et al.'s own assumptions; see Slioussar 2011). Relatedly, the post-verbal slot is the neutral, default position for unaccusative subjects, whereas for transitive subjects it is a syntactically marked position in which they are interpreted as focused (Bailyn 2012 and references therein). Further, pre-verbal occurrences of unaccusative subject arguments must be interpreted as topics (Bailyn 2012: 255), while those of transitive subjects may or may not be (Slioussar 2011; Bailyn 2012). These independent differences may enter the interpretation of Polinsky et al.'s results from Russian transitive and unaccusative subjects in ways that remain to be explored.

19 Since no objects were included in this experiment, no comparison between unaccusative subjects and objects was made.

20 Cohen's *d* = 0.70 and 0.50, respectively (calculated from the reported *z*-score means and CIs, and number of observations *N*=588 per condition, namely, 4 judgments collected in each condition from 147 participants).

3 Predictions for Hungarian

3.1 Subjects in Hungarian

A distinct advantage of studying the effect of fronting on subject opacity in Hungarian is that the pre-verbal versus post-verbal comparison is free of the asymmetries between transitive and unaccusative subjects just reviewed that characterize Russian both in terms of the syntactically derived *versus* base-generated nature of the position of the two types of subject and in terms of their information structural status. Moreover, Hungarian is also free of similar asymmetries between subjects and objects, making available direct comparisons between extractions from subjects and objects in parallel pre- and post-verbal positions.

The word order parallelism holding between subject and object arguments is partly due to the fact that Hungarian lacks a dedicated Case- or agreement-related canonical subject position.²¹ Subjects, as well as objects, may either remain *in situ*, in which case they follow the verb, or they can be fronted to a pre-verbal position.²² The finite verb raises in neutral sentences to vP-external position in the inflectional domain of the clause (É. Kiss 2008; for evidence, see Surányi 2009).

- (8) a. Be-csengetett a postás.
 PRT-rang the postman
 ‘The postman rang the bell.’
 b. A postás be-csengetett.
 c. A postás csengetett be.

Pre-verbal subjects and other argument NPs are aboutness topics, externalized from the predicate phrase by syntactic movement (É. Kiss 1987, 2002: 12–14, 27; Puskás 2000; Lipták 2011). No argument scrambling to the pre-verbal field is

²¹ Assuming that TP is projected nevertheless, two possibilities offer themselves. One of these is that Spec,TP is invariably null: either unfilled, or filled by *pro*. Another possibility is that Spec,TP is exploited as the immediately pre-verbal focus position of the language (see Surányi 2012 for an empirical argument in favor of this view). The latter would be in line with Miyagawa’s (2010) parametric account of focus-configurationality.

²² That post-verbal subjects are not extraposed from a pre-verbal position is evidenced, among others, by the fact that they may have narrow scope with respect to structurally low scope-bearing NPs and adverbials (cf. Fox and Nissenbaum 1999).

available. As topics are recursive in the language, the subject, *qua* topic, freely intermingles with other topics in the pre-verbal field. When functioning as a focus, pre-verbal arguments are followed by the obligatory inversion of the finite verb with the verbal particle (8c). Thus, whenever a verbal particle is present, no information structural ambiguity can arise.

The topic status of pre-verbal subjects is supported by a wealth of evidence, including their obligatory surface scope over pre-verbal negation. It is also illustrated by the felicity contrast between the out-of-the-blue utterances in (9). The verb ‘appear’ licenses its indefinite subject only post-verbally (9a), but not in a pre-verbal position (9b), where it would have to be interpreted as a topic. The topic status is incompatible with the pre-verbal subject in (9b), because the sentence introduces it as a new referent, whose existence is not presupposed.

- (9) a. Meg-jelent egy érdekes új könyv.
 PRT-appeared an interesting new book
 ‘An interesting new book appeared.’
 b. #Egy érdekes új könyv meg-jelent.

Similarly, if the postman is not given in the discourse, (8a) is felicitous as an answer to “What was that noise?” while (8b) is not.

A matter of contention that directly bears on the syntax of subjects is the question whether the Hungarian verb phrase is non-configurational. After an intensive period in the 1980s, the (non-)configurationality debate abated, with the non-configurational account becoming the received view (É. Kiss 1987, 1994, 2002). More recent work has defended a configurational approach, however. Revisiting the controversy, Surányi (2006a,b) argues for a fully configurational analysis according to which some, but not all, subject–object asymmetries are obliterated by Japanese-type A-scrambling that takes place in the post-verbal field, following the raising of the verb out of the *vP*. É. Kiss (2008) proposes a hybrid alternative, according to which the configurationally structured verb phrase becomes non-configurational (it is ‘flattened’) by the end of the syntactic derivation. Referring the reader to these works for relevant discussion, here we will assume the correctness of the configurational analysis of the *vP*.

3.2 Predictions of the competing approaches

With this background in place we are now in the position to formulate the diverging predictions that the main approaches to subject islands reviewed in

the preceding section make for Hungarian with regard to subextractions from unaccusative and transitive subjects, and from objects, both when they occupy their post-verbal *in situ* position and when they are topicalized. For ease of reference, the overview of the respective predictions is followed by a tabular summary below.

Consider first the approach that seeks to reduce the islandhood of subjects to their topic status, namely to the Topic Opacity generalization. Such an account predicts each of the topicalized NP types to be opaque to subextraction. On the other hand, post-verbal, *in situ* NPs, not being topics, are expected to be uniformly transparent. Since Topic Opacity may be conceptualized as independent of structural accounts of subject islands, in expounding the predictions of each structural approach we will also examine in what follows whether and how the overall predictions are affected if the account is combined with the assumption of Topic Opacity.

The generalized CED approach predicts topicalized NPs, being non-complements, to be opaque. Of the *in situ* NPs, transitive subjects, generated in the specifier of *vP*, are expected to be opaque, while objects and unaccusative subjects, being complements, are predicted to be permeable to subextraction. Topicalized NPs, having undergone movement, should be opaque according to generalized freezing approaches too, while they predict both types of subjects as well as objects to be transparent when *in situ*. The assumption of Topic Opacity is not relevant on either the generalized CED approaches or the generalized freezing accounts: they predict NPs subjected to topic fronting to be impervious whether or not Topic Opacity holds.

On the basis of Agreement-relativized (or Case-relativized) freezing accounts we expect *in situ* subjects and objects to be available to subextract from. Since fronted NPs are not raised to an Agreement-related (or Case-related) A-position, they too, are predicted to be permeable, providing that topics are not taken to be generally opaque. If, however, Topic Opacity holds, then extraction from fronted NPs is expected to be unacceptable on Agreement-relativized freezing approaches too. Chomsky's hybrid account assumes a phase-relativized version of the CED generalization, according to which the internals of the specifier in the edge of *vP* are inaccessible to movement. While this leaves objects and *in situ* unaccusative subjects unaffected, it should make *in situ* transitive subjects opaque.

Chomsky also assumes Agreement-relativized freezing, but since fronted NPs are not raised to an Agreement-related A-position, this restriction is irrelevant to them. The predictions regarding fronted NPs depend on whether or not Topic Opacity is adopted. If it is not embraced and topics

are available for subextraction, then topicalized NPs are expected to be transparent. On the other hand, if Topic Opacity is taken on board, then the topicalized occurrences of the NPs cannot be subextracted from. Crucially, since Chomsky assumes that A-bar movement can proceed from the base occurrences of moved phrases, subextraction from the base copy of topicalized objects and topicalized unaccusative subjects is predicted to be acceptable. The base copy of topicalized transitive subjects in the edge of ν P, on the other hand, remains impenetrable.

Table 1 below presents an outline of these predictions. An OK or an asterisk marks the predicted availability or unavailability, respectively, of subextractions from the respective NP types.

Table 1: Predictions of different approaches to subject islands (UaS=unaccusative subject, TrS=transitive subject, TrO=object).

NP type/ Approach to subject islands	In situ UaS	In situ TrS	In situ TrO	Topicalized UaS	Topicalized TrS	Topicalized TrO
Topic Opacity	OK	OK	OK	*	*	*
Generalized CED	OK	*	OK	*	*	*
Generalized freezing	OK	OK	OK	*	*	*
Agreement- relativized freezing	OK	OK	OK	no topic opacity: OK	no topic opacity: OK	no topic opacity: OK
Phase- relativized CED + Agreement- relativized freezing	OK	*	OK	topic opacity: * no topic opacity: OK	topic opacity: * no topic opacity: OK	topic opacity: * no topic opacity: OK
				topic opacity: OK	topic opacity: *	topic opacity: OK

4 An acceptability rating experiment

4.1 Design and materials

The goal of our experiment was to investigate the effect of two main factors on the opacity of subjects, namely, base position and fronting. The experiment had a 3×2 design, crossing the type of the NPs from which subextraction takes place

(NP) with their surface position (LOC). Two types of subjects were tested: subjects of transitive verbs (TrS) and subjects of unaccusative verbs (UaS), and objects (TrO) were added as a control. The NPs were either in a post-verbal *in situ* position (In situ), or in a fronted topic position (Topic).

The unaccusative verbs used in the experiment are all at or near the unaccusative end of Sorace's (2000) Unaccusativity Hierarchy, including verbs of change of location, change of state and continuation of a pre-existing state. As for their morphosyntax, all of them show one or more of the following unaccusativity traits: they are formed by an anticausative derivational suffix, they can undergo passivization (a process that may apply to unaccusatives in Hungarian, but not to unergatives), and they may combine with a resultative secondary predicate (Levin and Rappaport Hovav 1995; Mateu 2005). In addition, none of them can take a fake object, a property that characterizes unaccusatives (as opposed to unergatives).²³

The subextracted element was invariably a D-linked (specific) *wh*-phrase composed of *melyik* 'which' and an oblique case marked singular noun. Subextraction was long, since *wh*-extraction from pre-verbal NPs is only possible if it targets a position in a superordinate clause.²⁴

The *wh*-phrase was a complement of the head noun of the NP from which it was subextracted. Oblique complements were used rather than possessors, despite the fact that Hungarian permits the extraction of dative possessors. This is because dative possessors appear to be relatively freely extractable from NPs across the board.²⁵ In each case, the particular oblique case marker of the

²³ The unaccusative verbs used in the experiment were: *megmarad* 'remain', *megismétlődik* 'recur (be repeated)', *beszámít* 'count (be included)', *megjelenik* 'appear', *bekerül* 'get into (be included)'.

²⁴ This is the reason why we opted to test long *wh*-movements despite the fact that they are generally perceived to be less than perfect in Hungarian. In most cases the preferred construction is *wh*-scope marking, which involves short *wh*-movement within the complement clause and a *wh*-scope marker in the matrix.

²⁵ This relative freedom, illustrated in (i), might be due to a binding construal in which the external dative possessor binds a null resumptive pronominal possessor within the NP (cf. Den Dikken 1999, who argues this to be the only option in a well-defined set of cases, not including cases like (i) in which the possessum does not agree with the plural possessor in number). While certain A-bar dependencies in Hungarian involving a subject or object NP are amenable to a null resumptive construal that circumvents locality restrictions (Gervain 2009), such a construal is inapplicable to the extraction of oblique dependents. This is evidenced by the ungrammaticality of strong island violating extractions of obliques, exemplified in (ii).

complement was lexically selected by the complement-taking head noun. Semantically, all oblique complements were participants of the lexical conceptual structure of the selecting noun, in the sense of Davies and Dubinsky (2003).²⁶

The NP from which subextraction was launched was invariably a specific indefinite NP.²⁷ The indefinite NP consisted of three words: it was introduced by an indefinite article, and it contained an attribute followed by a noun. Indefinite NPs were used rather than definite NPs, as the latter are generally more opaque. Importantly, target sentences triggered a specific interpretation of the indefinite NP independently of its *in situ* or fronted position. This was guaranteed by the attributive modifiers, which were selected in order to give rise to an inference of anaphoricity (e.g., ‘a previous charge’, ‘a former debate’, ‘a concealed (so-far-undisclosed) interview’). Ensuring a specific reading of the indefinites independently of topicalization is of importance, because topicalized indefinite NPs are

-
- (i) Melyik cikkeknek szeretnéd, hogy ha elfelejtet
 which paper.PL.DAT would.like.2SG that if forget.2SG
 [__ a címét], küldjünk nyugdíjba?
 the title.POSS.3SG send.SUBJ.1PL retirement.into
 ‘Which papers would you like us to ask you to retire if you forget their title?’
- (ii) *Melyik politikussal mondtál fel, amikor megláttál [egy interjút __]
 which politician.with quit.PAST.2SG PRT when saw.2SG an interview.ACC
 az újságban?
 the newspaper.in
 ‘*Which politician did you quit when you saw an interview with in the newspaper?’

The relative ease of possessor subextraction is also the reason why unergative verbs could not be included in the experiment. In particular, thematic arguments of nouns heading unergative subject NPs are normally expressed as possessors rather than as oblique complements. Finally, passive verbs were not included because passivization is a comparatively marked construction in Hungarian, further encumbered by proscriptive stigmatization.

26 Due to the possibility of extraposition no reliable structural diagnostics of noun complement status have been established in the literature on Hungarian. It is worth pointing out, however, that Hungarian being a DP-language, extraction of adjuncts from noun phrases is plainly unacceptable (Culicover and Rochemont 1992; Bošković 2008b):

- (i) *Melyik újságban fénymásoltál le [egy interjút __]?
 Which newspaper.in photocopied.2SG PRT an interview.ACC
 ‘*Which newspaper did you photocopy an interview in?’

27 Definite NPs are generally more opaque to *wh*-subextraction than specific indefinites (Chomsky 1973; Erteschik-Shir 1973; Fiengo and Higginbotham 1981).

known to favour a specific interpretation, and specific NPs are less transparent in general than non-specific ones (Chomsky 1973; Erteschik-Shir 1973; Fiengo and Higginbotham 1981). If some NPs were interpretable as non-specific in their post-verbal position, then that would have introduced a further, hidden variable into our design. Further, this variable would have been uncontrolled, since – without unduly complicating the task – we would have no information as to which indefinite NP occurrences were interpreted as specific and which ones as non-specific by each individual participant.

Test sentences contained a matrix bridge verb, embedding a subjunctive complement clause introduced by an overt complementizer.²⁸ Embedded clauses contained a particle verb in the neutral particle > verb order. This order enforces a topic interpretation of the pre-verbal NPs in the embedded clause, and it makes their focus interpretation unavailable, as that would require an inverted verb > particle order (see section 3.1). The embedded clause contained exactly one XP in addition to the particle verb and the tested NP from which subextraction took place, in order to balance length and the overall word order. In the case of transitive subject NPs this XP was the object, in the case of object NPs it was the subject, while in the case of unaccusative subjects XP was a locative adjunct. Word order was balanced in the following way. In TOPIC conditions, in which the NP was pre-verbal, the XP was post-verbal; in IN SITU conditions, in which the NP was post-verbal, the XP was a pre-verbal topic.

The representations in (10) are the schematic structures of the TOPIC and the IN SITU conditions, respectively.²⁹ (11) provides a set of sample lexicalizations illustrating the three NP types in the IN SITU (11a–c) and TOPIC (11a'–c') conditions.

28 Subjunctive complement clauses were employed because indicative complement clauses behave as weak islands in Hungarian, and because the acceptability of long extraction from indicatives exhibits a degree of inter-speaker variation.

- (i) *Hogyan gondolod, hogy megismerkedtem Marival ____?
 how think.2SG that got.acquainted.1SG Mary.with
 'How do you think I got acquainted with Mary?'
- (ii) Melyik hírességgel gondolod, hogy megismerkedtem ____?
 Which celebrity.with think.2SG that got.acquainted.1SG
 'Which celebrity do you think I got acquainted with?'

29 Lexically selected oblique case markers are taken to be syntactically adpositional (see É. Kiss 2002).

- (10) a. [_{CP} *which-PP*_{OBL} V [_{CP} C [_{NP} Det Adj N ___] Prt+V XP]]
 b. [_{CP} *which-PP*_{OBL} V [_{CP} C XP Prt+V [_{NP} Det Adj N ___]]]

- (11) Melyik politikussal szeretnéd, hogy ...

‘With which politician do you want that ...

- a. ...az újságban meg-jelenjen [egy eltitkolt
 the press.in PRT-appear.SUBJ a concealed
 interjú ___]? UaS (*in situ*)
 interview
- a'. ...[egy eltitkolt interjú ___] meg-jelenjen az
 a concealed interview PRT-appear.SUBJ the
 újságban? UaS (topic)
 press.in
 ... [a concealed interview ___] should appear in the press?’
- b. ... a közvéleményt meg-változtassa [egy eltitkolt
 the public.opinion.ACC PRT-change.SUBJ a concealed
 interjú ___]? TrS (*in situ*)
 interview
- b'. ... [egy eltitkolt interjú ___] meg-változtassa a
 a concealed interview PRT-change.2SG the
 közvéleményt? TrS (topic)
 public.opinion.ACC
 ... [a concealed interview ___] should change the public opinion?’
- c. ... az újság meg-jelentessen [egy eltitkolt
 the newspaper PRT-publish.SUBJ a concealed
 interjút ___]? Obj (*in situ*)
 interview.ACC
- c'. ... [egy eltitkolt interjút ___] meg-jelentessen az
 a concealed interview.ACC PRT-publish.SUBJ the
 újság? Obj (topic)
 newspaper
 ... the newspaper should publish [a concealed interview ___]?’

4.2 Procedure and participants

Judgments were collected from 48 self-reported adult native speakers (mean age: 25.3) using a 7-point Likert scale, with 7 as the best score. 5 lexicalizations per condition yielded 30 target sentences, to which we added 74 fillers, most of

which also contained A-bar movements of varied levels of acceptability. Items were presented one-by-one in pseudo-randomized orders with the Inquisit Web software. 45 participants' data entered statistical analysis. Three participants had to be excluded: one used only the extremes on the scale, one mostly only used 6 as a judgment score, and one had many missing data points.

4.3 Results

Judgments were transformed into *z*-scores, with means and standard deviations estimated for each subject based on all target responses. Subextractions from transitive subjects received the lowest mean judgment both in the *in situ* position ($M = -0.41$, $SD = 0.89$, $CI_{95} = [-0.53; -0.29]$) and in the topic position ($M = -0.36$, $SD = 0.85$, $CI_{95} = [-0.47; -0.24]$). Subextractions from *in situ* unaccusative subjects ($M = 0.08$, $SD = 1.03$, $CI_{95} = [-0.06; 0.21]$) and from topicalized unaccusative subjects ($M = 0.10$, $SD = 0.94$, $CI_{95} = [-0.03; 0.22]$) were above the mean of all target judgments (i.e., to the *z*-score 0), similarly to the mean judgments of subextractions from *in situ* objects ($M = 0.40$, $SD = 1.01$, $CI_{95} = [0.26; 0.53]$) and from topicalized objects ($M = 0.20$, $SD = 0.92$, $CI_{95} = [0.07; 0.32]$). The mean judgments of the experimental conditions, grouped by NP type, are plotted in Figure 1.

Linear mixed effect models were used to analyze the *z*-transformed data, taking the type of the NP (NP) and the surface position (LOC) as fixed effects. Participants (SUBJECT) and items (ITEM) are considered as random effects. The full model revealed that the LOC factor does not have any main effect: $\chi^2(1) = 0.02$, $p = 0.88$; and there is no interaction between the two fixed effects: $\chi^2(2) = 0.77$, $p = 0.68$. The most parsimonious model, obtained by stepwise backward elimination, included only NP as a fixed effect and ITEM as a random effect. This model shows that the NP factor has a highly significant effect: $\chi^2(2) = 20.72$, $p < 0.001$. The *post hoc* test with Tukey contrasts on the NP factor revealed that the two types of subjects differ from each other (TrS–UaS: $Z = -3.07$; $p = 0.006$). While TrS significantly differs from the object (TrS–TrO: $Z = -4.45$; $p < 0.001$), the UaS and the TrO do not show any significant difference (UaS–TrO: $Z = -1.38$; $p = 0.35$).

Before proceeding to evaluate these outcomes, let us address a potentially surprising aspect of the descriptive statistical results. One may wonder why subextraction from objects received a relatively low judgment. We have two remarks to make in this respect. First, as noted in section 4.1 above (see esp. footnote 18), long *wh*-movements out of finite clauses are generally slightly degraded in Hungarian; thus it was expected that even the baseline condition,

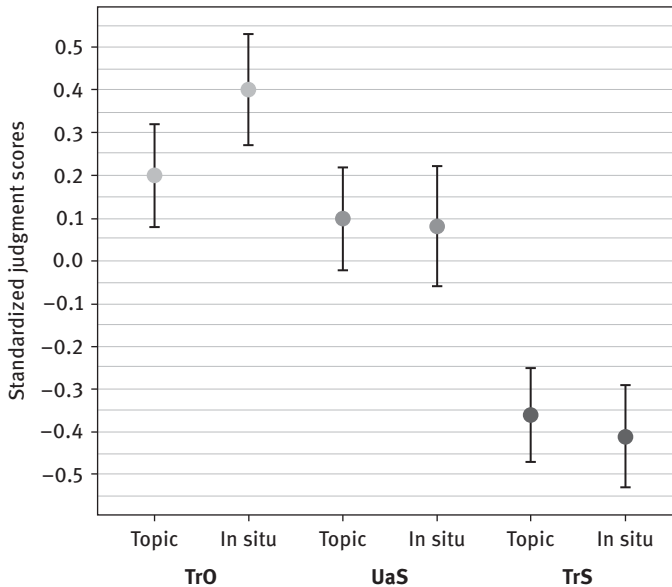


Figure 1: Mean judgments of subextraction from objects, unaccusative subjects and transitive subjects in their in situ and topicalized positions (error bars represent 95% CI).

namely, subextraction from objects, would not receive very high scores. Second, the filler items used in the experiment ($n = 2880$, $M = 4.74$, $SD = 2.29$) turned out, on average, to have received somewhat higher judgments on the 7-point raw scale than target items ($n = 1800$, $M = 3.98$, $SD = 1.98$). This has also contributed to shifting the z-scores of (especially the better) target conditions slightly lower. Of key interest, however, are not the absolute values of means in the different NP-type conditions, but rather the pattern of any significant differences between them. In this regard it is worth pointing out that the difference between UaS and TrS and between TrO and TrS can both be categorized as a medium-sized effect (Cohen's $d(\text{UaS}-\text{TrS}) = 0.51$, Cohen's $d(\text{TrO}-\text{TrS}) = 0.74$).

5 Discussion

The primary objective of our acceptability rating experiment was to empirically investigate the acceptability of subextraction from *in situ* and topicalized unaccusative and transitive subjects in Hungarian, in comparison with subextraction from objects in the same positions. In this section we evaluate the results

obtained in light of the competing approaches to subject islands reviewed in Section 2, as summarized in Table 1.

Consider extractions from *in situ* NPs first. The findings that extraction from *in situ* objects is relatively acceptable and that it is similarly acceptable from *in situ* unaccusative subjects are expected on all accounts. On the other hand, the fact that *in situ* transitive subjects are opaque is only predicted by CED-type approaches, which take the specifier of *vP* to be impermeable. The same fact is left unexplained by freezing-based accounts, whether they are of the generalized or the relativized kind.

Second, topicalization was not found to have either an ameliorating or a deteriorating effect on subextractions, independently of argument type. This is at odds both with accounts that assume generalized freezing and with treatments based on a generalized form of the CED. On these approaches objects and unaccusative subjects, which are transparent *in situ*, should become opaque in their fronted position. The finding is not captured by Agreement-relativized freezing based accounts either, since these do not predict fronted topics to be opaque. On these accounts, in case topics in general are taken to be permeable, subextraction is expected to be possible from topicalized transitive subjects, contrary to our results. If, on the other hand, topics are in general taken to be opaque (=Topic Opacity), then the problem is the reverse: it is unexplained why objects and unaccusative subjects are no less transparent when they are topicalized than when they are *in situ*.

While both mainstream freezing-based and CED-type accounts have difficulties in accounting for the pattern found in Hungarian, Chomsky's (2008) phase-based approach to cyclicity predicts precisely such a pattern. Recall that on that approach the lower copy of a moved element is available throughout the derivation of a given phase. Given that assumption, the fact that topicalization is not found to affect the transparency of either subject or object NPs is entirely expected. As for transitive subjects, even though the copy of the subject in Spec,*vP* remains available even after topicalization, that copy is opaque due to Chomsky's relativized, phase-based incarnation of the CED that makes the internals of phrases in phase edges inaccessible. Precisely because the base copies remain available, the permeability of the unaccusative subjects and objects is predicted to be unaffected by their participation in a topicalization chain. As the base copies of both unaccusative subjects and objects are *vP*-phase internal, they are available for subextraction.³⁰

30 To be precise, in the case of objects the first step of *wh*-subextraction takes place to the edge of *vP* on Chomsky's (2008) account. Thus, the subextracted *wh*-element and the 'remnant' object

Note that this account necessarily relies on the assumption that the copy of the argument NP in the topic position is opaque. Otherwise, if the copy of subjects and objects in the topic position were taken to be transparent, that would obliterate any differences in opacity among topicalized NPs. The assumption of the opacity of the copy in the topic position entails, correctly, that in derivations in which topicalization takes place, all and only those *wh*-subextractions are permitted that are licensed to apply to the base copy in the topicalization chain. Recall that Topic Opacity is conceptualized as an information structural interface constraint (see section 2). What is important then is that, granting Chomsky's phase-based cyclicity, in view of our results this restriction should apply narrowly to copies of phrases in the topic position. Since topicalized phrases are *interpreted* as aboutness topics in their fronted, topic position, rather than in their base position, information structural topic opacity restrictions can be formulated narrowly in terms of the copy in the topic position, as required.³¹

If Topic Opacity restricts subextractions specifically from those occurrences of constituents that are in the topic position, then Chomsky's phase-based cyclicity has two direct consequences for topicalization. One of them has just been discussed: any subextraction from a topicalized NP may be possible only if it is licensed to apply to a lower copy of the NP. As we have seen, this prediction is borne out by subextractions in Hungarian. Another consequence is that long *wh*-subextraction from topics involves movement of an element not from within, but rather, across the topic in the left periphery of the lower clause. This gives rise to the prediction that in languages in which a left peripheral topic creates a topic island effect (by turning the containing clause into an island), such subextractions will effectively constitute topic island violations.

NP are moved separately to the edge of the vP phase. From here the *wh*-element and the 'remnant' object topic move to their respective A-bar positions on separately.

31 As it is currently formulated, Criterial Freezing may seem to be paradoxical in that it applies specifically to the criterial phrase itself, while it does not freeze its contents, licensing subextraction (Rizzi 2006; see footnote 14). Chomsky's (2008) phase-based view of cyclicity in fact permits a simpler, more uniform characterization of Criterial Freezing; one that would also derive Topic Opacity in its formulation proposed here in the main text. Namely, in Chomsky's phase-based approach to cyclicity it can be maintained that the whole copy of the phrase, including its contents, get frozen in the criterial position. Subextractions should be possible only from the non-highest links of criterial chains, if at all. Moving the *same* phrase to two different criterial positions could still be ruled out, as seems necessary, on the plausible assumption that phrases that satisfy criteria in discourse-related positions must be interpreted in their criterial position (only their proper parts can undergo reconstruction).

In languages like English (Rochemont 1989; Culicover 1991, 1996: 453) and German (Müller and Sternefeld 1993: 485), fronted topics are known to induce topic island effects.

- (12) a. *Which books did Lee say that to Robin she will give? (Culicover 1991: 7)
 b. *Was glaubst du gestern hat Ede repariert?
 What think.2SG you yesterday has Ede repaired
 ‘What do you think Ede repaired yesterday?’
 (Müller and Sternefeld 1993: 485)

In Hungarian, on the other hand, topics do not erect an island for crossing A-bar movements. To illustrate, there is no detectable difference in acceptability between (13a), containing a topicalized object in the embedded clause, and (13b), in which the same object is post-verbal:

- (13) a. Hova szeretnéd, hogy Marit felvegyék?
 where.to would.like.2SG that Mary.ACC accept.SUBJ.3PL
 b. Hova szeretnéd, hogy felvegyék Marit?
 where.to would.like.2SG that accept.SUBJ.3PL Mary.ACC
 ‘Where would you like Mary to get accepted to?’

Assuming phase-based cyclicity, the apparent opacity of topics to subextraction in English and German then stem from the fact that in these languages the left-peripheral ‘remnant’ topic itself creates a topic-island for the crossing movement dependency that would proceed from the base copy of the topicalized phrase. On the other hand, as in Hungarian left-peripheral topics do not give rise to topic-island effects, in this language subextraction from (internal argument) topic-fronted phrases is licensed.³²

32 A further prediction is made for topic Left Dislocation (LD) in Hungarian. As LD gives rise to a mild topic island effect, see (i), it is expected that subextraction from left dislocated NPs will be similarly degraded. The prediction is borne out, see (ii). The topic island effect created by LD in Hungarian is apparently weaker than the the topic island effect that topicalization gives rise to in English and German, as illustrated in (12). Although the variation in the occurrence and the strength of topic island effects remains ill-understood, it is likely to be not only a function of syntactic parameters, like the recursivity of the topic position (topics are recursive in Hungarian, but non-recursive in German and English; for the latter, see chapter 1 of Haegeman 2012 and references therein), but it may also be affected by the interpretive properties of topics. Notably, contrastive topics (understood here as involving quantification over alternatives) may constitute a stronger barrier than non-contrastive topics (for the contrastivity of English topics, see Bianchi

We conclude our discussion with a brief comparison of the present findings to the outcomes of the previous empirical studies reviewed in section 2.2. With regard to the role of the base position (the question formulated in (7b)), our results show clear convergence with previous experimental data from German and Russian: in both German and Russian it was found that unaccusative subjects are easier to extract from than transitive subjects (Jurka 2013; Polinsky et al. 2013). Two differences are worth highlighting, nevertheless.

First, the effect of specificity, which, as noted on section 2.2, may have confounded previous comparisons between extractions from unaccusative and transitive subjects, was properly controlled in our study. In particular, target sentences invariably triggered a specific interpretation of the indefinite NPs that were subextracted from, independently of the type of the predicate and the (*in situ* or fronted) position of the NP. Second, what the present results from Hungarian bear on perhaps more vividly than previous findings is the issue of the (im)permeability transitive subjects that are *in situ*. As pointed out in section 2.2., in Russian transitive subjects are arguably *ex situ* not only when pre-verbal but also when post-verbal (in which case they are also focused), and subextractions from the *in situ* transitive subjects investigated in German have been argued to be degraded due to way the information structure of German interacts with processing. Hungarian post-verbal subjects are free from both of these potential complications. Therefore, the current findings corroborate more incontestably than prior empirical studies that transitive subjects are opaque even when surfacing in their vP-internal *in situ* position.

The role of aboutness topic fronting in the opacity of subjects (namely, question (7a)), to our knowledge, has not been experimentally investigated before: that aboutness topicalization does not affect the (non-)opaqueness of argument NPs is empirically demonstrated here for the first time. In Russian pre-verbal subjects are in an A-position and are not necessarily interpreted as topics

and Frascarelli 2010; for the contrastivity of German pre-V2 topics, other than those fronted by Formal Movement, see Frey 2010).

- (i) ^{?(2)}Melyik egyetemre_i szeretnéd, hogy [a lányodat]
 which university.to would.like.2SG that the daughter.POSS.2SG.ACC
 azt felvegyék _i ?
 DEM.ACC accept.SUBJ.3PL
 ‘Which university would you like your daughter to get accepted to?’
- (ii) ^{?(2)}Melyik politikussal_i szeretnéd, hogy [egy korábbi interjút _i]
 which politician.with would.like.2SG that a previous interview
 azt ne közöljenek le?
 DEM.ACC not publish.SUBJ.3PL PRT
 ‘With which politician would you like them not to publish an old interview?’

(Slioussar 2011; Bailyn 2012). Nevertheless, it is instructive to compare our finding that topic fronting does not alter the opacity of subjects and objects in Hungarian to Polinsky et al.'s (2013) results from the topicalization of objects in Russian. According to their data, fronting moderately degrades extractions from objects in Russian, as a result of which Polinsky et al. categorize pre-verbal, topicalized objects as opaque. They propose to analyze topicalized objects as adjuncts, and subextraction from them as a violation of an adjunct island.

The classification of pre-verbal objects as syntactically opaque, however, seems somewhat arbitrary. First, while *in situ* post-verbal objects are classified as transparent, the mean acceptability of pre-verbal objects is only very slightly lower, and no direct statistical comparison is made between *in situ* and topicalized objects.³³ Second, even in the pre-verbal position the mean judgment of transitive subjects is significantly lower than that of objects; a difference that remains unaccounted for if fronted objects are treated as adjunct islands and hence opaque. Third, since objects are generally interpreted as specific when topicalized, while they may be construed as either specific or non-specific when *in situ*, this alone may explain the observable difference between pre-verbal and post-verbal objects in the mean judgments of subextractions (for relevant discussion, see sections 2.2 and 4.1).

It seems more realistic therefore to categorize both post-verbal and pre-verbal objects as syntactically transparent. Such an assessment converges with our data from Hungarian, which show that the topicalization of the object does not significantly affect its transparency. This interpretation of the Russian data furthermore conforms to what is expected on the basis of our proposal that topic fronting does not lead to opacity in languages – including Russian (see Bailyn 2012: 101) – in which topicalization does not give rise to topic island effects for crossing movement dependencies.

6 Conclusions

This paper has brought empirical evidence from Hungarian to bear on the issue of the opacity of subjects to subextraction. As Hungarian permits transitive and unaccusative subjects and objects alike either to remain *in situ* or to be moved to

³³ Mean z-scores and 95% CIs: Post-verbal object: $M=0.17$, $CI=[0.08;0.26]$, pre-verbal object: 0.00 , $CI=[-0.10;0.10]$. This difference can be categorized as very small (Sawilowsky 2009; Cohen's $d = 0.14$, calculated as described in note 19). By comparison, the statistically significant difference between pre-verbal objects and pre-verbal transitive subjects is twice this size: Cohen's $d = 0.28$.

a pre-verbal topic position, it offers an ideal testing-ground of the role of the informational structural topic status in subject opacity, as well as the main alternative syntactic approaches. With regard to the latter, it allows one to examine the effects of two key factors that figure prominently in current structural accounts, and their potential interaction: namely, the syntactic movements that subjects undergo in the course of the derivation, and their base position.

The results of our rating experiment suggest that the base position of subjects is a primary factor contributing to their opacity, in which fronting to the pre-verbal position plays no role. In particular, transitive subjects were found to be opaque, while unaccusative subjects were relatively transparent and behaved on a par with objects, both *in situ* and when fronted to a topic position. These findings cast doubt on the assumption that the islandhood of subjects at large can be reduced to movement-induced freezing, whether of a generalized or of a feature-relativized variety, and they point to the need for some version of the CED that renders the specifier of *vP* – possibly *qua* a phase edge position – opaque. As both specificity and topic status were controlled in our study, such properties cannot be held responsible for the sizeable difference between unaccusative and transitive subjects either.

The fact that topic fronting leaves the opacity/transparency of each of the three argument types unaffected, rather than making them all opaque or all transparent, invites a model of syntactic derivation, such as Chomsky's (2008) phase-based theory of cyclicity, that does not limit syntactic operations on an element to its highest copy. On that approach the fact that topicalization exerts no effect on the opacity/transparency of the different arguments implies that while the base copy of the NPs that have been fronted can be targeted by subextraction, their copy in the topic position cannot. We have taken this to suggest that in the case of fronted topics, the principle of Topic Opacity must be relativized to the occurrence of the fronted phrase in the topic position.

Showing that in languages like English and German Topic Opacity holds both of fronted and base-generated topics, and both of adjunct and specifier topics, we argued that this copy-relativized Topic Opacity effect is more likely information structural, rather than purely syntactic, in nature. Assuming Chomsky's phase-based approach to cyclicity, in which base copies are available for subextraction within the same phase, the general opacity of topicalized phrases in English and German then must be related to an independent factor. We argued that it stems from the fact that in these languages a left-peripheral topic creates a topic-island for crossing movement dependencies. This proposal is hoped to offer a fruitful avenue of research on cross-linguistic differences in the islandhood of topicalized constituents.

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Part III: Interface extensions

Peter W. Culicover and Susanne Winkler

Freezing: Between grammar and processing

Abstract: We argue in this paper that ‘freezing’ phenomena do not reflect grammatical constraints, but rather processing complexity. We extend this result to the radical hypothesis that in general, judgments of unacceptability that have been taken in the literature as evidence for grammatical constraints on otherwise well-formed configurations are in fact the consequence of processing complexity and context effects. After briefly reviewing the notion of freezing, we look at the kind of evidence that has been used to argue for freezing constraints. Then we review experimental evidence that suggests that the unacceptability of certain freezing configurations is actually due to the processing effects of interacting extraction chains, and we argue that certain freezing effects are due to discourse processing factors such as information structure. We conclude with a summary and a statement of our radical hypothesis as a basis for future research.

1 Introduction

1.1 Freezing: a brief history

The idea of freezing in syntactic theory is that the reordering of syntactic material may under certain circumstances render parts of a structure closed to extraction. It has a venerable history, going back to Ross (1967, 1974); see Corver (2006, 2017) for a review.

Ross (1967) proposed the Immediate Self-Domination Principle (ISP), which said that in a structure of the form [_A A B], nothing can be extracted from B. In the Standard Theory of the time, such structures arose through movement and adjunction; hence the consequence of the ISP is that nothing can be extracted from a derived adjoined constituent.

Ross (1967: 305) also observed that extraction from a PP that has been extraposed is reduced in acceptability, as shown by (1b).

- (1) a. You saw [a picture] yesterday [_{PP} of Thomas Jefferson].
b. *Who_i did you see [a picture _{t_j]} yesterday [_{PP} of _{t_i]} ?

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Ross's (1967) formulation of the Frozen Structure Constraint in (2) deals specifically with such examples.¹

- (2) a. The Frozen Structure Constraint: If a clause has been extraposed from a noun phrase whose head noun is lexical, this noun phrase may not be moved, nor may any element of the clause be moved out of that clause. (Ross 1967: 295)
- b. If a prepositional phrase has been extraposed out of a noun phrase, neither that noun phrase nor any element of the extraposed prepositional phrase can be moved. (Ross 1967: 303)

Later, Wexler & Culicover (1980) proposed the Raising Principle (3) and the Freezing Principle (4), based on considerations of language learnability.

- (3) Raising Principle (Wexler & Culicover 1980: 143)
If a node A is raised, then no node that A dominates may be used to fit a transformation.
- (4) Freezing Principle (Wexler & Culicover 1980: 119)
a. If the immediate structure of a node in a phrase-marker is nonbase, that node is FROZEN.
b. If a node A of a phrase-marker is frozen, no node dominated by A may be analyzed by a transformation.²

Principle (3) can be interpreted as blocking subextraction from an extraposed PP, as in (1).³ There is in fact evidence that subextraction from raised constituents is unacceptable, as seen in (5).

- (5) a. *Who_i did you say that [friends of t_i]_j, you dislike t_j? [subextraction from embedded topicalization]
b. *Who_i did you say that [friends of t_i]_j t_j dislike you? [subextraction from subject]

¹ Ross's formulation of the constraint reflects the fact that it is not possible to extract from an extraposed relative clause, even though it is not in a configuration that would fall under the Complex NP Constraint. Thus we see right at the start the treatment of freezing as a special type of island phenomenon.

² The expressions "analyzed by" in (4) and "used to fit" in (3) mean "undergo".

³ In the original learnability proof, raising is understood to be movement from an embedded S into the S that immediately contains it. The cases discussed here do not fall under the Raising Principle as originally formulated.

In (5a) a constituent is extracted from a topicalized constituent. Attribution of the unacceptability in (5b) to the Raising Principle of course depends on an analysis in which the subject is raised from a lower position.

Turning to the Freezing Principle (4), it stipulates that freezing arises from a non-structure-preserving adjunction, in the sense of Emonds (1970, 1976).⁴ What condition (4b) means in practical terms is that adjunction of a constituent B to some phrase A should make it impossible to subsequently extract from anything dominated by A, including B.⁵

We give a simple illustration. In cases such as (6c), the heavy NP *a picture of who* has arguably moved from the position adjacent to the verb to the end of the VP. In (6d), extraction is from the PP over which the heavy NP moves. (t_j indicates the gap corresponding to the canonical position of the direct object.)

- (6) a. You put [a picture of FDR]_j on the table.
 b. You put t_j on the table [a picture of FDR]_j.
 c. *Who_i did you put t_j on the table [a picture of t_i]_j?
 d. *Which table_i did you put t_j on t_i [a picture of FDR]_j?

By hypothesis, the configuration [_{VP} V PP NP] is not a base configuration in English; hence it is frozen. It should not be possible to extract from any constituent of the VP, according to (4). The judgments in (6) appear to confirm this prediction.

More recently, Müller (2010, 2014) has proposed a contemporary version of the Wexler and Culicover Freezing Principle to explain the fact that extraction is not possible in German from a specifier if it is last-merged in its projection (e.g. subjects). However, extraction is possible when some other phrase scrambles over the last-merged specifier and becomes the last-merged specifier itself within the same phrase, which Müller refers to as melting.

Müller gives the data in (7) and (8) as instances of freezing and melting in German, respectively.

- (7) *Was_i haben [_{DP} t_i für Bücher] [_{DP} den Fritz] beeindruckt?
 What have [_{DP} t for books.NOM] [_{DP} the Fritz.ACC] impressed
 ‘What kind of books impressed Fritz?’

⁴ The same result follows from Ross’s ISP, cited above.

⁵ Adjunction in this sense is daughter adjunction, where B becomes a daughter of A, and not so-called Chomsky-adjunction where a new node of category A is created above sisters A and B. (cf. Ross 1967)

- (8) Was_i haben [_{DP} den Fritz]_j [_{DP} t_i für Bücher] t_j beeindruckt
 what have [_{DP} the Fritz.ACC] [_{DP} t for books.NOM] t impressed
 ‘What kind of books impressed Fritz?’
 (Müller 2010: 61(36))

On Müller’s account, *was für Bücher* in (7) is frozen, because it is last-merged in the specifier-position of vP. However, it is not frozen in (8), because the movement of *den Fritz* over it by scrambling removes the offending configuration that froze it – this is melting.

Contemporary syntactic theories, whether they are derivational or monostratal, do not permit the kinds of derivations in Ross (1967) and Wexler & Culicover (1980). For both, extraposition and heavy NP shift require rightward movement, which has been ruled out in more recent versions of syntactic theory (see the papers in Beermann et al. 1997 for discussion). Moreover, since at least Chomsky (1981), all operations in derivational theories have been stipulated to be structure-preserving, and the issue of structure-preservingness simply does not arise in a theory without movement. Hence it is impossible in contemporary approaches to syntax to derive the frozen structures that (4) is intended to rule out.⁶

Although the idea of freezing as envisioned by Ross and Wexler and Culicover may not be viable in contemporary theories, the idea of freezing as a grammatical phenomenon has persisted. For example, Rizzi (2006) (see also Rizzi & Shlonsky 2006, 2007, this volume) has proposed a notion of ‘criterial freezing’, which freezes any constituent that has moved in order to satisfy the formal checking requirements (i.e., criterion) of a head. The crucial cases of criterial freezing involve extraction of a *wh*-phrase to a position higher than its scope position, as in (9) (Rizzi 2007: 147, from Lasnik & Saito 1992).

- (9) a. Bill wonders [[which book]_i Q [John published t_i this year]]
 b. *[Which book]_i does Bill wonder [t_i Q [John published t_i this year]]

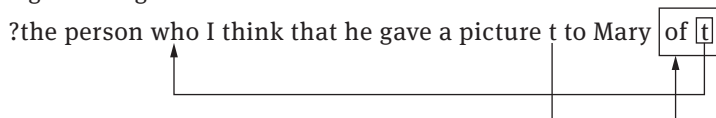
Similarly, Gallego & Uriagereka (2007) propose that constituents on the left edge of phrases are frozen with respect to further analysis.

⁶ Gereon Müller (p.c.) raises the question of whether some version could not be formulated in more contemporary terms. The key idea in the learnability proof is error detection on simple input. That is, the learner must be able to determine that s/he has hypothesized the wrong grammar on the basis of examples with limited embedding of structure. It is not clear whether it is possible to recreate error detection; an offending feature would have to be put on a node and only become visible after movement to a higher position in the structure.

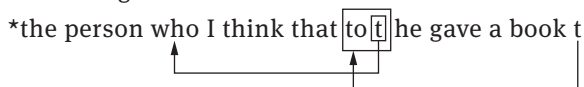
1.2 Chain interactions

Let us step back and consider the characteristics of derivations that produce freezing effects. These derivations involve subextractions from constituents that have themselves been extracted. We refer to these types of chain interactions as Right Surfing and Left Surfing.⁷ The patterns are schematized in (10).

(10) a. Right surfing



b. Left surfing



These patterns have been ruled out as ungrammatical because they violate freezing constraints in the grammar.

But it has been recognized since Chomsky & Miller (1963) and Chomsky (1965) that not all cases of unacceptability have to do with grammatical well-formedness *per se*. The classic examples involve multiple chains and center-embedding. The configuration of (11b) is the same as that of (11a).

(11) a. The cat the dog chased ate the cheese.

b. *The rat the cat the dog chased killed ate the cheese.

(11b), unlike (11a), has multiple chains in a ‘nesting’ relationship.

The unacceptability of such cases suggests that it may be the complexity of the chain interaction that is responsible for unacceptability in the freezing cases, not a grammatical constraint. This idea is made more plausible by the fact that there are other non-surfing chain interactions that can yield unacceptability. We illustrate Nesting and Crossing in (12).⁸

⁷ The term ‘surfing’ to refer to extractions from extracted constituents originates with Sauerland (1999). The idea of a chain interaction typology that we discuss here was developed in collaboration with Jutta Hartmann.

⁸ We do not intend to suggest that Nesting and Crossing will automatically yield precisely the same kinds of judgments in every instance. The psycholinguistic mechanisms of chain processing are far from being well understood, and there are well-known lexical effects that can

- (12) a. Nesting
 *the person who I think that books he gave t to t
-
- b. Crossing
 ?the book which I think that to Mary he gave t t
-

To take another case, Chomsky (1973) discusses examples that show that nested chains are not fully acceptable, and crossing chains are even less acceptable. Consider his examples in (13) – the judgments are ours.

- (13) a. ?[Which violins]_i are [these sonatas]_j easy to play t_j on t_i ?
 b. ??[Which sonatas]_j are [these violins]_i easy to play t_j on t_i ?

There have in fact been proposals in the literature attributing a variety of island phenomena to extra-grammatical factors. A particularly well-studied case has been extraction from subject. The following examples showing the variability of judgments are due to Kluender (2005).

- (14) a. Who_i does [being able to bake ginger cookies for t_i] give her great pleasure?
 b. ??What_i does [being able to bake t_i for her children] give her great pleasure?

Kluender argues that the distance of the gap from the right edge of the constituent that contains it plays a role in determining acceptability, perhaps reflecting different demands on memory in the course of processing. Other work demonstrates the role of such factors as the relatedness between the extracted constituent and the head of the subject DP, the relatedness between the extracted constituent and the main verb, and the thematic structure of the main verb (Clausen 2010; Chaves 2013; Polinsky et al. 2013). Other studies that argue for the proposition that extra-grammatical factors play a role in judgments of unacceptability of various island violations are: Arnon, Hofmeister, Jaeger, Sag & Snider (2005); Gieselmann, Kluender & Caponigro (2011); Hawkins (1994, 2004);

ameliorate judgments in otherwise complex sentences. For discussion, see Lewis, Vasishth & Van Dyke (2006) and references cited there.

Hofmeister, Jaeger, Sag, Arnon & Snider (2007); Hofmeister & Sag (2010); Hofmeister, Staum Casasanto & Sag (2013); Kluender (1991, 1992, 1998); Kluender & Kutas (1993a,b); Sag, Hofmeister & Snider (2007). Taken together, these studies suggest the following hypothesis, which forms the backdrop to this paper.

- (15) *No Freezing Hypothesis*: the unacceptability of freezing configurations, and perhaps all islands, is due to processing complexity.

In order to adequately evaluate this hypothesis, we first have to consider what the sources of unacceptability are, and on what basis it is reasonable to attribute unacceptability judgments to grammatical or extra-grammatical factors. This question is taken up in the next section.

2 What constitutes evidence for freezing?

We argue in this section that unacceptability in itself is not evidence for ungrammaticality. It is premature to attribute the unacceptability of configurationally well-formed expressions to grammatical principles without entertaining the possibility of alternative explanations.

The classical view of grammaticality is that a string of words is grammatical if it is licensed by the grammar. Licensing by the grammar involves assigning a proper structural description to the string. If the grammar does not assign a proper structural description to a given string, then the string is ungrammatical.

If there is no clear evidence that unacceptability is due to semantic anomaly or processing complexity, the default assumption in the field has been that an unacceptability judgment reflects ungrammaticality. That is, the grammar rules out the unacceptable string. However, a string of words may be well-formed except for the violation of one particular grammatical condition. For instance, in the following sentence the only problem is that there is an inflection error on the last verb.

- (16) *Everyone said that they thought that Sandy would wins the race.

Compare this example with one that has the words of a grammatical sentence in reverse order.

- (17) a. Sandy wants to climb Mount Everest.
b. *Everest Mount climb to wants Sandy.

It is clear that (16) is much better than (17b), although strictly speaking both are ungrammatical. Such observations give rise to the notion of relative grammaticality, a phenomenon that has been characterized in various ways in the literature. This was a concern early on in generative grammar (cf. Katz 1964, Chomsky 1975: Chapter V and Ross 1972), and has been taken up more recently by, for example, Featherston 2005; Sorace & Keller 2005; Staum Casasanto et al. 2010.

In considering whether there is evidence for a grammatical constraint per se, then, it is not sufficient to show that a given sentence or configuration is acceptable or unacceptable to some degree. Clear evidence for a grammatical constraint is that there is a component of the unacceptability judgment that simply cannot be accounted for in terms of extra-grammatical factors (Phillips 2013). At the same time, it must be demonstrated that this component of the unacceptability judgment does not occur when the particular configuration at issue is absent – it must be uniquely associated with the configuration.

Our reasoning here follows Occam's Razor. Given that processing and pragmatic factors have demonstrable effects on judgments of acceptability, we must do our best to rule out such factors before we conclude that certain unacceptability judgments are due to a grammatical constraint. For example, if extractions in sentences that do not satisfy the definition of freezing are nevertheless unacceptable, and in the same way as in freezing configurations, it would be reasonable to conclude that the unacceptability is due to the extraction itself, and not to a freezing configuration.

Our goal is to demonstrate that at least for the prominent cases of putative freezing introduced above, the unique association of configuration and unacceptability judgment does not hold. There are two types of evidence that we bring to bear.

Additivity: We show that the unacceptability encountered in these cases of freezing can be accounted for entirely in terms of the individual extractions. That is, there is no portion of the unacceptability that adheres specifically to freezing.

Context: We show that the judgments can be manipulated by context, so that the unacceptability cannot be attributed to the configuration but rather to discourse processing factors, such as information structure.

Section 3 shows that the unacceptability judgments in the classic Ross case of extraction from extraposition are additive, leaving no part of the judgment to be explained by a grammatical principle. This section also addresses the classic Wexler and Culicover case of extraction from heavy NP shift, with similar results. In section 4 we show that the case of freezing due to Müller (2010) (cited above) can be explained by appealing to the computation of topic and focus with and without plausible context.

3 Processing complexity

3.1 Extraction from extraposition: distance matters

In this section we cite evidence that suggests that an extraposed PP is not actually frozen. The unacceptability of extraction appears to depend on how far to the right the PP has been extraposed; cf. (18).

- (18) a. Who_i did you show [a picture *t_j*] yesterday [of *t_i*]_j to Martha at the party?
 b. Who_i did you show [a picture *t_j*] yesterday to Martha [of *t_i*]_j at the party?
 c. Who_i did you show [a picture *t_j*] yesterday to Martha at the party [of *t_i*]_j?

Our intuition is that (18a) is least unacceptable while (18c) is most unacceptable.

Our intuition agrees with the observation that increasing the distance between syntactically related linguistic units slows reading times at the point where they are integrated (cf. Gibson 1998, 2000; Grodner & Gibson 2005; Bartek et al. 2011). To confirm this intuition, we ran an experiment with English native speakers to test the hypothesis that extraposition by itself (without extraction) lowers judgments, and that as extraposition distance increases, acceptability decreases. The experiment was carried out in collaboration with Philip Hofmeister. In this experiment, as well as in the other experiments described in this paper, we collected acceptability judgments via Amazon.com's Mechanical Turk marketplace on a five or seven point scale with higher values indicating higher acceptability. 60 participants took part in the present experiment. All of them identified their location as the US and indicated that they were native English speakers. Participants received between \$1.50 and \$3 for their participation. As the present experiment is not published elsewhere, it will be described in some detail.

We constructed 24 items and manipulated the distance between an NP and the PP extraposed from it in terms of the number of phrases intervening between them within items as illustrated in (19). The head noun of the NP was separated from the syntactically and semantically related PP by zero, one, or two phrases. The three levels of the predictor distance are labelled SHORT, as in (19a), where the PP *about that actor* follows the noun phrase *a story* immediately; MEDIUM, as in (19b), where the PP occurs to the right of the adverb *anxiously* and is separated from the head noun by one phrase; LONG, as in (19c), where the PP is extraposed to the end of the clause over two phrases.

- (19) a. My friend read a story [about that actor] anxiously while having breakfast. [= SHORT]

- b. My friend read a story anxiously [about that actor] while having breakfast. [= MEDIUM]
- c. My friend read a story anxiously while having breakfast [about that actor]. [= LONG]

The three different variants of an item (cf. 19) were assigned to three different lists according to a Latin square design such that each list contained eight experimental items in each of the three conditions. 72 distractor items accompanied the experimental items. Participants were randomly assigned to one of the three lists. The instructions preceding the experiment asked participants to judge the subsequent sentences in terms of naturalness on a 5 point scale. Following each sentence, we included a comprehension question to ensure that participants read the items carefully. All participants performed better than 75% correct and were included in the analysis.

The acceptability data were subjected to a linear mixed model (LME) analysis in R with the single fixed factor distance and random intercepts and slopes for participants and items. We were interested in the course of the decrease in acceptability with increasing distance. Therefore, we used a polynomial contrast for the single three-level predictor distance (SHORT, MEDIUM, LONG), which checks for a linear and a quadratic component of the decrease (contr.poly in R). This contrast supposes that the predictor distance is taken to be an interval scaled variable with equidistant spaces from SHORT to MEDIUM and from MEDIUM to LONG (zero vs. one and one vs. two intervening phrases). Mean acceptability judgments are shown in Figure 1.

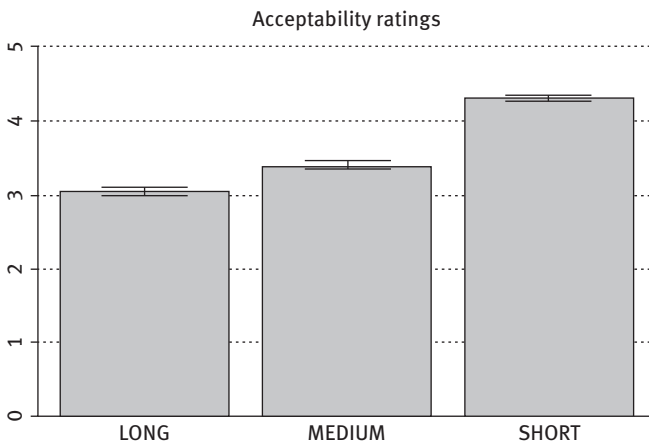


Figure 1: Mean acceptability judgments for extraposition distance. Error bars show +/- standard error.

Table 1: LME summary from Experiment 1.

	Coefficient	Standard Error	t-value
linear	0.904	0.097	9.30
quadratic	0.228	0.078	2.93

The analysis corroborates significant linear and quadratic components in the decrease of acceptability as a function of the increasing distance between NP and PP (cf. Table 1). In particular, the quadratic component confirms that the decrease from SHORT to MEDIUM distance is larger than the further decrease from MEDIUM to LONG distance. In other words, the effect of interposing a second phrase was weaker than the effect of interposing the first one.

Extraction from PP in a subject produces similar results (Huck & Na 1990). While extraction from the non-extraposed PP in subject position is slightly degraded (20b), extraction from the extraposed PP is much worse (21b). (The judgments are Huck and Na's.)

- (20) a. A picture [of that actor]_j was for sale at the market yesterday.
 b. A picture *t_j* was for sale at the market yesterday [of that actor]_j.
- (21) a. ?Which actor_i do you suppose that [a picture [of *t_i]_j] was for sale at the market yesterday?
 b. *Which actor_i do you suppose that [a picture *t_j*] was for sale at the market yesterday [of *t_i]_j?**

Furthermore, Huck & Na (1990) (see also Bolinger 1992) showed that contrastively stressing the preposition and contextualizing the contrast conveyed by the accent facilitates stranding of the preposition.

- (22) Okay, you saw a picture yesterday, but just who(m) did you see a picture yesterday OF?
- (23) a. Here's an article in the Tribune by Trevor, of all people; he's someone I'd expect to read a story in the paper ABOUT.
 b. I know Alger found letters in the file TO Chambers, certainly, but I'm not sure I can remember whom he found letters in the files FROM.
 c. I think Bill said we saw a film yesterday by Napoleon, but of course Napoleon was the fellow who(m) we saw a film yesterday ABOUT.
 d. I heard Mary took some photographs in Peoria for the director, but one has to wonder what she could find there to take photographs for the director OF. (Huck & Na 1990: 66)

Huck and Na propose that what is going on in the extraposition cases is not a matter of grammar, but of accent and contrastive focus, which are linked to discourse context.

3.2 Chain processing

If Huck and Na are on the right track, a question that arises is, Why does context make extraction from extraposition more acceptable? The beginning of an answer to this question takes note of the fact that it is not just any context that helps, but context that increases the expectation that there is an extraposed PP. In (22) the first clause contains *a picture* with no complement, and the second clause supplies the complement. In (23) the first clause sets up a contrast between the extraposed PP with one preposition, e.g. *to (Chambers)*, and the second clause has the same extraposed structure with a contrasting preposition, e.g. *from*.

So we must ask why the appropriate contrastive context improves acceptability. Our answer appeals to the idea that the sentence processor is a probabilistic parallel processor (Hale 2001, 2003; Levy 2005, 2008, 2013; Levy et al. 2012; van Schijndel et al. 2013). On this view, the total “probability mass” of the parse of a sentence is allocated over the possible alternative parse trajectories at any point in the processing. If the actual parse follows the most probable trajectory, there is minimal “surprisal”. But if the actual parse trajectory takes a course that is of low probability, there is high surprisal, and the subjective experience of difficulty, which leads to a lower ranking of the sentence.

This story raises a couple of obvious questions. One is, why does context facilitate processing? The other is, why do some parse trajectories have lower probability than others?

The answer to the first question, we suggest, is that context changes the probabilities in favor of the structure that is exemplified. This is, in effect, a form of priming. Along related lines, Levy, Fedorenko, Breen & Gibson (2012) show that surprisal, as measured by reading times and corpus frequency, is lower for an extraposed relative clause when there are cues for it in the antecedent NP. We suggest that anything that raises the expectation of a particular parse trajectory will have the effect of lowering surprisal and raising acceptability.

The answer to the second question is that surprisal is a function of frequency, and frequency is a function of complexity. It has been shown by Hawkins (2014) that more complex structures are less frequent in corpora and less likely to be licensed by the grammars of languages. Hawkins’ central assertion is that the

complexity of a dependency correlates with the length of the dependency: the longer the dependency, the more complex the dependency, and the lower the frequency.⁹

Given the foregoing, our No Freezing Hypothesis in (15) above suggests an experimental approach to judgments of unacceptability that have been attributed to freezing. Sections 3.3 and 3.4 summarize results of experiments on chain interactions in extraction from extraposition and HNPS, respectively. The results suggest that unacceptability in these cases is due entirely to processing complexity. Section 4 reviews an experiment that shows that manipulation of context can alleviate or induce unacceptability of putatively frozen structures. In all cases, it appears that there is no need to appeal to a grammatical principle of freezing.

3.3 Experiment: Extraction from extraposition

Focusing now on extraction from extraposition, we see that there are two types of dependency that are relevant. One is the *wh*-chain of the extraction, and one is the extraposition dependency. In the case of a simple extraction without extraposition, or a simple extraposition without extraction, there is one chain that must be constructed. When there is extraction from extraposition, there are two chains.

We reason, therefore, that the unacceptability of examples such as (18) is due simply to the complexity of the two chains. On this view, there is no interaction in the processing of the chains. In the simplest case, we would expect that the processing complexity of sentences with extraction from extraposition, thus the frequency and hence the rankings, would be determined by the sum of the complexity of the two dependencies.

We ran an experiment, reported on in Hofmeister, Culicover & Winkler (2015), to confirm our initial intuitions that such chain interaction causes processing complexity. The experiment determines if the acceptability judgments due to extraposition and extraction are in some way dependent on the two factors occurring together in the same examples, that is, if there is a freezing effect. A sample of the examples used in this experiment is given in (24).

⁹ An anonymous reviewer points out that Hawkins has also argued for an influence of processing on grammar. Hawkins argues that frequency effects due to processing considerations (mainly minimizing dependency length) may become grammaticalized in the limit. Thus a particular configuration that is more or less acceptable due to processing complexity in one language may be completely impossible, hence ungrammatical, in another. If Hawkins is right, it will be useful to bring to bear experimental evidence of the kind provided in this paper in order to adjudicate between grammatical and extragrammatical accounts of certain phenomena.

- (24) a. You told me your friend read a story [about an actor] twice while having breakfast. [No extraction, no extraposition]
 b. You told me your friend read a story_i twice [about an actor]_i; while having breakfast. [No extraction, extraposition]
 c. Tell me which actor_i your friend read [a story about t_i] twice while having breakfast. [Extraction, no extraposition]
 d. Tell me which actor_i your friend read [a story t_j] twice [about t_i]_i; while having breakfast. [Extraction, extraposition]

Example (24a) has neither extraposition nor extraction. Example (24b) shows extraposition without extraction, while (24c) shows extraction from the unextraposed PP. Example (24d) shows extraction from the extraposed PP. This design allows us to determine how much extraposition and extraction independently lower judgments, and whether combining the two lowers judgments beyond what is expected on the basis of each independent source of unacceptability.

Our results, as reported in Hofmeister, Culicover & Winkler (2015), showed that when combined, extraction and extraposition are additive (mean acceptability judgments are shown in Figure 2). There is no interaction: extraction is no worse in contexts with extraposition, (24d), than in contexts without, (24c).

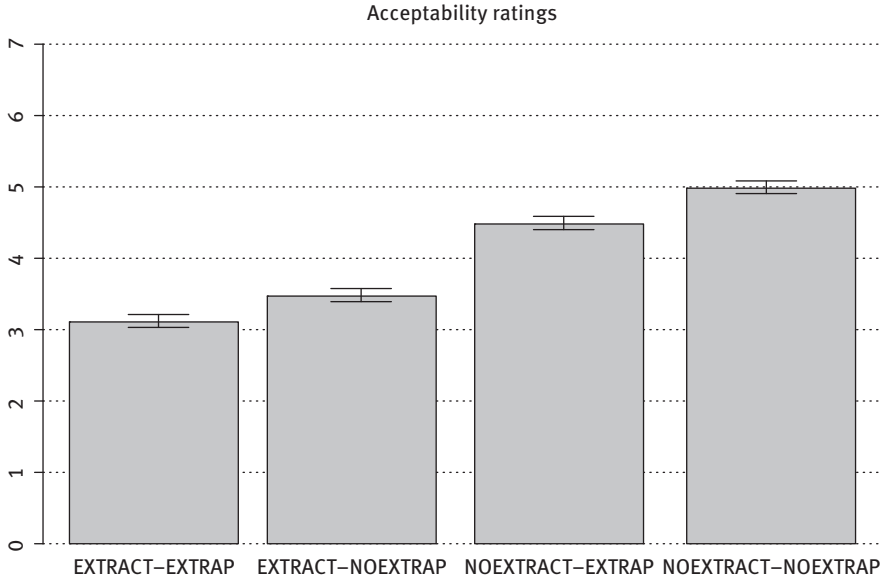


Figure 2: Mean acceptability judgments from experiment on extraction/extraposition interaction. Error bars show +/- standard error.

The freezing violations (24d) have an average rating that is predictable on the basis of the independent average penalties for extraposition and extraction. This fact, taken together with the observation in section 3.1 that chain distance plays a role in the acceptability judgments suggests that it is processing that is responsible for the judgments, and not a grammatical freezing constraint.

3.4 Experiment: Heavy NP shift

Another classic case of freezing is Heavy NP shift (HNPS). If freezing is not due to a grammatical principle, as the preceding sections suggest, we expect to find similar additivity in the case of extraction from a shifted heavy NP. This is precisely what we found, in an experiment that we summarize briefly in this section.¹⁰ We collected acceptability judgments via Amazon.com's Mechanical Turk marketplace. 96 individuals completed the survey on Mechanical Turk in the two experiments, respectively. Participants were instructed to judge the sentences in terms of naturalness on a 7-point scale, 1 being extremely unnatural and 7 being extremely natural.

For reasons discussed in the preceding sections, extraction is expected to cause some reduction in acceptability, because of the chain processing. In the case of HNPS without extraction in (6a,b), repeated below, a chain processing account is plausible. Staub, Clifton & Frazier (2006) found evidence of a processing slowdown at this point, regardless of the subcategorization properties of the verb.

- (6) a. You put [a picture of FDR]_i on the table.
 b. You put *t_j* on the table [a picture of FDR]_j.

With this in mind, we presented subjects with experimental materials varied with respect to whether or not there is extraction, as well as whether the heavy NP is shifted or not. Combining these factors yields example items like (6c), repeated here.

- (6) c. *Who_i did you put *t_j* on the table [a picture of *t_i*]_j?

In addition, we varied the material to the right of the NP. In our materials, the intervening phrases consisted of adverbial PPs, adverbs and PP arguments of the

¹⁰ See Konietzko, Winkler & Culicover (2018) for experimental details.

verb. (25)–(27) show the various conditions. In (25) for example, (25a) is the base order where the heavy NP immediately precedes the PP adverbial (non-extr. (base)). In (25b) the heavy NP follows the PP adverbial (non-extr.(shift)), and (25c) shows extraction from the heavy NP in its base position (extr.(base)). Example (25d) illustrates extraction from the shifted heavy NP (extr.(shift)). The examples in (26)–(27) show the same alternatives for a heavy NP and an adverb and a PP argument, respectively.

(25) Adverbial PPs (PP-ADV)

- a. The professor praised a detailed review of the new book in his article.
[Base order]
- b. The professor praised in his article a detailed review of the new book.
[HNPS]
- c. What did the professor praise a detailed review of in his article?
[Extraction from base order]
- d. What did the professor praise in his article a detailed review of?
[Extraction from HNPS]

(26) Adverbs (ADV)

- a. The professor praised a detailed review of the new book passionately.
[Base order]
- b. The professor praised passionately a detailed review of the new book.
[HNPS]
- c. What did the professor praise a detailed review of passionately?
[Extraction from base order]
- d. What did the professor praise passionately a detailed review of?
[Extraction from HNPS]

(27) PP arguments of the verb (DITR)

- a. The professor gave a detailed review of the new book to his colleague.
[Base order]
- b. The professor gave to his colleague a detailed review of the new book.
[HNPS]]
- c. What did the professor give a detailed review of to his colleague?
[Extraction from base order]
- d. What did the professor give to his colleague a detailed review of?
[Extraction from HNPS]

As Figures 3–5 show, HNPS lowers acceptability for all of the conditions. The differences are all significant – see Konietzko et al. (2018). Examples

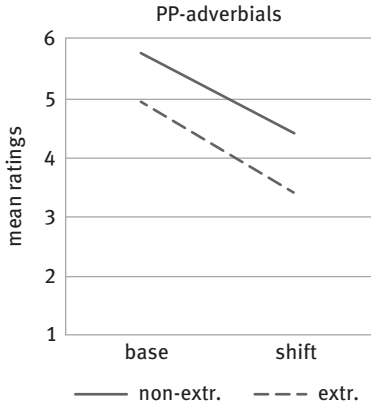


Figure 3: Mean acceptability judgments for shift over PP-adverbials, with and without extraction from heavy NP.

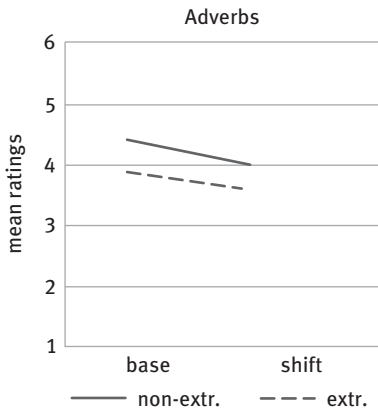


Figure 4: Mean acceptability judgments for shift over adverbs, with and without extraction from heavy NP.

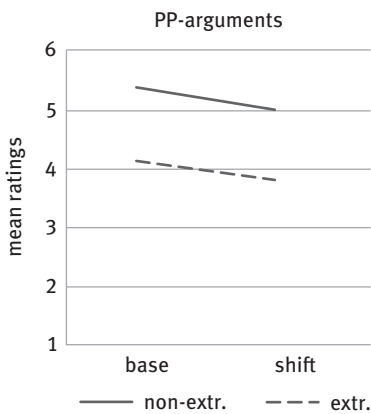


Figure 5: Mean acceptability judgments for shift over PP-arguments, with and without extraction from heavy NP.

like (25a,c), (26a,c) and (27a,c) are judged to be worse than examples like (25b,d), (26b,d) and (27b,d). Extraction lowers judgments in all conditions. Examples like (25c,d), (26c,d) and (27c,d) receive lower ratings than examples like (25a,b), (26a,b) and (27a,b). However, HNPS is no worse in contexts with extraction than in contexts without.

We do see differences in the effect of HNPS in what is shifted over. Sentences with final adverbs are judged to be not as good as sentences with final adverbial PPs. (We speculate that this is due to the fact that the preferred position for the adverbs is preverbal.) HNPS has a significantly larger negative effect on the judgment of the PP adverbials than the adverbs.

Similarly, sentences with final PP arguments are judged to be not as good as sentences with final PP adverbials. Again, HNPS has a larger negative effect on the judgment of the PP adverbials than the PP arguments.

In all conditions, the effect of extraction is independent of the effect of HNPS; there is no significant interaction. The judgments in each condition are additive. The mean acceptability judgments for extraction from the shifted heavy NP in the individual conditions are not significantly different from the sum of the acceptability conditions for HNPS and extraction alone. In fact, while the interaction is slightly superadditive in the PP adverbial condition, it is underadditive in the adverb and PP argument conditions.

Thus, the current results support the *prima facie* case against a grammatical account of freezing. The more plausible explanation, it seems, is that the judgments are due to the processing of multiple chains.

There are, of course, alternative explanations depending on the analysis of HNPS, but these do not bolster the case for a grammatical freezing principle. For example, it might be that HNPS is a base order. This would make the question of freezing moot, since without movement it would not be frozen in the conventional sense.¹¹

3.5 Discussion

Summarizing to this point, we see that for two classical cases of freezing, the experimental evidence does not provide support for a grammatical constraint.

¹¹ Alternatively, we might suppose that the heavy NP is in a Spec position and the rest of the VP moves over it to the left, as in Larson (1988) (but see Jackendoff 1990). In this case the NP would also be in situ, and a freezing account would not explain the reduced acceptability of extraction from the NP. The Larsonian account does not result in freezing of the larger VP that contains the heavy NP, the V and other material, since it assumes a local structure-preserving movement.

The case of extraction from extraposition purports to be freezing due to ‘raising’ – it is subextraction from a raised constituent. The evidence thus suggests that the Raising Principle is not descriptively adequate. Rizzi (2006, 2007, 2014) arrives at similar conclusions in his formulation of criterial freezing – the raised constituent cannot be moved beyond the criterial position, but subextraction can apply to the raised constituent.

In the case of Heavy NP Shift we have evidence that data that had been explained by the Freezing Principle itself must have an alternative account. As noted above, the non-structure-preserving movement of the heavy NP is not licensed in contemporary syntactic theories. Furthermore, the experimental results suggest, again, that the unacceptability of extraction from the heavy NP is a function of the chain dependencies, and not the configuration of the VP.

4 Context

4.1 Müller 2010: *was-für* split

We turn now to another case of freezing, *was-für* split, which we introduced briefly in section 1.1. We provide evidence that in this case the lack of appropriate context is responsible for the unacceptability of the frozen examples, not the syntactic configuration.

The *was-für* ‘what for’ construction in German consists of *was-für* plus N(oun) and is usually translated as ‘what kind of DP’ as in (28).

(28) *was-für*

[_{DP} Was für Bücher]_i hat er _{t_i} kritisiert?
 [_{DP} what for books] has he _t criticized
 ‘What kind of books did he criticize?’

One specific feature which is central to the present discussion is that the wh-element *was* ‘what’ can be subextracted out of the DP-constituent, as in (29).

(29) *was-für* split

Was_i hat er [_{DP} _{t_i} für Bücher] kritisiert?
 what has he [_{DP} _t for books] criticized
 ‘What kind of books did he criticize?’

This phenomenon, called *was-für* split, was first observed by Bennis (1983) and den Besten (1985).

The puzzle that we focus on is described by Müller (2010). Müller's freezing account represents the classical syntactic view that a certain grammatical configuration causes freezing. He updates the original freezing principle by Wexler & Culicover (1980: 119) by formulating a general constraint in terms of configuration, rather than extraction.

Müller (2010:61) gives the data in (30) and (31) as instances of freezing and 'melting' in German, respectively.

(30) *Was_i haben [_{DP} t_i für Bücher] [_{DP} den Fritz] beeindruckt?
 What have [_{DP} t for books.NOM] [_{DP} the Fritz.ACC] impressed
 'What kind of books impressed Fritz?'

(31) Was_i haben [_{DP} den Fritz]_j [_{DP} t_i für Bücher] t_j beeindruckt?
 what have [_{DP} the Fritz.ACC] [_{DP} t for books.NOM] t impressed
 'What kind of books impressed Fritz?'

According to Müller, (30) is marked – and in his view ungrammatical – since *was-für* extraction takes place from a frozen configuration, here the last-merged subject in vP, *was für Bücher*. However, (31), where the freezing configuration has been removed by subsequent merging of the direct object above the subject, is deemed grammatical. Müller calls this process melting, defined as in (32).

(32) Melting

Local scrambling in front of what would otherwise qualify as a last-merged specifier renders the specifier transparent for extraction. (Müller 2010: 35)

(31) is an instance of melting, here brought about by a local scrambling operation, which moves *den Fritz* to a position higher in the structure than *was für Bücher*.

Müller further suggests (2010: 61, fn. 35) that freezing effects occur not only with psych-verb subject extractions like *beeindrucken* ('impress'), but also with regular transitive verbs, such as *kritisieren* ('criticize') in (33).

(33) Freezing

*Was_i haben [_{DP} t_i für Ärzte] [_{DP} den Minister] kritisiert?
 What have [_{DP} t for doctors.NOM] [_{DP} the secretary.ACC] criticized
 'What kind of doctors criticized the secretary?'

Müller's proposal also predicts that if the definite DP *den Minister* is scrambled over the subject and adjoined to the highest vP, grammaticality is restored; cf. (34).

(34) Melting

Was_i haben [DP den Minister]_j [DP t_i für Ärzte] t_j kritisiert?
 what have [DP the secretary.ACC] [DP t for doctors.NOM] t criticized
 ‘What kind of doctors criticized the secretary?’

Our intuition about this data, and specifically about the putative ill-formedness of example (33), is that it is not a matter of a grammatical constraint. Rather, there is an interaction between the constituent order, the default assignment of sentence accent, and extraction. The key to the interaction is that in the absence of context, the default accent in German falls on the immediate preverbal constituent. This constituent is interpreted by default as the focus. Extraction from focus is well-formed, while extraction from a non-focus is not.

Context can be used to manipulate the placement of focus on different constituents of a sentence. Our hypothesis is that contrastive focus on *Ärzte* and backgrounding *den Minister* raises the expectation of a particular parse trajectory (see section 3.2). It thereby lowers surprisal and increases the judgment. Hence extraction, given the same constituent order and constituent structure, may receive different judgments in the absence of context and in the presence of context that shifts the position of focus reliably onto the subject. The consequence of this interaction is that in the absence of context, *was-für* split from a subject is understood as extraction from a non-focus constituent, which produces an information structure conflict, and hence ill-formedness.

4.2 Information structure constraints in German

In order to give substance to the intuition noted at the end of the previous section, we summarize here three constraints that govern the interpretation of accent in German. They are summarized in (35).

- (35) DEFFOC: Assign default focus to immediate preverbal position.
 DESTRESS: Destress Given
 EXTRACT: A' extract only from a focused constituent.

The first constraint, DEFFOC, was first formulated by Höhle (1982) for declarative sentences. It has subsequently been used as a diagnostic criterion for wide focus readings (cf. Haider & Rosengren 2003; Reis 1993; Selkirk 2011; Truckenbrodt 1995, among others). A schematic representation of the default intonational pattern in German declaratives is given in (36), where we distinguish the different fields according to their information-structural contribution. The H*+L accent is

the default accent realized on the immediate preverbal DP. The particle *denn* is a diagnostic for the left edge of vP and plays a central role in locating the precise position of the focal accent in the structure.

- (36) H*L
 [CP... [TP...<topic field>... [vP (denn) [vP ...<focus field>...] V_{fin}]]]

In (37), we show that DEFFOC applies to regular V-final patterns in German. The same constraint accounts for the default intonation of the embedded *was-für* split construction in (38a), as it does for the V2 *was-für* split construction in (38b). In each of these examples the DP *Bücher* ('books') receives the default focus, indicated by full capitalization.

- (37) warum er (denn) BÜCHER gelesen hat
 why he PRT books read has
 'why he then read books'
- (38) a. Ich wollte wissen, was er (denn) für BÜCHER gelesen hat
 I wanted to.know what he PRT for books read has
 'I wanted to know what books he read'
- b. Was hat er (denn) für BÜCHER gelesen
 what has he PRT for books read

The second constraint, DESTRESS, requires the deaccentuation of old information in discourse. Such a constraint has been explicitly proposed by Féry & Samek-Lodovici (2006), but observed before by Chomsky (1971); Culicover & Rochemont (1983); Ladd (1980), Rochemont (2013a), Rochemont (2013b); Rochemont (2016), Schwarzschild (1999), among many others.

The third constraint, EXTRACT, is a reformulation of Bayer's (2004) generalization in (39); see also Erteschik-Shir (2007).

- (39) In a topic/focus structure [[_{TOP} X] [_{FOC} Y]], A'-movement is not allowed to affect X.

Bayer investigates subject/object asymmetries in long extractions and observes that the opposition is not one of grammatical function (subject vs. object), but a difference in information structure (IS) status. He distinguishes the topic domain and the focus domain and argues that elements cannot be extracted from the topic domain (cf. Bayer 2004: 238).

In section 4.3 we summarize the results of a rating study that suggest that these constraints are in fact responsible for acceptability judgments of the word order patterns in *was-für* construction.

4.3 Experiment: Extraction from *was-für*

The experiment that we summarize in this section is discussed at greater length in Winkler, Radó & Gutscher (2016). The goals of the experiment were (i) to demonstrate that judgments on examples such as (33) are graded, and (ii) to demonstrate that the IS-based constraints discussed in section 4.2 can explain the gradient character of the freezing-melting phenomenon.

The core cases of freezing, melting and extraction from a moved subject are provided in (40). They are based on some of Müller's (2010) examples. However, in contrast to the examples we discussed earlier in (31) and (33), they involve the particle *denn*, which clearly identifies the boundary between the topic and the focus field (cf. Bayer 2012; Bayer & Obenauer 2011; Grosz 2016). Through the position of *denn* we can exactly identify the position of the subject remnant; otherwise the freezing case (40a) and the subject movement case (40c) would be indistinguishable.

- (40) a. No movement [NM]
 *Was_i haben denn [_{DP} t_i für Ärzte] [_{DP} den Minister]
 What have Prt [_{DP} t_i for doctors.NOM] [_{DP} the secretary.ACC]
 kritisiert?
 criticized
 'What kind of doctors criticized the secretary?'
- b. Object movement [OM]
 Was_i haben [_{DP} den Minister] denn [_{DP} t_i für Ärzte] t_j
 What have [_{DP} the secretary.ACC] Prt [_{DP} t_i for doctors.NOM] t_j
 kritisiert?
 criticized
- c. Subject movement [SM]
 *Was_i haben [_{DP} t_i für Ärzte] denn [_{DP} den Minister]
 What have [_{DP} t_i for doctors.NOM] Prt [_{DP} the secretary.ACC]
 kritisiert?
 criticized

The three different *was-für* patterns are given schematically in (41). Since all three patterns involve wh-extraction from the subject position, we represent the word

order patterns prior to this operation for simplicity. We refer back to (41) in our analysis below.

- (41) [_{CP} ... wh [_{TP} ...<topic field>... [_{VP} (denn) [_{VP}...<focus field>...] V]]]
- a. No Movement (NM) ⇒ Müller's Freezing
* [_{CP} [_{TP} (denn) [_{VP} Subj Obj] V]]
 - b. Object Movement (OM) ⇒ Melting
[_{CP} [_{TP} Obj_i (denn) [_{VP} Subj t₁] V]]
 - c. Subject Movement (SM) ⇒ Control Condition; Freezing
* [_{CP} [_{TP} Subj_i (denn) [_{VP} t₁ Obj] V]]

In Müller's terms, wh-extraction from Subj in (41a) is from the last merged subject. We refer to it as the 'no movement' (NM) case since both the subject and object are in their base position in vP. This is the configuration Müller defines as freezing. Wh-extraction from Subj in (41b) is again from the subject in vP. The difference here is that the object is scrambled to a position to the left of the modal particle *denn*. We refer to this instance as the "object movement" (OM) case. Note that the subject is the only argument left in the vP. From a linear perspective, it occurs immediately preverbally. This is the so-called "melting" configuration.

In (41c), extraction is from a moved subject. The subject moves out of the focus field into the topic field prior to wh-extraction. This case is called "subject movement" (SM). For our experiment, this configuration serves as a control. It is a structure that is characterized as extraction from a moved subject. In contrast with the NM-case of (41a), (41c) constitutes a prototypical case of freezing of the Ross/Wexler and Culicover variety.

Following this perspective, the NM-structure (41a) is not frozen, but victim to processing difficulties and therefore marked relative to the OM-case (Müller's melting, 41b). Constraint satisfaction accounts of sentence processing assume that all possible analyses of a sentence structure are activated at the same time (cf. MacDonald 1994). However, the level of activation depends on the support that the different analyses receive from the constraints relevant to processing the sentence, here the constraints in (35). The core challenge is that information structural, prosodic and syntactic constraints lend support to different possible ways of analyzing the sentence structure at different points of analysis. Only in the OM-case (41b) do the constraints in (35) point to the same processing alternative throughout the sentence. The scrambled object is given, default focus is assigned to the subject, extraction occurs from the focused subject. In the no movement (41a) and the subject movement (41c) cases, competing analyses receive similar amounts of expectation and leave the parser with a greater processing burden (see Winkler et al. 2016).

One major argument against the configurational view of freezing is that the acceptability judgments may change if context is provided. More specifically, our account predicts that the degraded status of Müller's freezing case should be improved by a suitable context.

The essential idea is that a DP in immediate preverbal position in German is by default accented and focus, as discussed in section 4.2. In the absence of context, a sentence such as (40a) with this implicit intonation is interpreted with focus on the immediate preverbal constituent. Extraction from *was für Ärzte* is thus from a constituent not in focus, in violation of the constraint EXTRACT. However, if context forces the implicit accent and the focus interpretation onto *was für ÄRZTE*, extraction will not violate this constraint and thus should be acceptable.

With this in mind, we designed an experiment in which we manipulated word order (NM vs. OM vs. SM) and default focus (DF) vs. contrastive focus (CF) on the subject, induced by a preceding context, yielding a total of six conditions, as illustrated in (42a)–(43c).

(42) DF

Sag mal ('Say,'):

- a. Was haben denn für Ärzte [den Minister]_{DF} kritisiert?
- b. Was haben den Minister denn [für Ärzte]_{DF} kritisiert?
- c. Was haben für Ärzte denn [den Minister]_{DF} kritisiert?
'what have for doctors.NOM then the minister.ACC criticized'

(43) CF

Dass den Minister Journalisten kritisiert haben, weiß ich schon, aber
('I know already that journalists criticized the minister, but ')

- a. Was haben denn [für Ärzte]_{CF} den Minister kritisiert?
- b. Was haben den Minister denn [für Ärzte]_{CF} kritisiert?
- c. Was haben [für Ärzte]_{CF} denn den Minister kritisiert?
'what have for doctors.NOM then the minister.ACC criticized'

We constructed 18 experimental items like those in (42)–(43). The particle *denn* was used to mark the boundary between the topic and the focus field. We selected simple transitive verbs to avoid potential problems with establishing the base position of the direct object. The *was-für* phrase was always the subject DP. In the CF context conditions, the target sentences were preceded by a subordinate clause that introduced the direct object of the matrix clause, as well as an alternative to the matrix subject (e.g., 'journalists' in the example in (43)). This manipulation forced contrastive focus on the matrix subject, while

making the direct object “given”. In the no-context conditions, the sentences were introduced by the phrase *Sag mal*, (‘Say,’), since complex sentences such as those used in our experiment may sound less natural without any lead in at all, especially in comparison to the contrastive context versions.

We expected object movement in the absence of context to be rated best, because the *wh*-extraction is from the immediate preverbal constituent, which is the focus, as we discussed in section 4.2. Subject movement should be the worst, because it involves extraction from a topic, in violation of EXTRACT; moreover, this case is an instance of Left Surfing; there are two chains. And the no movement condition should be intermediate, since the only conflict is that the gap is not in the default focus constituent.

With context establishing the object as given and the subject as contrastively focused, however, no change is expected in the OM-condition, since context supports the analysis that was the most highly activated in the first place. In contrast, the NM- and SM-conditions should improve significantly. The SM-condition is still expected to be more degraded, since although it does not involve an information structure conflict, it does have a chain interaction, similar to that discussed above in connection with extraction from extraposition.

The results of our experiment are summarized in Figure 6; see Winkler et al. (2016) for discussion of the methodology and statistical analysis.

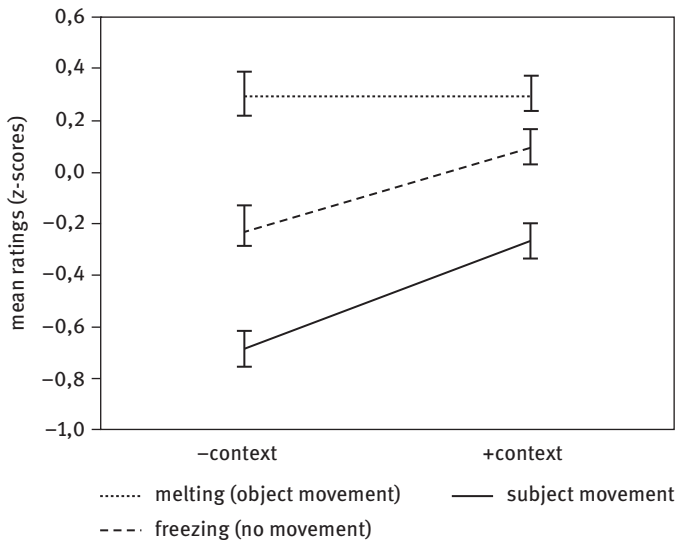


Figure 6: Mean normalized ratings per condition. Error bars show the 95% confidence interval.

We see that the results come out as predicted, and are very robust. In the absence of context, the construction with the direct object outside the VP and the split subject remaining in the focus field (42b) was significantly better than the condition where both subject and object were inside the VP (42a). Focus assignment in the latter case was ambiguous because of conflicting IS constraints. The worst configuration, however, was the one where the subject phrase containing the trace of the *was-für* element appeared outside the VP in the topic field (42c). Here, in addition to conflicts between the IS constraints, the occurrence of *denn* to the right of the subject phrase signals that the subject has been displaced into the topic field. Here, extraction occurred out of a topic which has been moved from its base position and therefore further complicated processing.

As predicted, context that places contrastive focus on the subject guided the interpretation in (42a). Context also improved subject movement (42c), but the construction was still clearly suboptimal, since parsing the structure involves two IS constraint violations in any case. Note that the best case, object movement (42b), did not benefit from the contrastive context at all. This is predicted by our account since the construction can already be parsed unambiguously without guiding context. Even in the absence of context, the analysis in which focus is assigned to the preverbal subject remnant is clearly the most probable one. The lack of improvement cannot be explained by a ceiling effect: the OM-conditions were still rated considerably worse than the highest rated fillers.

Interestingly, the context that placed contrastive focus on the subject was not sufficient to make the NM-condition (42a) as good as the OM-condition (42b). Although the context clearly supported the analysis where the subject remnant is focused and increased probability, the competing analyses were apparently still available. This is because the contrastive context is just one of the relevant factors that jointly determine the probability of a given analysis. We hypothesize that the high probability that analysis (42a) received made the alternative analyses dispreferred, yet their (lower) probability still resulted in a certain additional processing load, which led to the perception of markedness. Processing the OM-sentence in (42b) did not face these problems.

Our evidence supports an alternative approach to Müller's (2010) freezing vs. melting opposition in *was-für* extractions. More specifically, it suggests that a purely syntactic account cannot describe the phenomenon properly. Rather, the results support the information structural hypothesis that context dependent contrastive focus on the subject facilitates extraction. The reason is that context can correct violations of the information structural constraints;

it enhances interpretability and increases processing ease. As we have demonstrated, the degraded status of the freezing structure in (42a) relative to its melting counterpart (42b) reduces when presented to the reader in a suitable context. The rating of the melting case does not change in context since it fulfills all the IS constraints. A purely syntactic explanation does not predict this.

5 Conclusion and a radical hypothesis

More generally, we have found that the freezing phenomena that we have been able thus far to study experimentally appear to be artifacts of processing complexity, construed generally. In the case of extraction from extraposition and HNPS, the effect seems to arise from processing multiple chains, plausibly placing demands on gap identification, memory and integration across chains. Among the relevant factors appear to be dependencies and dependency length, and chain interactions. The types of chain interactions that lead to processing complexity involve surfing, as in the freezing cases, but also nesting, as in self-embedding, and crossing.

In the case of *was-für* split, the freezing/melting effects appear to arise from the requirement that the processor correctly predicts the gap, given discourse conditions. And when there is a true chain interaction, stronger unacceptability follows.

No doubt there are other factors that contribute to unacceptability. But, crucially, we have encountered no evidence yet that suggests that there needs to be a grammatical definition of freezing (or melting) configurations *per se* or a grammatical constraint that specifically blocks extraction from such configurations.

This leads us to strengthen our original No Freezing Hypothesis, as follows.¹²

(44) *Radical Unacceptability Hypothesis*: All judgments of reduced acceptability in cases of otherwise locally well-formed extractions are due to processing complexity, not grammatical constraints.

There is, interestingly, a precedent for seriously entertaining such a possibility: “... one might propose that once process models are developed we will find that

¹² For speculation along the same lines, see Chaves (2012).

all relevant facts are explained without any abstraction to a rule system that articulates the speaker-hearer's knowledge of his language. This thesis might prove correct ... ” (Chomsky 1976).

Of course, as Chomsky took pains to note, in order to evaluate such a proposal seriously, it must be made explicit and it must be based on independently motivated theories of processing. There has been progress along these lines, e.g. Gibson (1990, 1991, 1998, 2000); Kluender (2005); Kluender & Kutas (1993b); Lewis (1993, 1996); Lewis & Vasishth (2005); Lewis, Vasishth & Van Dyke (2006) among others. But we are not yet at the point where we can predict with accuracy the judgments of native speakers on arbitrary sentences simply on the basis of a processing model. We take the development of such a model as a long-term goal, one that is informed by the types of data addressed in this paper.

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Andreas Konietzko

Heavy NP shift in context: On the interaction of information structure and subextraction from shifted constituents

Abstract: The study investigates whether context affects subextraction from heavy DPs, both in situ and ex situ (HNPS). The study provides evidence that the contextual factors *givenness* and *newness* play a crucial role in licensing subextraction, while ordering preferences such as given>new are less decisive for the acceptability of subextraction. Experimental evidence suggests that subextraction receives contextual support if the heavy DP is discourse new irrespective of whether the heavy DP is in situ or shifted. Provided that *newness* is typically associated with focus, the study provides new evidence for the sensitivity of extraction to information structure. In particular, evidence is provided for the hypothesis that extraction takes place from focused and is dispreferred from discourse given constituents, which are identified as the relevant information-structural domains for subextraction from heavy DPs.

Keywords: heavy NP shift, (sub)extraction, information structure, heaviness, given-new distinction, principle of end weight

1 Introduction

The interaction of extraction with information structure has been a matter of much debate since the beginning of the discussion on island constraints (Erteschik-Shir 1973; Allwood 1976; Erteschik and Lappin 1979; Bayer 2004; Goldberg 2006; Boeckx 2012; Newmeyer 2016, among many others). Although information-structural domains have been claimed to be relevant for extraction phenomena, the precise formulation of this interaction is still a research desideratum. In particular, it is not clear which information-structural domains are relevant for extraction and whether they are the same for different types of movement (i.e. *wh*-movement, topicalization, relativization). Also, it is not clear whether the same information-structural restrictions hold for extractions and subextractions. This paper aims to add to this debate by investigating subextraction from DPs, in particular, DPs that qualify for heavy NP shift (HNPS). HNPS belongs to the set of focus constructions as defined by Rochemont and Culicover (1990). From the point of view of subextraction, HNPS is particularly relevant because subextraction from shifted constituents

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falls under the Freezing Principle (Wexler and Culicover 1980: 119). Under the Freezing Principle, subextraction from HNPS should be ruled out. There is, however, a growing body of research which suggests that Freezing is not a grammatical constraint (Hofmeister, Culicover, and Winkler 2015; Winkler, Radó, and Gutscher 2016; Chaves, this volume). The present study compares subextraction from heavy DPs in situ to subextraction from shifted heavy DPs (HNPS). The goal is to establish to what extent subextraction from heavy DPs is sensitive to context and what the relevant information-structural domains are for subextraction from this construction.

HNPS refers to the reordering of arguments in the post-verbal domain (Arnold et al. 2000; Wasow 2002; among others). The following data from Arnold et al. (2000) illustrate the phenomenon:

- (1) a. The waiter brought [_{DP} the wine we had ordered] to the table.
 b. The waiter brought to the table [_{DP} the wine we had ordered].

The example in (1a) exhibits the base order, where the direct object is adjacent to the verb. In (1b), the direct object has been shifted across the goal-PP. This operation is dependent on the weight of the shifted constituent. In (1b), the shifted DP contains a relative clause modifier, which contributes to the heaviness of the whole constituent. In cases where the DP contains less material, the shift operation yields less felicitous results, as the data in (2), adapted from (1), show:

- (2) a. The waiter brought the wine to the table.
 b. ??The waiter brought to the table the wine.

The example in (2b) is highly marked and improves only if the shifted DP is accented (cf. Rochemont and Culicover 1990), which results in a contrastive focus interpretation:

- (3) The waiter brought to the table the WINE, not the BEER.

It has been claimed in the literature (Wexler and Culicover 1980) that HNPS renders the shifted DP opaque for extraction. In fact, subextraction from HNPS has been considered one of the core cases to fall under the Freezing Principle (Wexler and Culicover 1980), which states that:

- (4) a. If the immediate structure of a node in a phrase-marker is nonbase, that node is frozen.

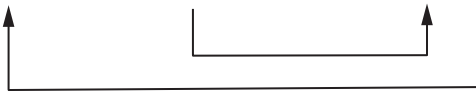
- b. If a node A of a phrase-marker is frozen, no node dominated by A may be analyzed by a transformation. (Wexler and Culicover 1980: 119)

Consider the following data from Konietzko, Winkler, and Culicover (2018) which show that subextraction from a heavy DP in situ is fine while subextraction from a shifted constituent is highly marked. The example in (5a) contains subextraction from a heavy DP in situ. In (5b), by contrast, subextraction has taken place from a shifted DP. Subextraction from HNPS contains the formation of two different syntactic chains, one caused by the shift operation, the second caused by the extraction operation. The data show that subextraction from HNPS leads to a highly marked result¹:

- (5) a. Who_i did you put [a picture of t_i] on the table? [extraction, no HNPS]



- b. ??Who_i did you put t_j on the table [a picture of t_i]_j? [extraction, HNPS]



The goal of this paper is to investigate subextraction from HNPS in more detail. The investigation will draw from the results presented in Konietzko, Winkler, and Culicover (2018), who argue against the assumption that the Freezing Principle is a purely syntactic constraint. If this is so, it is expected that subextraction from HNPS should improve if a context which licenses the construction is provided. In this study, I will therefore look more closely at potential contextual licensing conditions for subextraction from HNPS. The paper is organized as follows: Section 2 discusses recent treatments of Freezing from extraposed and shifted constituents. Section 3 gives an overview of the factors which facilitate HNPS in more general terms. This discussion will serve as the basis to formulate hypotheses with respect to potential context effects for subextraction from HNPS. Section 4 discusses experimental evidence for the effect of context. Section 5 discusses and summarizes the results.

¹ An anonymous reviewer points out that the markedness of (5b) might also be partly due to a potential gardenpath with the *wh*-phrase being wrongly interpreted as the complement of *put*. Although the misparse might influence the acceptability, the sentence remains marked under the correct parse.

2 Subextraction from HNPS, Freezing, and markedness

Recent approaches to Freezing have revealed that Freezing is not a purely syntactic phenomenon. Hofmeister, Culicover, and Winkler (2015) and Konietzko, Winkler, and Culicover (2018) provide experimental evidence showing that the acceptability of subextraction from extraposed constituents and from constituents that underwent HNPS is the additive effect of the cost for extraposition and the shift operation, respectively and the additional cost for the extraction operation.² This result is stable for HNPS in three different environments: HNPS across PP-adverbials, adverbs, and PP-arguments. Under this view, there is no specific penalty for subextraction from frozen constituents. Rather, the acceptability judgments for subextraction from displaced constituents are the result of the two movement operations (extraposition/HNPS and extraction) which independently lower judgments. Under this view, there is no grammatical principle that rules out Freezing configurations. Therefore, subextraction from HNPS might improve under appropriate discourse conditions as the markedness of this configuration might be rooted in the fact that it needs a very specific context to be licensed. The notion of markedness is typically related to context in a very specific way (Höhle 1982). According to Höhle, marked structures are felicitous in fewer contexts. Markedness increases if less contexts are available in which a form can occur. Under this view, a marked structure has of course a very specific context in which it is felicitous, which means that it is highly context sensitive.³ The higher the degree of markedness of a structure, the fewer contexts are available to license it (Höhle 1982). The research question to be explored in this study then is to what extent such highly marked structures are licensed by context and what kind of contexts can potentially license them.

The assumption that context should improve judgments for subextraction from HNPS faces two challenges. First, it is not clear what contextual factors may potentially contribute to the licensing of subextraction from shifted

² An anonymous reviewer doubts that *wh*-movement per se leads to lower acceptability pointing out that, for instance, interrogative clauses where a DP undergoes *wh*-movement are not necessarily less acceptable than their declarative counterparts. The studies by Hofmeister, Culicover, and Winkler (2015) and Konietzko, Winkler, and Culicover (2018), which report decreased acceptability for *wh*-movement, involve cases of subextraction from DPs and PPs. Subextraction might lead to a higher degree of markedness than standard *wh*-movement, which might explain the observed lower ratings for *wh*-movement in these cases.

³ I am grateful to an anonymous reviewer for bringing this point to my attention.

heavy DPs. This is so, because HNPS is subject to various conditions such as, e.g., heaviness and newness that may also interact with each other (Arnold et al. 2000; Wasow 2002). Note also that subextraction from HNPS results in a highly complex structure with two independent chain formations in the syntax. Given this state of affairs, it is conceivable that such configurations will actually show less sensitivity to context. The reason might be that each of the operations that add to the markedness (HNPS and extraction in our case) comes with its own specific context requirements that are difficult or impossible to satisfy at the same time. It is also possible that one type of reordering imposes a stronger restriction on the context than the second type of reordering. The weaker context requirement might be overridden if the stronger requirement is contextually satisfied. Moreover, some of the operations, in particular HNPS, might be subject to conditions which are not purely context sensitive, and heaviness might in fact be such a condition. Before I present contexts that might improve subextraction from shifted HNPS, I will discuss factors which affect HNPS in the first place.

3 Factors affecting heavy NP shift

Arnold et al. (2000) investigate the influence of the factors ‘heaviness’ and ‘newness’ on the ordering of post-verbal constituents in English. In principle, both factors could influence the shifting of a constituent to the right, as heavy material tends to be realized at the end of a sentence (this observation goes back to Behaghel 1909/1910, 1930, see also Quirk et al. 1972). The same is true for new material. They also investigate the interaction of the two factors. Their main finding is that both factors influence the ordering of post-verbal constituents and contribute to HNPS, based on corpus data. Both factors also contribute to ordering of constituents in the dative alternation, here based on corpus data and experimental data. Although these data provide an explanation under what conditions reordering of post-verbal constituents is facilitated, it is still an open question whether shifting is preferred to non-shifting and how context information relates to reordering. To test these questions, the present study reports an experiment where the length of the heavy NP was kept constant across the SHIFT conditions. This design allows us to determine the direct cost of the shift operation. Moreover, both word orders were presented with two different types of context to investigate to what extent context affects the reordering. This experimental set-up allows us to determine the relative strength of the structural factors such as reordering and heaviness and contextual factors such as givenness and

newness, and the interaction of these. The background for our experiment are the studies by Arnold et al. (2000) and Konietzko, Winkler, and Culicover (2018). The latter study reports that without context HNPS is generally dispreferred compared to the non-shifted word order. This suggests that HNPS is generally a costly operation.

4 Subextraction from shifted heavy DPs in context

In this section, I will introduce the experimental design of the study and spell out the context manipulation in more detail. In 4.1, the experimental conditions for non-extractions are discussed, 4.2 introduces the design for the extraction conditions.

4.1 Context manipulation for non-extractions

The experimental study directly targeted the discourse status of the heavy DP. In particular, sentences where the heavy DP was partly discourse given were compared to sentences in which the heavy DP was discourse new. The data in (6)-(7) illustrate the context manipulation for non-extractions. In example (6), the heavy DP in the target sentences (6a,b) *a detailed review of the new book* is partly given because the DP *a new book* is already mentioned in the preceding context. Consequently, the DP is definite in the target sentences. The context manipulation is such that only a part of the heavy DP is given. If the heavy DP was mentioned in the context as a whole, there would be a strong preference to pronominalize it in the target sentences to avoid an unnaturally sounding repetition of the whole DP. The PP *in an article* is not mentioned in the context, hence discourse new. Consequently, it contains an indefinite DP. In the context in (7), the heavy DP is discourse new and the DP *new book* is indefinite. The PP *in his article* is discourse given. Therefore, we used the possessive pronoun in the target sentences. The two examples (6)-(7) thus exhibit a complementary partition with respect to the discourse status on the heavy DP and the PP *in an/his article*:

- (6) Context: Prof. Johnson told me about a new book.
- a. Base order: In fact, he praised a detailed review of the new book in an article.
 - b. HNPS: In fact, he praised in an article a detailed review of the new book.

- (7) Context: You know, I read the recent article by Prof. Johnson. So, I can tell you:
- a. Base order: He praised a detailed review of a new book in his article.
 - b. HNPS: He praised in his article a detailed review of a new book.

What are the predictions for the two word orders of the target sentences in (6) and (7), respectively? There are two possible factors influencing word order preference. The first is heaviness, which is a structural complexity factor. According to the principle of end weight, heavy constituents tend to be ordered after light constituents, as discussed by Behaghel (1909/10) and Wasow (2002). The second factor is information-structural. Given material tends to be ordered before new material (see e.g. Gundel 1988). Note that these two principles work against each other in the examples in (6) and in (7a) and are in line with each other in (7b). However, since the heavy DP is only partly given in (6), ‘given before new’ might be affected by the mixed status of the heavy DP. This manipulation is intended and will be used to detect the impact of ‘given before new’, as we will see below.

Let me discuss in more detail the information-structural manipulation in (6)-(7). In (6a), for instance, the heavy DP contains given material *the new book*, which will be deaccented. Apart from the subject, which was pronominalized throughout the study, all material is discourse new. Thus, the DP *a detailed review* and the PP *in an article* will both be accented. With respect to word order preference, given>new is fulfilled because the PP is discourse new as a whole. The principle of end weight, in this case, goes against the given>new partition, because the heavy DP is ordered before the relatively short PP. By contrast, in (6b) given>new is violated because the heavy DP contains given material and is ordered after the PP, which is discourse new. However, the principle of end weight is respected. We observe that the two ordering principles work against each other in (6a) as well as (6b). Thus, both sentences might be judged to be equally acceptable. This, however, depends on whether the two principles are equally weighted with respect to their effect on word order. Note also that in English, the complement comes preferably directly after the verb, which might pose an additional constraint against the shift operation. In (7a,b), the context renders the PP *in his article* discourse given. Hence, the heavy DP contains only discourse new material. Given>new is thus violated in (7a) and respected in (7b). Moreover, (7b) also adheres to the principle of end weight because the heavy DP is shifted, while (7a) violates it. We would thus expect that (7b) receives higher ratings than (7a) under these two conditions.

4.2 Context manipulation for extractions

I will now turn to the examples in (8) and (9), which contain extractions from heavy DPs. The context manipulation is essentially the same as in (6) and (7). The main difference lies in the focus structure of the heavy DP. While in (6) and (7) the heavy DP was partly discourse given and partly discourse new, in (8) and (9) the discourse new part corresponds to the *wh*-phrase which has been extracted; consequently the part of the heavy NP that is in situ as in the a-examples of (8) and (9) or shifted, as in the b-examples, contains only discourse given material. The discourse status of the PP is parallel to the manipulation described above for (6) and (7):

- (8) Context: I heard Prof. Johnson was positive about some detailed review. So maybe you can tell me:
- a. Base order: What did he praise a detailed review of in an article?
 - b. HNPS: What did he praise in an article a detailed review of?
- (9) Context: I heard you read the recent article by Prof. Johnson. So maybe you can tell me:
- a. Base order: What did he praise a detailed review of in his article?
 - b. HNPS: What did he praise in his article a detailed review of?

The crucial difference between (6)-(7) and (8)-(9), however, is that extraction is an additional factor which might affect acceptability. First, because it adds an additional chain formation into the syntax, which lowers acceptability (cf. Konietzko, Winkler, and Culicover, 2018) and second, because it interacts with information structure. Under the assumptions that extraction is also subject to its own specific information-structural restrictions, in particular the given-new or focus-background distinction (Bayer 2004, Goldberg 2006), we would expect that extraction interacts with the information-structural manipulation described above. If, for instance, extraction is only licensed if it takes place from discourse-new material, it would be predicted that (9a) receives higher ratings compared to (8a), and (9b) is rated higher compared to (8b). Let us also consider the direct comparison between (9a) and (9b). In (9a), extraction has taken place from a heavy DP in situ, while in (9b) extraction has taken place from HNPS, a configuration which falls under the Freezing Principle. Since in both cases extraction takes place from a discourse new constituent, the question arises which configuration, base or shifted, might benefit more from this discourse

manipulation. The prediction is that (9b) should benefit more. Note that (9a) violates the given>new condition. This condition is respected in (9b). The question, however, is whether subextraction, as an additional factor that enters the derivation, is only sensitive to the given-new distinction, i.e. to information structure, or whether the ordering of information-structural domains (i.e. given>new) also plays a role. In the first case, we would predict that (9a, b) should both equally benefit (compared to (8)), if given>new also plays a role, we would predict that (9b) might benefit more than (9a).

5 Context restrictions on subextraction: Experimental evidence

The discussion in Section 4 allows us to formulate the following hypotheses which can be tested experimentally⁴:

- (10) (i): Complexity Hypothesis: Syntactic complexity defined in terms of chain formation and heaviness affects acceptability of the construction.
- (ii): Focus Hypothesis: HNPS and extraction from HNPS are sensitive to focus.

(10) has two subparts which are independently motivated. (10i) is uncontroversial and has been argued for, e.g., in Schütze (1996), Hofmeister, Staum Casasanto, and Sag (2014), Hofmeister, Culicover, and Winkler (2015). The sensitivity of HNPS to focus has been argued for in Arnold et al. (2000) and Wasow (2002). The assumption that extraction is sensitive to focus is based on work on the interaction of information structure and extraction (Erteschik-Shir 1973; Bayer 2004; Newmayer 2016). We will assume here by hypothesis that it also holds for extraction from HNPS. The precise predictions derived from these hypotheses are discussed in section 5.1.2.

⁴ The hypotheses in (10) were developed in more general terms in the grant proposal of the project A7 of the SFB 833. In this study, they are adapted and tested with respect to HNPS.

5.1 Method

5.1.1 Design and materials

To test the hypotheses outlined in (10), an experimental study was conducted with the following factors: EXTRACTION (two levels: non-extraction vs. extraction), SHIFT (two levels: base vs. shift), and CONTEXT (two levels: one type of context renders the heavy DP discourse new, the other type of context renders the heavy DP and the PP discourse given). We thus arrive at a 2×2×2 design. The experimental conditions are given in (11). The contexts are given in ‘C’, the target sentences in ‘T’:

(11) Conditions

1. Non-extraction: Heavy NP in situ; Heavy NP partly given
 C: Prof. Johnson told me about a new book.
 T: In fact, he praised a detailed review of the new book in an article.

2. Non-extraction: Heavy NP in situ; Heavy NP new
 C: You know, I read the recent article by Prof. Johnson. So, I can tell you:
 T: He praised a detailed review of a new book in his article.

3. Non-extraction: Heavy NP shift; Heavy NP partly given
 C: Prof. Johnson told me about a new book.
 T: In fact, he praised in an article a detailed review of the new book.

4. Non-extraction: Heavy NP shift; Heavy NP new
 C: You know, I read the recent article by Prof. Johnson. So, I can tell you:
 T: He praised in his article a detailed review of a new book.

5. Extraction: Heavy NP in situ; Heavy NP given
 C: I heard Prof. Johnson was positive about some detailed review. So maybe you can tell me:
 T: What did he praise a detailed review of in an article?

6. Extraction: Heavy NP in situ; Heavy NP new
 C: I heard you read the recent article by Prof. Johnson. So maybe you can tell me:
 T: What did he praise a detailed review of in his article?

7. Extraction: Heavy NP shift; Heavy NP given

C: I heard Prof. Johnson was positive about some detailed review.
So maybe you can tell me:

T: What did he praise in an article a detailed review of?

8. Extraction: Heavy NP shift; Heavy NP new

C: I heard you read the recent article by Prof. Johnson. So maybe you can tell me:

T: What did he praise in his article a detailed review of?

5.1.2 Predictions

The hypotheses in (10) lead to the following predictions. Based on (10i), conditions containing HNPS should be rated lower than conditions where the heavy DP is in situ. Extractions should be rated lower than non-extractions. From the hypothesis in (10ii), the following predictions were derived: Conditions in which the shifted heavy DP is discourse new (independent of whether extraction takes place or not) should receive higher ratings than conditions with discourse given heavy DPs; no such effect is expected for heavy DPs in situ.

5.1.3 Participants and Procedure

Acceptability judgments were collected via Amazon.com's Mechanical Turk platform. 112 individuals completed the experiment. At the beginning, participants identified their age, sex and language background. Participants completed the experiment irrespective of their language background and were excluded only afterwards if their mother tongue was not English. This procedure was chosen to remove any incentive to lie about language background. The data of 106 native speakers of English were included in the statistical analysis. Participants received 3.30\$ for their participation. The estimated duration of an experimental session was 15–20 minutes. Participants judged the acceptability of sentences on a 7-point scale, '1' corresponding to completely unacceptable and '7' to very acceptable. The experiment consisted of 40 experimental items (5 per condition) and 40 filler sentences. The experimental items were distributed on 8 different lists according to the Latin square design.

5.2 Results

First, we analyzed the full $2 \times 2 \times 2$ design. The results reveal a main effect for each of the three factors: [EXTRACTION: $F_1(1,105) = 706.1, p < .001, F_2(1,39) = 387.8, p < .001$; SHIFT: $F_1(1,105) = 269.1, p < .001, F_2(1,39) = 265.7, p < .001$; CONTEXT: $F_1(1,105) = 17.2, p < .001, F_2(1,39) = 6.0, p < .05$]. As Figures 1a and 1b show, non-extractions were judged better than extractions, non-shifts were judged better than shifts, and new heavy NPs led to higher ratings than (partly) given ones. In addition, EXTRACTION interacted with CONTEXT [$F_1(1,105) = 13.1, p < .001, F_2(1,39) = 8.7, p < .01$], an interaction that was further qualified by a three-way interaction of all three factors [$F_1(1,105) = 5.3, p < .05, F_2(1,39) = 3.3, p = .08$] which was fully significant by subjects and marginal by items. For this reason, separate analyses for non-extraction (conditions 1–4) and extractions (conditions 5–8) were computed. The analysis of non-extractions, shown in Figure 1a, yielded only a main effect of SHIFT [$F_1(1,105) = 199.0, p < .001, F_2(1,39) = 191.0, p < .001$]: non-shifts were judged better than shifts. The analysis of extractions, shown in Figure 1b, also yielded a main effect of SHIFT [$F_1(1,105) = 162.2, p < .001, F_2(1,39) = 166.9, p < .001$], as non-shifts were again judged better than shifts. In addition, there was a main effect of CONTEXT [$F_1(1,105) = 24.1, p < .001, F_2(1,39) = 12.3, p < .01$]. Conditions with context received higher ratings than conditions without (cf. Figure 1b). The interaction of SHIFT and CONTEXT did not reach significance [$F_1(1,105) = 3.6, p = .06, F_2(1,39) = 2.1, p = .15$].

5.3 Discussion

The results of the experimental study yield the following picture: Our results confirmed the complexity hypothesis in (10i). Both complexity factors, HNPS and extraction, lowered judgments independently and revealed a main effect of SHIFT and EXTRACTION. The context hypothesis in (10i) was only partly confirmed. It did not reveal an effect for non-extractions (conditions 1–4). Here, we only found evidence for the effect of the factor SHIFT. Conditions with HNPS received lower ratings than conditions with heavy DPs in situ. However, we did not find evidence that HNPS is sensitive to the given-new distinction such that shifted constituents are preferably discourse new (cf. Figure 1a). This result contrasts with the extraction data (conditions 5–8). Extractions showed a main effect of CONTEXT. Extractions from discourse new DPs were judged better than extractions from DPs that contained discourse given material. This effect could be detected both for HNPS and heavy DPs in situ. There was, however, no interaction of SHIFT and CONTEXT in the extraction conditions, which means that subextraction from shifted DPs, i.e. the Freezing condition,

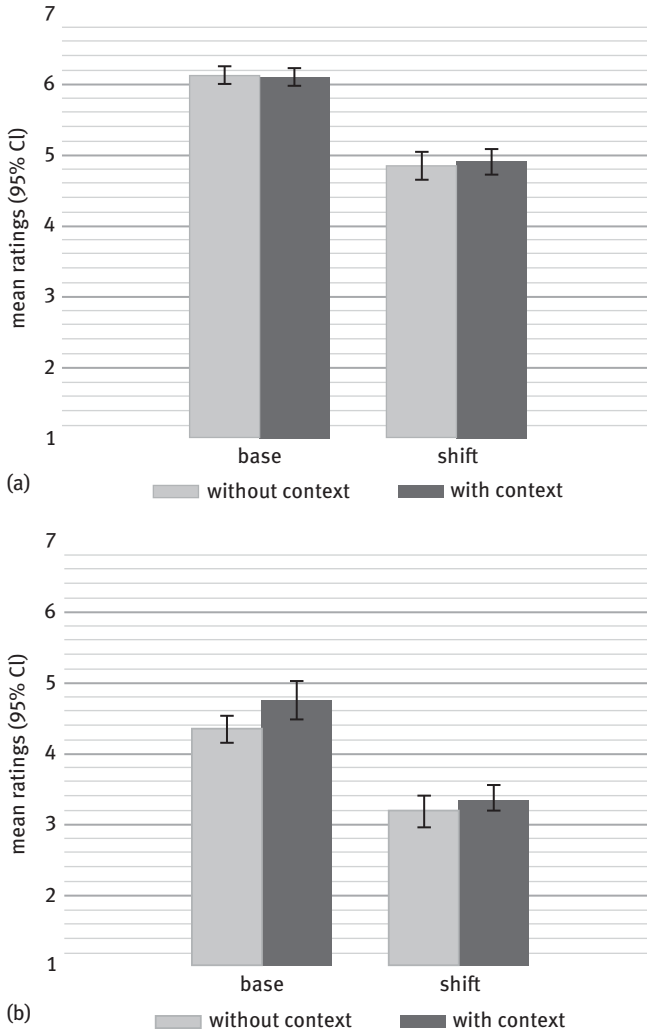


Figure 1: (a) Mean ratings for non-extractions. (b) Mean ratings for extractions.

did not benefit more from the context than the non-shifted condition 6. This result is interesting with respect to the question to what extent subextraction from frozen constituents is sensitive to context. What our results suggest is that in this type of multiple chain formation, the context seems to be able to support only one instance of reordering in a Freezing configuration. Subextraction from shifted DPs benefits if the DP is discourse new, but this effect also holds for subextraction from DPs in situ (cf. Figure 1b). This suggests that in the case of subextraction from shifted DPs,

where two chain formations are present, only the subextraction operation benefits from contextual support, while the additional shift operation is unaffected.

6 General discussion and conclusion

In this study, I have discussed the interaction of information-structure and subextraction from heavy DPs. The main goal of this study was to shed light on the interaction of information-structurally controlled contexts with syntactic complexity factors such as HNPS and *wh*-extraction. I have reported an experimental study which investigated the following factors: types of syntactic chain formation (HNPS and *wh*-subextraction) and the context factors givenness and newness. The experimental data show that *wh*-subextraction from heavy DPs is subject to the following information-structural constraints: ‘extract from focus’ and ‘don’t extract from given’. These constraints proved to be stronger than the ordering principle given>new because subextraction did not benefit if it took place from a heavy DP that respected this ordering principle compared to subextraction from a heavy DP that violated it. Since the given vs. new distinction did not reveal an effect for non-extraction cases, the data strongly suggest that it is subextraction which is particularly sensitive to the partition of information-structural domains in the clause. The results also show that Freezing does not benefit more from context than subextraction from DPs which are in situ. In both cases it could be shown that subextraction receives higher ratings if it takes place from a constituent that is in focus. This finding suggests that structures with high syntactic complexity such as multiple chain formation, which result in a high degree of markedness, cannot always be licensed by context.

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Rui P. Chaves

Freezing as a probabilistic phenomenon

Abstract: This paper shows that freezing effects are graded rather than categorical, and that different kinds of freezing are not equally strong. Building on Hofmeister et al. (2015: 470), I argue that freezing effects are at least in part caused by their extremely unusual structure, with two disparate *foci* governed by the same verb. By being inconsistent with comprehenders' expectations about the distribution of gaps, such constructions likely create a processing conflict between what is expected and the actual input. Experiment 1 suggests that such expectations are malleable, given that the oddness of extracting from an extraposed phrase disappears by virtue of making such constructions as likely as their non-extraposed counterparts. Experiments 2 and 3 suggest that the oddness created by crossing extraposition and extraction paths also disappears, but at a much lower rate. I propose that the latter constructions are more improbable and therefore worse than the former because (a) they are preempted by simpler and more likely alternative (local) parses (Fodor 1978) in which the point of retrieval and integration does not coincide with the point of reanalysis (Hofmeister et al. 2015), (b) involve crossing non-local dependencies (which are independently known to be more difficult than non-crossing dependencies (Fodor 1978), and therefore bound to be rarer), and (c) have disparate *foci* and therefore atypical pragmatic requirements (Huck and Na 1990; Bolinger 1992).

Keywords: Extraposition, extraction, islands, frequency, adaptation

1 Introduction

Ross (1967: 305) first noticed that leftward extraction (1a) and extraposition (1b) cause low acceptability when they interact, as seen in (2), a phenomenon known as *freezing*. In (2a) there is extraction from an extraposed PP, in (2b) there is extraction from an extraposed NP, and in (2c) an extraction from a PP crossed with direct object extraposition.

- (1) a. Who_j did you [give [a picture of _j] [to Robin]]?
b. Did you [give _i [to Robin] [a picture of my brother]_i]?

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- (2) a. *Who_j did you [give a picture _i] [to Robin] [of _j]_i?
 b. *Who_j did you [give _i [to John] [a picture of _j]_i?
 c. *Who_j did you [give _i [to _j] [a picture of my brother]_i]?

Most accounts of freezing involve theory-dependent assumptions (e.g. Wexler and Culicover 1980; Takahashi 1994; Rizzi 2007, among others) which usually predict that any movement out of *any* moved phrase is necessarily illicit. This is not quite so. For example, (3a) shows that a clause moved rightwards does not block leftward sub-extraction, (3b) exhibits complement extraposition from an extracted *wh*-phrase, and (3c) contains extraction from an extracted *wh*-phrase. It remains unclear how the full range of facts can be explained via syntactic constraints, without stipulation.

- (3) a. What_i did he explain _j to Mary [that she should write _i]_j?
 b. [How many videos _i]_j are there _j on the web [of Mitt Romney getting booed]_i?
 c. [Which handout]_j can't you remember [how many copies of _j]_i you have to print _i?

The structure of the paper is as follows. Section 2 discusses non-configurational accounts freezing phenomena, and provides evidence that freezing effects like (2a) are created by independently motivated phonological phrasing constraints, following Huck and Na (1990). Freezing effects like (2b,c) require a different explanation, however. Section 3 describes three sentence acceptability experiments which show that, although the acceptability of such freezing constructions are initially low, speakers gradually come to regard such constructions as being significantly more acceptable. These results suggest that freezing effects are transient and at least in part plausibly caused by the fact that constructions with multiple *foci* are extremely unusual. By making such constructions more frequent, comprehenders can adapt their expectations and come to regard freezing violations as less severe. The reported experiments also show that the amelioration rates caused by increased frequency are much more robust for (2b) than for (2c). Finally, Section 4 describes a probabilistic model of the behavioral phenomena.

2 Non-syntactic accounts

Huck and Na (1990) offer a simple explanation for why sentences like (2a) have low acceptability. They begin by noting that such examples improve with contrastive stress and appropriate contextualization, as in (4).

- (4) a. Okay, you saw a picture yesterday, but just whom did you see a picture yesterday OF _ ?
 b. Here's an article in the Tribune by Trevor, of all people; he's someone I'd expect to read a story in the paper ABOUT _ .
 c. I know Alger found letters in the file to Chambers, certainly, but I'm not sure I can remember whom he found letters in the files FROM _ . (Huck and Na 1990: 66)

Huck and Na (1990) argue that this kind of amelioration is analogous to the one observed in pronouns (Zwicky 1982, 1986), as illustrated in (5). These examples show that unstressed pronouns like *it* and *me* cannot be separated from the verb, because the former are unable to project their own phonological phrase.

- (5) a. Mia told to Noel *[it] / [that joke] yesterday.
 b. Mia told [it] / [that joke] to Noel yesterday.
 c. She called up *[me] / [the janitor] about the fire.
 d. She called [me] / [the janitor] up about the fire.

For Huck and Na (1990), the same is true for unstressed prepositions: when an unstressed stranded proposition is separated from its selecting head by another phrase, oddness ensues for prosodic reasons. Thus, the oddness of (2a) is due to independently motivated phonological phrasing constraints rather than syntax proper. Apparent counterexamples like (6a), where the stranded P is itself fronted, and no amount of stress can ameliorate the sentence, pose no problem. Note that *to* in (6a) is an argument marking preposition, and therefore it is semantically defective. As such, it cannot be contrasted with anything or instantiate the required pragmatic function of topicalized expressions. Note that acceptability does in fact improve if the stranded preposition is semantically richer, as seen in (6b).

- (6) a. *Who_i do you think that [TO/to __i]_j, John gave a book __j . (Postal 1972)
 b. This is [a bridge]_i that I think [UNDERNEATH __i]_j, Robin would never park __j .

In the remainder of this paper I focus on (2b,c), which cannot be accounted for by prosodic phrasing alone. Fodor (1978: 457) notes that (2c) has a syntactically highly probable temporary alternative parse in which *to* combines with the NP *a picture of my brother*. The existence of this local ambiguity likely disrupts parsing, especially as it occurs in a portion of the sentence that contains two gaps in close succession. Indeed, constructions with two independent gaps in close

proximity are licit, but not trivial to process, as seen in (7), specially if the extraction paths cross (Fodor 1978), as in (7b).

- (7) a. This is a problem which_j John_j is difficult to talk to _{-j} about _{-i}.
 b. Who_j can't you remember which papers_j you sent copies of _{-i} to _{-j}?

Hofmeister et al. (2015: 477) make a similar observation, by noting that constructions like (2c) must cause increased processing effort since the point of retrieval and integration coincides with the point of reanalysis. The existence of a preferential alternative parse that is locally licit but globally illicit can in turn lead to a 'digging-in' effect (Ferreira and Henderson 1991, 1993; Tabor and Hutchins 2004), in which the more committed the parser becomes to a syntactic parse, the harder it is to backtrack and reanalyze the input. The net effect of these factors is that the correct parse of (2c) is less probable and therefore harder to identify than that of (2b), which suffers from none of these problems, and is regarded to be more acceptable than (2c) by Fodor (1978: 453) and others.¹

Finally, there may also be problems caused by the use of preposition stranding. Gries (2004) provides corpus data suggesting that P stranding tends to be used when the processing cost of the utterance is not already high, whereas PP extraction tends to be used otherwise. For example, it should be easier to process PP extractions and NP extractions because in the former there is more information about the syntactic function of the fronted phrase, by virtue of the presence of the preposition. In contrast, in NP extraction the fronted phrase can have virtually any syntactic function. Indeed, the observation that PP extraction from Subject Islands is more acceptable than NP extraction goes back to Ross (1967). Given that (2b,c) involve two different types of displacement, that would favor the use of PP extraction, but this would require using the pronoun *whom*, which many speakers generally deem to be marked or awkward. Register effects and prescriptive pressures may further complicate matters.

Finally, Huck and Na (1990) and Bolinger (1992) also conjecture that freezing effects may be in part due to a pragmatic conflict created by extraposition and extraction: *wh*-movement has extracted a phrase leftward, focusing interest on that expression, while at the same time extraposition has moved a constituent

¹ The *Clause Non-Final Incomplete Constituent Constraint* (Kuno 1973: 130) prohibited extraction out of phrases in a clause non-final position, and may be best explained by essentially the same kinds of garden-path-like processing problems created by a mid-sentence gap, specially given the number of counterexamples found in the literature (Jackendoff and Culicover 1972; Hukari and Levine 1991; Fodor 1992).

rightward, focusing interest on that constituent as well. Note also that objects tend to be extraposed when they are discourse new, and even more so when they are heavy (Wasow 2002: 71). Therefore, the theme phrase *a picture of John* in (2c) is strongly biased to be discourse new, but this clashes with the fact that an entirely different entity, the recipient, is leftward extracted, and therefore is the *de facto* new information that the open proposition is about. No such mismatch exists in (2a) or (2b), in contrast, where the extraposed theme is more directly linked to the entity targeted by leftward extraction.

In this work I examine the possibility that the extreme low frequency of freezing constructions plays a role in the freezing effects in (2b,c), drawing inspiration from Hofmeister et al. (2015: 470), which conjectures that extraposed constituents are more difficult to process when they appear in environments that are more unexpected. Levy et al. (2012) provides evidence that the processing difficulty associated with extraposed relatives depends on how expected such constructions are: sentences in which a relative clause is highly expected facilitates the comprehension of an extraposed relative. In addition, there is also broader evidence that processing difficulty is affected by expectations about lexical (Kutas and Hillyard 1984; Altmann and Kamide 1999; Metzing and Brennan 2003; DeLong et al. 2005; Creel et al. 2008; Arai and Keller 2013; DeLong et al. 2005; Van Berkum et al. 2005; Gibson 2006; Kutas and Federmeier 2011; Levy and Keller 2013), syntactic (Demberg and Keller 2008; Ferreira and Clifton 1986; McRae et al. 1998), semantic (Federmeier and Kutas 1999; Altmann and Kamide 1999; Kamide et al. 2003), and pragmatic (Ni et al. 1996) information. By using their statistical experience with their language to generate predictions about upcoming syntactic structure, comprehenders are able to efficiently and robustly process complex and ambiguous linguistic input. As an analogy, consider the garden-path sentence (8), which contains a temporary ambiguity between a grammatical parse in which *plans* is a noun, and an ungrammatical parse in which *plans* is a verb. Since the sequence ‘N *plans*_V to’ is many orders of magnitude more frequent than ‘N *plans*_N to’, the verbal parse is preferred.²

(8) The government plans to raise taxes were defeated.

Crucially, the nominal parse is not only much more (locally) likely than the verbal parse, it also does not create any syntactic problems until the end the

² For example, in the 520,000,000 word Corpus of Contemporary American English (COCA; Davies 2008), the sequence ‘[nn*] plans.[v*] to’ has a frequency of 1744 whereas the sequence ‘[nn*] plans.[nn*] to’ is much rarer, with a frequency of 8.

sentence, which makes the source of the misparse difficult to identify. Hence, the grammatical parse is likely to be preempted. In this work I explore the possibility that freezing effects are similarly sensitive to probabilistic information.

3 Experimental evidence

In what follows I provide experimental evidence that increased frequency of freezing violations can ameliorate freezing effects. These results are related to what Hiramatsu (2000), Francom (2009), Kravtchenko et al. (2009), and Chaves and Dery (2014), found for Subject Island violations, usually regarded as another type of freezing effect. If sentences with freezing island violations were ungrammatical, and if grammars cannot construct representations for ungrammatical representations – as explicitly argued by Phillips (2006: 803), Sprouse (2007), Wagers and Phillips (2009), and Phillips (2013) – then it should be impossible to improve their acceptability by simply increasing their frequency. If the language processor cannot construct ungrammatical structures, then ‘extra-grammatical factors that affect the acceptability – and are predicated on the existence of a representation – such as syntactic priming, should not affect the acceptability of ungrammatical sentences’ (Sprouse 2007: 123).

3.1 Experiment 1

This experiment focuses on classic freezing effects like (9b,d,f), and shows that the oddness attributed to such constructions can be made to vanish by virtue of repeated exposition. In other words, by making (9a,c,e) as frequent as (9b,d,f) the difference in acceptability steadily disappears.

- (9) a. Who_i did you give [a picture of _{-i}] to Robin?
 b. *Who_i did you give _{-j} to Robin [a picture of _{-i}]_j?
 (Wexler and Culicover 1980)
 c. Who_i did you see [some beautiful pictures of _{-i}] yesterday?
 d. *Who_i did you see _{-j} yesterday [some beautiful pictures of _{-i}]_j?
 (Johnson 1985: 74)
 e. What_t did you give [a book about _{-i}] to John?
 f. *What_t did you give _{-j} to John [a book about _{-i}]_j?
 (Lasnik and Saito 1992: 103)

3.1.1 Methods

A total of 70 self-reported native English speakers with IP addresses originating from the United States were recruited through Amazon.com's Mechanical Turk (AMT) crowdsourcing marketplace.³ The task was open to anyone, but participants were asked to report if they happened to be native speakers. Participants were instructed to rate how natural each sentence was, by giving it a number from 1 (very unnatural) to 7 (very natural). The experimental items consisted of 20 pairs of sentences, a sample of which is shown in (10). The full set of items is in Appendix A.

- (10) a. Which cake did you serve Mark several slices of? (In situ)
 b. Which cake did you serve to Mark several slices of? (Ex situ)
 c. Which problem did you write Robin several emails about? (In situ)
 d. Which problem did you write to Robin several emails about? (Ex situ)

In the *in situ* (control) condition, the verb phrase consists of a double object construction where the verb is followed by the direct object and then followed by the sentence-final indirect object containing the gap (e.g. [serve [Mark] [several slices of _{-i}]]). In the *ex situ* condition, however, the verb phrase consists of a prepositional indirect-object construction in which the object containing the gap is extraposed over the oblique (e.g. [serve _{-j} [to Mark] [several slices of _{-i}]]), constituting a freezing violation analogous to (9d). Hence, the acceptability of the latter should be consistently lower than that of their *in situ* counterparts.

The experimental items were pseudorandomized and counterbalanced across two lists using a Latin Square design, and interspersed with 40 distractor sentences. This way, no participant saw both versions of the same item, and no two participants saw the items in the same order. There were six kinds of distractor sentence, exemplified in (11), half of which were ungrammatical. In the actual stimuli, no diacritic ‘*’ was present, of course.

- (11) a. Which library did you donate several books about Oprah to?
 b. Which houses did the roofs of get damaged by the explosion?
 c. Which individual did you see Robert with?
 d. *Which school did you compare Ann to attend some classes at?
 e. *Which restaurant did you order multiple dishes to Larry about?
 f. *Which windows did you strain James of?

³ For evidence that linguistic data obtained via AMT parallels data obtained in the laboratory see Melnick et al. (2011), Gibson et al. (2011), and Sprouse (2011).

3.1.2 Results

The mean acceptability rating for the *in situ* condition was 5.76 (SD = 1.35), and for the *ex situ* condition was 4.51 (SD = 1.73). The mean rating for the grammatical distractors was 5.54 (SD = 1.77), and for the ungrammatical distractors it was 2.26 (SD = 1.49).

Linear mixed-effect regression (LMER) models were fitted using the `lme4` package (version 1.1–7) (Bates et al. 2014) in R (version 3.1.2), and the intercept was adjusted by item type, subjects, and lists, in order to account for random effects. An LMER model with sentence type and presentation order as fixed factors and items, subjects and lists as random factors confirmed that *in situ* items were rated significantly higher than *ex situ* items ($t = 9.848, p < 0.001$), and revealed that acceptability ratings improved as the experiment progressed ($t = 5.621, p < 0.001$). No interactions were detected between item type and presentation order ($t = -0.947, p = 0.34$). LMER models for each item type further confirmed that both *in situ* items ($t = 4.85, p < 0.001$) and *ex situ* items ($t = 5.38, p < 0.001$) improved with presentation order. Separate models just for distractors detected no change in acceptability as the experiment progressed for ungrammatical distractors ($t = 1.07, p = 0.28$), but an increase of acceptability occurred in the case of grammatical distractors ($t = 4.77, p < 0.001$). Figure 1 depicts the change in acceptability as a function of presentation order for all stimuli. Since no two participants saw the experimental items in the same order, each dot corresponds to the average across different items in each condition. Moreover, the increase in acceptability judgements during the experiment cannot be attributed to the particular order in which the items were presented.

Next, the acceptability ratings of 60 responses in the *in situ* condition with presentation order of 1, 2, and 3 were compared against the acceptability ratings of 60 responses in the *ex situ* condition with presentation orders of 18, 19, and 20. A linear mixed-effect regression model with sentence type as a fixed predictor (allowing the intercept to be adjusted by items, subjects, and lists) revealed that the acceptability of the *in situ* items in the beginning of the experiment was not significantly different from the acceptability of the *ex situ* items by the end of the experiment ($t = 1.123, p = 0.2633$).

3.1.3 Discussion

The experimental findings suggest that the acceptability of freezing violations standardly regarded as illicit (Wexler and Culicover 1980; Johnson 1985; Lasnik

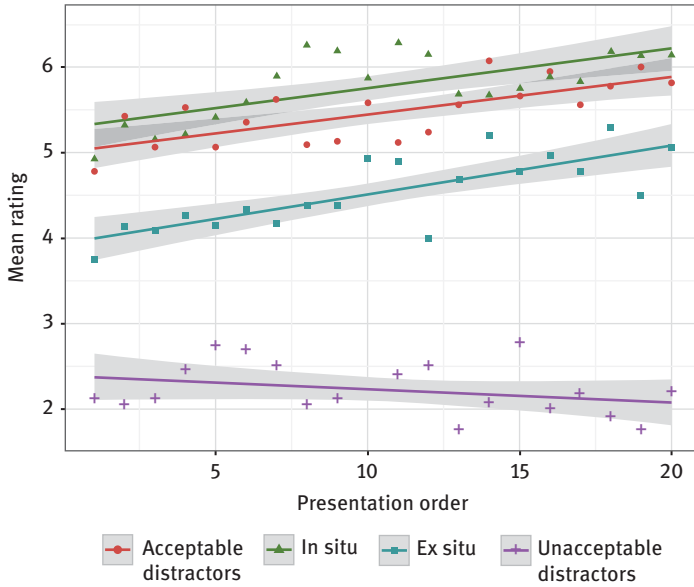


Figure 1: LMER of each item type with presentation order as a fixed predictor.

and Saito 1992) disappears by merely increasing their frequency. The gradual increase of acceptability over the course of only 10 sentences in the *ex situ* condition may reflect comprehender's adaptation to highly unusual constructions, by prompting them to revise their expectations about the syntactic distribution of English gaps. Given enough exposure, the results suggest that both conditions would eventually converge towards the upper end of the scale, and become equally likely and acceptable.

The present interpretation of the behavioral evidence is not unlike that of Kim et al. (2011), for which the acceptability cline in category mismatches in Verb Phrase Ellipsis (VPE) constructions is argued to correlate with how consistent the prior heuristics are with the particular input: highly acceptable VPE constructions are those consistent with comprehenders' parsing heuristics, and have syntactic analyses that are found comparatively early during sentence comprehension. Conversely, less acceptable VPE constructions involve more processing as well as more processing conflicts because they are inconsistent with heuristics that normally aid sentence processing. According to surprisal theory (Hale 2001; Levy 2008), more cognitive effort is required to process input that is less expected. The relation between surprisal and processing effort has been experimentally validated (Boston et al. 2008; Demberg and Keller 2008;

Roark et al. 2009; Smith and Levy 2008), as has the correlation between sentence acceptability and probability (Keller 2003; Lau et al. 2015; Manning 2003).

3.2 Experiment 2

Experiment 2 focuses on freezing effects like those in (12), where the extraposition of the direct object putatively blocks the leftward extraction from the oblique complement. If the oddness of (12b) and (12d) is due to grammar, then their acceptability should not improve with repeated exposition, let alone approach the acceptability of their *in situ* counterparts in (12a,c).

- (12) a. Who_i does this sentence appear to be fine to _{-i}?
 b. *Who_i does this sentence appear _{-j} to _{-i} [to be fine]_j?
 (Langendoen and Pullum 1977)
 c. Who_i did you give [a picture of Sandy] to _{-i}?
 d. *Who_i did you give _{-j} to _{-i} [a picture of Sandy]_j?
 (Wexler and Culicover 1980)

As we shall see, the acceptability of sentences like (12d) improves only marginally with repeated exposure, suggesting that the freezing effects examined in Experiment 2 (e.g. **Who did you give to a book about Sandy?*) are more severe than those examined in Experiment 1 (e.g. **Who did you give a book about to John?*), and therefore unlikely to be caused by the exact same factors.

3.2.1 Methods

A set of different 76 participants were recruited through AMT, using the same methodology as in Experiment 1. The experimental items consisted of 20 pairs of sentences listed in Appendix B, a sample of which is given in (13). In the *in situ* condition, the gap is located immediately after a sentence-final stranded preposition, whereas in the *ex situ* condition the direct object has been extraposed over the stranded preposition. The latter is isomorphic to (12d).

- (13) a. Who did you promise a sum of \$1,000 to? (*In situ*)
 b. Who did you promise to a sum of \$1,000? (*Ex situ*)
 c. Who did you forward a copy of the contract to? (*In situ*)
 d. Who did you forward to a copy of the contract? (*Ex situ*)

As in Experiment 1, the item pairs were pseudorandomized, counterbalanced across two lists, and interspersed with 40 distractor sentences. There were various types of distractor sentence, some with *who/what* phrases, others containing *which*. As before, half of the distractors were grammatical, half were ungrammatical, illustrated in (14).

- (14) a. What did you call back your boss about?
 b. Which restaurant did you ask me to book a reservation for?
 c. Who did you recommend several songs by Rihanna to?
 d. *What did you look for a neighbor at?
 e. *Which road did you drive me to go to various places with?
 f. *Who did you visit several friends of mine?

3.2.2 Results

The mean acceptability of the *in situ* items was 6.42 (SD = 0.88) and the mean for *ex situ* items was 3.17 (SD = 1.64). An LMER model with item type and presentation order as fixed factors confirmed that sentences in the *in situ* condition were rated significantly higher than sentences in the *ex situ* condition ($t = 40.94$, $p < 0.001$), and revealed that acceptability ratings improved as the experiment progressed ($t = 2.73$, $p < 0.01$). No interactions were detected between item type and presentation order ($t = 0.19$, $p = 0.84$). LMER models for each item type further confirmed that both *in situ* items ($t = 3.39$, $p < 0.001$) and *ex situ* items ($t = 2.91$, $p < 0.01$) improved with presentation order, as in Figure 2. Again, ungrammatical distractors showed no improvement.

3.2.3 Discussion

The results of Experiment 2 suggest that this type of freezing effect is difficult to ameliorate with frequency alone. Any theory of freezing effects should explain this fact. The mean acceptability of the freezing violation items approaches the middle of the scale, presumably where the threshold for acceptability lies, but never quite crosses it. As discussed in §2, it is possible that freezing violations like (12d) do not exhibit strong amelioration effects because they are more unlikely and unexpected. First, comprehenders may overlook the possibility that there is a gap immediately after the mid-sentence preposition because the

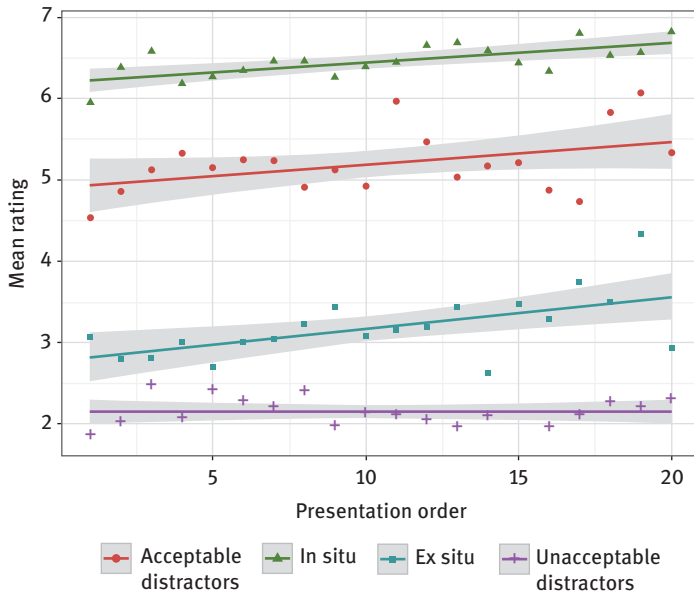


Figure 2: LMER of each item type with presentation order as a fixed predictor.

preposition is adjacent to an NP. Second, extraposition and extraction target the same sentence region, which is dispreferred as it likely creates processing difficulty that hampers and preempts the correct parse. Third, extraposed phrases usually describe new information, but the extraction targets the non-extraposed phrase. This conflict created by extraposition and extraction may prevent speakers from viewing such constructions as fully felicitous, without a suitable contextualization for the double *foci*. Moreover, the discourse contexts in which such multiple *foci* would be felicitous are arguably rare, and therefore unlikely, all else being equal.

3.3 Experiment 3

If the sentence-medial stranded preposition in the *ex situ* condition in Experiment 2 mislead comprehenders into assuming that the preposition would combine with the following NP, then the low acceptability of the *ex situ* items in Experiment 2 might be in part due to difficulty detecting the correct grammatical parse. Experiment 3 examined if participants would rate *ex situ* items more favorably if a small pause were to be inserted at the gap site, thus more overtly indicating the location of the gap as in (15).

(15) Who did you owe to // a debt of millions of dollars?

Drawing from work on silent reading by Quinn et al. (2000), Fodor (2002) and various others, the items in Experiment 2 were modified to include prosodic cues that signaled the ‘brief pause’, in (15). The present experiment should be regarded as a preliminary study, since speech stimuli should ideally be used to probe the effect of a pause in sentence acceptability.

3.3.1 Methods

A different set of 76 participants from those that participated in the previous experiments was recruited through AMT. All enrollment criteria and participant instructions were identical to that of Experiment 1. The experimental items consisted of the same 20 pairs of items used in Experiment 2, counterbalanced across two lists, pseudorandomized, and mixed with distractors, exactly as in previous experiments. However, the items contained the symbol ‘■’ as shown in (16), which participants were told signaled ‘a brief pause’.

- (16) a. Who ■ did you promise a sum of \$1,000 to? (*In situ*)
 b. Who did you promise to ■ a sum of \$1,000? (*Ex situ*)

The break in (16a) is grammatical, though somewhat marked. The goal of this manipulation is to allow *ex situ* items to benefit from some prosodic information, and to make *in situ* items less prototypical. Hence, the acceptability between *in situ* items and *ex situ* items should be less extreme than in Experiment 2.

3.3.2 Results

The mean acceptability for the *in situ* condition was 5.06 (SD = 1.86), and for the *ex situ* condition 3.58 (SD = 1.73). The means for the ungrammatical and grammatical distractors were 2.77 (SD = 1.72) and 4.38 (SD = 1.97) respectively. An LMER model with sentence type and presentation order as fixed factors, and items, subjects and lists as random factors confirmed that *in situ* items were rated significantly higher than items in the *ex situ* condition ($t = 28.08$, $p < 0.001$), and revealed that acceptability ratings improved as the experiment progressed ($t = 2.4$, $p = 0.01$). No interactions were detected between item type and presentation order ($t = -0.734$, $p = 0.46$). Contrary to Experiment 2, however, separate LMER analysis revealed that

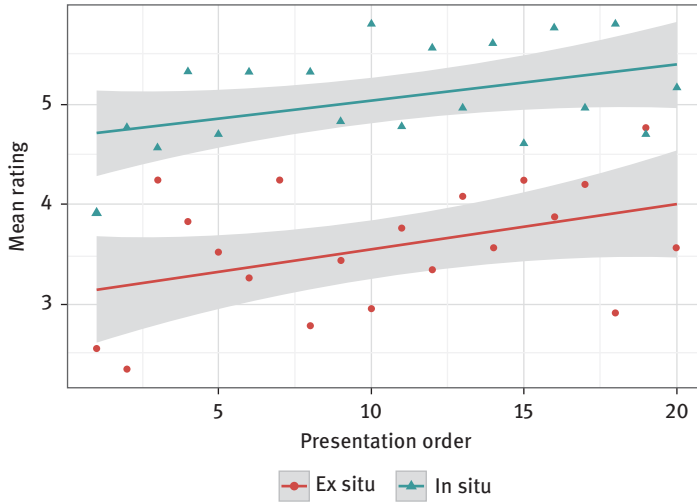


Figure 3: LMER of each item type with presentation order as a fixed predictor.

ex situ items improved faster during the experiment ($t = 4.37, p < 0.001$) than *in situ* items did ($t = 3.17, p = 0.001$). See Figure 3.

A regression model with sentence type as a fixed predictor revealed that the acceptability ratings of 48 responses in the *in situ* condition whose presentation order was either 1 or 2 was not significant from the acceptability ratings of 48 responses in the *ex situ* condition whose presentation orders were 19 or 20 ($t = -0.45, p = 0.64$), but broader selections of presentation order windows yield significant mean differences. For example, the acceptability ratings of 60 responses in the *in situ* condition whose presentation order was either 1, 2, or 3 was significantly different ($t = -2.07, p = 0.04$) from that of 60 responses in the *ex situ* condition whose presentation orders were 18, 19, or 20.

Although the acceptability of *ex situ* items by the end of the experiment only tended to approach the acceptability of the *in situ* items at the beginning of the experiment, it is nonetheless clear that the acceptability of *ex situ* items gradually approached and crossed the midpoint of the acceptability scale, which raises questions with regard to their ungrammaticality status.

3.3.3 Discussion

The results from the above three experiments indicate that freezing effects like those in (9), repeated below in (17a), are stronger and harder to ameliorate those in (12), repeated in (17b).

- (17) a. *Who_i did you give _j to _i [a picture of Sandy]_j ?
 b. *Who_i did you give _j to Robin [a picture of _i]_j ?
 (Wexler and Culicover 1980)

Although the prosodic cue had a mild ameliorative effect, and increase of acceptability was not as strong as the one observed in Experiment 1, the *ex situ* condition exhibited a stronger amelioration effect than the *in situ* condition. This is unexpected if such freezing violations are impossible for the parser to construct and prime. Secondly, it is also possible that if comprehenders had been exposed to more experimental items than the acceptability of (17a) would more clearly converge into the upper range of the scale. Thirdly, it is also possible that with appropriate contextualization, some of the oddness created by the presence of the double *foci* can be circumvented. Further research is necessary in order to more directly compare the acceptability of freezing violations with and without prosodic cues, using actual auditory stimuli. It is possible that the prosodic break at the gap site in the *ex situ* condition would have been more effective in circumventing the freezing effect if the experimental materials consisted of actual speech rather than written stimuli.

As discussed in §2, there are important differences between the two types of freezing violation in (17) that may explain the contrast in amelioration rates. In (17a) there is a highly likely alternative syntactic parse in which *to* combines with the following NP *a picture of Sandy*, thus creating additional processing difficulty, two gaps in close succession, crossing displacement dependencies, and an information structural conflict created by extraposition and extraction of completely different entities. As a consequence, comprehenders may be less likely to regard such constructions as fully felicitous, and more reluctant to revise their expectations about the distribution of extraction and extraposition.

4 A probabilistic model

The experimental results reported in this paper are consistent with the hypothesis that comprehenders make use of expectations about the syntactic distribution of filler-gap dependencies to efficiently prune the search space during gap detection, and mitigate the processing costs associated with resolving such dependencies during on-line sentence comprehension. The more syntactically, semantically, and pragmatically unlikely the position of a gap, the harder for the language processor to overcome the conflict between the expected structure and the actual input, and the harder it is to reanalyze the structure.

Indeed, freezing violations like (2) are not attested in corpora. No single occurrence is found in the COCA corpus, for example. As discussed in §2 such constructions may be odd not only because they involve two *foci* that require very peculiar contexts, but also because they contain temporary structural ambiguities which are more likely to be resolved incorrectly and to persist until the end of the sentence. The rarity of dual *foci* constructions causes them to be unexpected, and therefore more likely to be preempted by any extant (local) alternative parses. These factors plausibly conspire to hamper the production and comprehension of freezing constructions.

If sentence processing is guided by probabilistic information about the distribution of gaps, then it is also likely that such expectations are malleable and can be changed to reflect variations in the input, just like other types of syntactic expectation have been shown to be malleable (Fine et al. 2010; Kamide and Mitchell 1997; Fine and Jaeger 2013; Farmer et al. 2014). In ideal conditions, comprehenders can adapt their prior syntactic expectations to match those in the current context. In what follows I sketch a simple model that can predict the frequency-based behavioral effects detected by the experiments in §3.

Sentence processing proceeds incrementally, which means that as each word is processed, speakers determine the most likely syntactic structure given the current discourse context, and predict with varying degrees of certainty what the remainder of the sentence should consist of. For example, suppose the observed input is $w_1 = \textit{Lisa}$, $w_2 = \textit{said}$. The most likely partial tree t consistent with the input is $[_S [_{NP} \textit{Lisa}] [_{VP} [_V \textit{said}] [...]]]$, where the ellipsis indicates the node that upcoming input is expected to be. Only parse trees consistent with the input and the grammar are permitted, and among those, the parse tree with highest probability given by the grammar and the input are preferred to those with lower probability. We can define the most likely tree \hat{t} for the input $w_1 \dots w_n$ to be the most probable tree from the set of trees T_G that a grammar G licenses for the string $w_1 \dots w_n$, as seen in (18).

$$(18) \hat{t} = \arg \max_{t \in T_G(w_1 \dots w_n)} P(t)$$

There are many ways to estimate what the most probable tree is or what the most probable continuation is, and there are many ways to analyze extraction and extraposition. Before addressing the former problem, I'll discuss the latter. I start by assuming that each tree node is a set of attribute-value pairs $\{a_1: v_1, \dots, a_n: v_n\}$, where a is an attribute and v is its value, encoding part-of-speech, case, valence, etc. Simplifying somewhat the HPSG framework of Sag et al. (2003), a nominal like *Lisa* corresponds to (19), which I abbreviate as 'NP' for convenience.

- (19) {PHON : /lisə/, POS : *n*, VALENCE : ⟨⟩, NUM : *sing*, PER : *3rd*,
GEN : *fem*, CASE : *nom*, SLASH : {}, EXTRA : {}, SEMANTICS : *lisa*}

Crucially, I follow Kim and Sag (2005) and others in representing leftward displacement dependencies with the attribute SLASH, and rightward displacement dependencies with the attribute EXTRA. In this framework, any given local constituent tree is of the form $[\tau \beta_1 \dots \beta_n]$ where τ is the type of construction, α is the mother and $\beta_1 \dots \beta_n$ are its local daughters. For example, in Figure 4 the node that combines the subject and the verbal phrase is $[\text{S}_{\text{head-subj-cxt}}^{\text{NP VP}}]$. Here, attributes other than SLASH and EXTRA are omitted due to space limitations.⁴

The label VP is merely an abbreviation for a verbal expression with one element listed in VALENCE, and S is a verbal constituent with no elements listed in valence. For illustration, the V *gave* in Figure 4 is shown in full in 20a, the VP *gave a book* is shown in (20b), and the S node is in (20c). Phrase-structure rules are responsible for matching and ordering the elements in VALENCE with the sisters of the head, combining phonological information, composing the semantic representations, and projecting the correct information to the mother node.

- (20) a. {PHON : /geɪv/, POS : *v*, VALENCE : ⟨NP, NP, PP⟩, SLASH : {},
EXTRA : {}, SEMANTICS : $\lambda z.\lambda y.\lambda x.give'(x, y, z)$ }
- b. {PHON : /geɪv ʌ məθ bʊk tu lisə/, POS : *v*, VALENCE : ⟨NP⟩, SLASH : {},
EXTRA : {}, SEMANTICS : $\lambda x.\exists y(book(y) \wedge about(y, math') \wedge give'(x, y, lisa'))$ }
- c. {PHON : /aɪ geɪv ʌ məθ bʊk tu lisə/, POS : *v*, VALENCE : ⟨⟩, SLASH : {},
EXTRA : {}, SEMANTICS : $\exists y(book(y) \wedge about(y, math') \wedge give'(speaker', y, lisa'))$ }

However, in a topicalization sentence like the one in Figure 5 the verbal nodes in the extraction path bear the specification [SLASH: {NP^y}], except when the extraction is terminated, at the matrix node $[\text{S}_{\text{SLASH: \{ \}}^{\text{head-filler-cxt}}^{\text{NP}^y \text{S}_{\text{SLASH: \{ NP}^y \}}}]$, where the first daughter is identified with the element in the SLASH value of the clause.

⁴ Although only SLASH and extra are show in this discussion, the model formalized below takes into consideration *all* attribute-value pairs, from *all* nodes in the local tree, including semantics and phonology. Thus, information about phonological phrasing too can influence the model's behavior. Moreover, if we augment our attribute-value sets with an attribute dedicated to information structure, then information about *foci* can be factored in and potentially influence the probability of a given tree, in a given context.

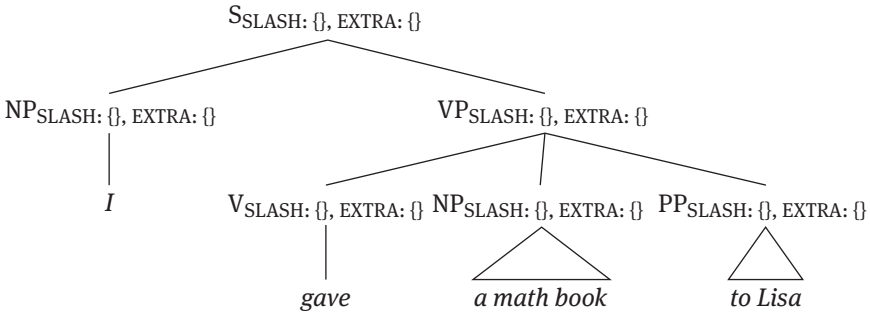


Figure 4: A clause without extraposition or extraction.

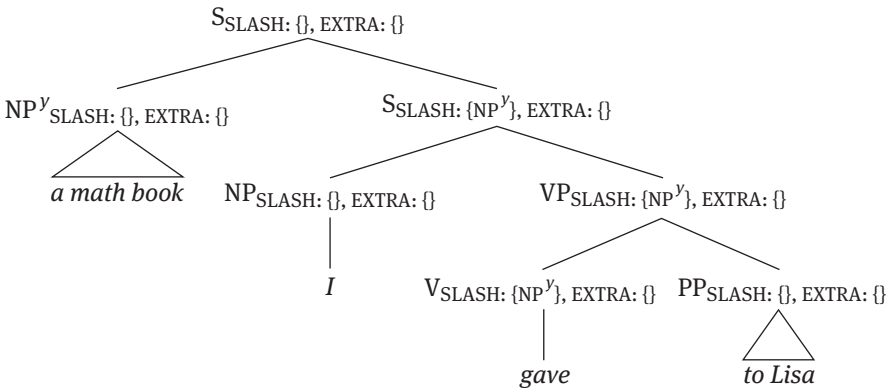


Figure 5: A clause with extraction.

Similarly, in an extraposition construction it is up to the attribute *extra* to allow an object to be realized to the right of its canonical position. In the case seen in Figure 6 the $\left[\begin{smallmatrix} \text{head-extraposed-cxt} \\ \text{VP}_{\text{EXTRA:}\{\}} \end{smallmatrix} \text{VP}_{\text{EXTRA:}\{\text{NP}^y\}} \text{NP}^y \right]$ allows the the verb phrase to combine with the a right-dislocated object in *extra*. When both extraposition and extraction occur in the same clause, both attributes *SLASH* and *extra* have non-empty values which propagate in the structure and are linked to their filler phrases independently.

We can now return to (18), and define the probability of parse *t* as the product of the probability of the constituent trees *c* that *t* is composed of:

$$(21) P(t) = \prod_{c \in t} P(c)$$

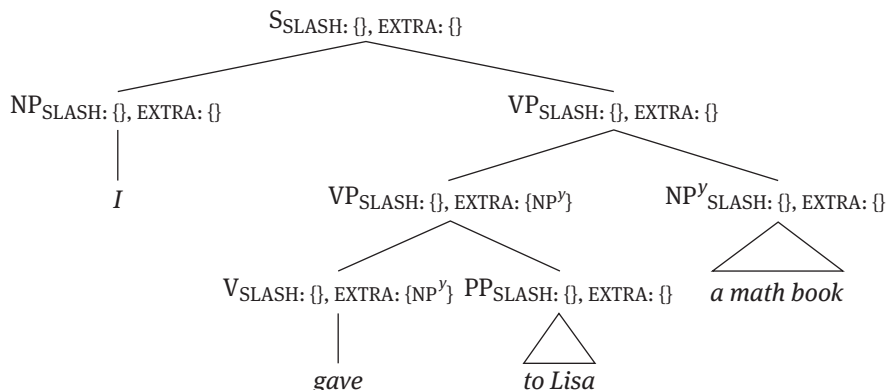


Figure 6: A clause with extraposition.

Finally, the probability $P(c)$ of any given local tree c can be defined in terms of the probability of its features. As a consequence, the probability of the same verbal node having non-empty values for SLASH and EXTRA simultaneously (as in *Who did you give to a picture of Sandy?*) will be exceedingly low, given that these constructions do not occur. In contrast, the probability of a verb's direct object being extraposed (i.e. of bearing [SLASH: {}] and [EXTRA: {NP}]) and the probability of a verb's direct object containing a leftward extraction (i.e. of bearing [SLASH: {NP}] and [EXTRA: {}]) are not as low because these constructions do in fact occur, as the attestation samples in (22) and (23) show.

- (22) a. Webb approved the sale _ to Iraq [of military transport helicopters] (...)
(COCA: 1995 MAG)
- b. And what was the value _ to Michelangelo [of being part of that]?
(COCA: 2008 SPOK)
- c. Just two weeks ago, Britain stopped a shipment _ to Iraq [of devices that could be used to trigger nuclear weapons].
(COCA: 1990 SPOK)
- (23) a. (...) this was something James didn't seem to have [a problem with _].
(COCA: 2007 FIC)
- b. Others, we're going to have to find [some housing for _].
(COCA: 1994 SPOK)
- c. There was one last question my editor was dying to know [the answer to _].
(COCA: 2004 NEWS)

Our statistical model should therefore predict that any given node has an extremely low probability of having non-empty values for SLASH and EXTRA simultaneously (simply because these do not occur) and that the independent probabilities of having non-empty values for SLASH and EXTRA are higher (given that the latter do in fact occur). Such a model should be flexible enough to allow the former to become more likely if non-empty values for SLASH and EXTRA are repeatedly observed simultaneously, for the same verb, as in the experiments reported above. As the increase in acceptability due to repeated exposure is linear, one plausible choice is the log-linear model in (24).⁵

$$(24) P([\alpha \beta_1 \dots \beta_n]) = \frac{\exp\left(\sum_{a:v} w_{a:v} \times f_{a:v}([\alpha \beta_1 \dots \beta_n])\right)}{\sum_{c \in T_\tau} \exp\left(\sum_{a:v} w_{a:v} \times f_{a:v}(c)\right)}$$

Here, $w_{a:v}$ is an \mathbb{R} -valued weight for a given attribute-value combination $a:v$ (including joints of attribute-value combinations, as described below), $f_{a:v}(c)$ is the indicator function yielding 1 if $a:v$ is present in the given local tree c and 0 otherwise, and τ is the set of local trees of type T_τ in the treebank. In HPSG, the values of SLASH and EXTRA can only be of one of two types: *empty-set* and *non-empty-set*. In in (24), the former is coded as 0 and the latter as 1.

For example, suppose that the local constituent tree c we are evaluating specifies that SLASH and EXTRA both have non-empty values. In that case, the model will take into consideration at least three weighted factors: one for non-empty SLASH, one for non-empty extra and a third one for the joint non-empty pair SLASH and EXTRA. More formally, the numerator of (24) will be: $\exp(w_{\text{SLASH}:1} + w_{\text{EXTRA}:1} + w_{\text{SLASH:1\&EXTRA:1}} + \dots)$, where the weights for attributes other than the mother's SLASH and extra are not shown for space limitations. Although the two first weights have moderate positive values, the third is strongly negative (since such gap distributions are extremely rare), and therefore the model yields a minuscule non-zero probability for such gap distributions. Consequently, such local constituent trees will be heavily dispreferred if there are more likely competing alternatives, and very difficult to consider when comprehenders realize the parse is incorrect and attempt a reanalysis. However, if tree structures simultaneously containing non-empty values for SLASH and EXTRA are made more likely, then the weight $w_{\text{SLASH:1\&EXTRA:1}}$ increases, and so does the probability of the double-extraction analysis. Since the model is linear, a linear

⁵ See Miyao and Tsujii (2002,2008) for more discussion about this class of models and their computational implementation. Alternatively, such a model may be recast in terms of Data-Oriented Parsing, such as Linadarki (2006).

increase in the frequency of such structures leads to a linear increase in their probability. And as the latter parses becomes more likely, they require less cognitive effort to compute than before, and their acceptability improves (perhaps as a function of both the probability and the required processing effort).

If on the other hand the constituent tree c we are evaluating specifies that SLASH is empty but extra is not, then the numerator of (24) will instead be $\exp(w_{\text{SLASH:1}} + w_{\text{EXTRA:1}} + w_{\text{SLASH:1\&EXTRA:1}} + \dots)$, all of which are positive weights, as intended. Consequently, such structures will be more likely, and therefore easier to process, harder to preempt, and ultimately deemed more acceptable.

Consequently, frequency alone can significantly ameliorate freezing effects as long as there are no additional factors hampering or preempting the correct parse; for example, no additional processing difficulty incurred by crossing extraction and extraposition, converging on the same sentence region, no competition from highly likely and alternative parses caused by sentence-medial P stranding, and no informational-structural conflicts due to multiple *foci*.

It is possible that the kinds of expectations that we are concerned with here are straightforwardly created by extra-grammatical heuristic parsing rules drawn from frequently occurring patterns, deployed during online sentence comprehension. There is evidence that speakers resort to such heuristics. For example, given the lexical input ‘*who did ...*’ with a high-falling intonation, speakers of English create the expectation of an $S_{\text{SLASH:}\{NP^y\}, \text{EXTRA:}\{\}}$ constituent in which y is co-referential with the *wh*-phrase. Often times this heuristic will aid language processor, by correctly pre-activating the right linguistic structures and rules, but sometimes it will not, as in continuations where there is no extraction whatsoever, e.g. ‘*who did that?*’. Although such heuristics involve linguistic information, they need not be part of the grammar *per se*. As Kroch (2001: 722) notes, “There is no doubt, however, that human beings like other animals, track the frequencies of events in their environment, including the frequency of linguistic events.” For other examples of similar heuristics likely deployed during sentence processing see Sag and Wasow (2011, 2015), including some that involve visual and gestural information, social knowledge, style, and genre. For an overview about how this kind of expectation can be represented in a Bayesian framework see Manning (2003).

5 Conclusion

Speakers use probabilistic information as an heuristic to predict upcoming linguistic input and aid the processing of complex and ambiguous utterances.

Such heuristics are adaptive in order to overcome variation and unexpected patterns. Hofmeister et al. (2015) propose that the unacceptability of freezing constructions is caused by their unanticipated syntactic structure, which creates processing difficulty. The experimental results reported in this paper are consistent with this hypothesis, since freezing effects can be ameliorated simply by making such structures more frequent. Following Fodor (1978), Huck and Na (1990), Bolinger (1992), Hofmeister et al. (2015), I argue that freezing effects are strongest when the correct syntactic analysis is extremely unlikely due to independent factors, such as /the existence of alternative syntactic parses, crossing extraction pathways, which likely cause additional processing difficulty and make the correct parse construction unlikely. Extraposition freezing constructions are argued to be rare – and therefore unexpected – because two *foci* are governed by the same verb, and as such may only be pragmatically felicitous in peculiar contexts.

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Appendix A

1. Which cake did you serve (to) Mark several slices of?
2. Which cigarettes did you toss (to) Sean several packages of?
3. Which coffee did you sell (to) Roger several blends of?
4. Which documents did you forward (to) Jake various copies of?
5. Which house did you pay (to) the IRS too much tax on?
6. Which lands did you lease (to) Scott multiple parcels of?
7. Which logos did you hand (to) Frank several drawings of?
8. Which building did you (to) grant Sam too much access to?
9. Which machine did you ship (to) Quinn several parts of?
10. Which mistake did you assign (to) Lee too much blame for?
11. Which plant did you offer (to) Pam several varieties of?
12. Which problem did you write (to) Robin several emails about?
13. Which products did you send (to) John some samples of?
14. Which provisions did you bring (to) Carl abundant supplies of?
15. Which riddle did you read (to) Ben several versions of?
16. Which stocks did you owe (to) Kim some dividends from?
17. Which student did you pass (to) Bree several notes about?
18. Which theory did you show (to) Mia some basic principles of?
19. Which topic did you lend (to) Doug several books about?
20. Which wine did you slide (to) Rose several glasses of?

Appendix B

1. Who did you promise (to) a sum of \$1,000 (to)?
2. Who did you forward (to) a copy of the contract (to)?
3. Who did you owe (to) a debt of gratitude (to)?
4. Who did you sell (to) your share of the company (to)?
5. Who did you send (to) several letters of apologies (to)?
6. Who did you award (to) the custody of the children (to)?
7. Who did you feed (to) a handful of roasted peanuts (to)?
8. Who did you show (to) the letter from the IRS (to)?
9. Who did you teach (to) the basics of poker (to)?
10. Who did you throw (to) the bouquet of flowers (to)?
11. Who did you disclose (to) the breach of security (to)?
12. Who did you give (to) a box of Belgian chocolates (to)?
13. Who did you grant (to) full access to the pool (to)?
14. Who did you mention (to) the cost of the damage (to)?
15. Who did you offer (to) a bribe of \$25,000 (to)?
16. Who did you owe (to) a debt of millions of dollars (to)?
17. Who did you pass (to) several notes about me (to)?
18. Who did you pay (to) a bribe of \$2,000 (to)?
19. Who did you serve (to) a slice of frosted cake (to)?
20. Who did you toss (to) the box of matches (to)?

Marion Jäger

An experimental study on freezing and topicalization in English

Abstract: Extraction from topicalization belongs to the constructions which have been analyzed to be ungrammatical due to subextraction from a moved constituent and are therefore assumed to be freezing configurations (cf. Corver 2006, 2017 for a review). Syntactic accounts on freezing which explain this phenomenon in terms of grammatical restrictions have been challenged by processing accounts which explain freezing by means of extra-grammatical factors like processing complexity (e.g. Hofmeister, Culicover, and Winkler 2015; Chaves (this volume), Culicover and Winkler (this volume)). In this paper, we argue that the three factors topicalization, embedding and extraction play a role in the unacceptability of extraction from topicalization. Two rating studies show that these three factors independently lead to a decline in acceptability, as they each add complexity to the structure. Our study therefore provides further evidence for the claim that freezing configurations can be better explained by processing complexity than by syntactic restrictions.

Keywords: Topicalization, extraction, freezing, processing complexity

1 Introduction

This study analyzes extraction from embedded topicalization in English. Example (1) demonstrates how this construction is derived. The declarative sentence in (1a) consists of canonical SVO order. The sentence in (1b) shows topicalization, i.e. the object *a book about syntax* has been moved to the sentence-initial position. In (1c), the topicalized structure is embedded. (1d) shows subextraction from the embedded topic, i.e. *syntax* has undergone *wh*-movement to the sentence initial position of the matrix clause.

- (1) a. Daniel read [a book about syntax]. (SVO)
b. [A book about syntax]_i, Daniel read *t_i*. (Topicalization)
c. Paula thought that [a book about syntax]_i, Daniel read *t_i*. (Embedded topicalization)
d. What_j did Paula think that [a book about *t_j*]_i Daniel read *t_i*? (Extraction from embedded topicalization)

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It has been claimed in the literature that structures with extraction from topicalization, like the *wh*-question in (1d), are ungrammatical due to *freezing* (cf. Corver 2006, 2017 for a review). Freezing is a special type of island effect. The idea is that it is impossible to extract out of a constituent which has undergone movement: a moved constituent is frozen and thus banned from extraction. Ross (1967) first observed that extraction from a constituent which has been extraposed is impossible. An example for this phenomenon is given in (2).

- (2) a. I saw [a book –] yesterday *about lazy pronouns* (Corver 2006: 388)
 b. *[What kind of pronouns]_i; did you read [a book *t_i*] yesterday [about *t_i*]_i?
 (Corver 2006: 389)

In (2a), *about lazy pronouns* has undergone PP-extraposition. (2b) shows extraction from the extraposed constituent, which leads to unacceptability.

Before further elaborating on freezing with respect to extraction from topicalization, we first summarize some general observations in the literature with respect to topicalization.

Topicalization involves non-canonical word order by preposing a constituent to the sentence-initial position. In English, *focus topicalization* is distinguished from *topic topicalization* (e.g. Gundel 1977; Prince 1981; Ward, Birner, and Huddleston 2002; Ward and Birner 2004). In focus topicalization, the preposed constituent, which carries pitch accent, and the deaccented rest of the sentence form one intonation unit. An example is shown in (3). The focused element *John* is underlined.

- (3) John he called. (Gundel 1977: 134)

This sentence is an appropriate answer to the question “Who did he call?” (Gundel 1977: 134).

Topic topicalization, on the other hand, consists of two intonation units with a pause following the topicalized constituent. The main pitch accent is on the focused element which carries new information and does not correspond to the topicalized element of the sentence (Prince 1998). An example for topic topicalization is given in (4).

- (4) John he called. (Gundel 1977: 134)

In this example, the verb *called* is the focus and carries the main pitch accent while *John* is the topic. This sentence is an appropriate answer to the question “What about John?” (Gundel 1977: 134).

In topicalization constructions, the preposed element provides an anaphoric link to the preceding discourse (e.g. Gregory and Michaelis 2001; Ward and Birner 2004). Therefore, topicalization contributes to the cohesion of a text (e.g. Hietaranta 1989). Netz and Kuzar (2007) consider object fronting to be a marked theme construction and found only a few examples of this construction in their corpus study with spoken language data. In most of the examples of object fronting, which they found in the Santa Barbara Corpus of Spoken American English (SBCSAE), this construction was used “to express the logical relation of contrast in the discourse” (Netz and Kuzar 2007: 331).

Different syntactic analyses of topicalization have been proposed in the literature. A prominent analysis is that topicalization is leftward adjunction to IP (Baltin 1982; Lasnik and Saito 1992; Rochemont 1989; Maki, Kaiser, and Ochi 1999).¹ Evidence for this analysis is the fact that the topicalized constituent follows the complementizer in embedded topicalization. In (5b), the NP *articles about vowel harmony* has been moved from its base position to the specifier position of IP.

- (5) a. I think that [_{IP} you should read [_{NP} articles about vowel harmony] carefully]
 b. I think that [_{IP}[_{NP} articles about vowel harmony], [_{IP} you should read *t* carefully]] (Lasnik and Saito 1992: 101)

Lasnik and Saito (1992) claim that embedded topicalization is possible in English but that it is a marginal construction for some speakers.^{2,3} Moreover, it has been observed that extraction from topicalization is impossible. This phenomenon is discussed in the following sections. Section 1.1 presents how syntactic accounts analyze extraction from topicalization. Section 1.2 presents alternative analyses of this phenomenon which take processing into account. In this paper, we argue against syntactic accounts and provide further evidence for processing accounts.

1 Other analyses involve e.g. syntactic movement to Spec-CP. See Authier (1992) for a review and discussion. Müller and Sternefeld (1993) argue against adjunction to IP analyses and against movement to Spec-CP analyses. They claim that topics are “specifiers of their own topic phrase” (Müller and Sternefeld 1993: 485).

2 Susanne Winkler pointed out that embedded topicalization could be a historical phenomenon and provided the following example from 1853: “Ah, happiness courts the light, so we deem the world is gay; but misery hides aloof, so we deem that misery there is none” (Hermann Melville, “Bartleby the Scrivener”).

3 Thanks to Peter Culicover for pointing out that natural examples of embedded topicalization can be found on the internet when searching for “think that for” or “think that into”, e.g., “And they all think that for money we should do everything.” (<https://apha.confex.com/apha/135am/webprogram/authorz.html>)

1.1 Syntactic accounts of extraction from topicalization

When it comes to extraction from configurations with an embedded topic, two types of extraction can be distinguished: argument extraction over an embedded topic and subextraction from an embedded topic. The unacceptability of both extraction types has been discussed in the syntactic literature.

The examples in (6) show that extraction over embedded topics are unacceptable. It has been claimed that topicalization through adjunction to the maximal projection IP causes ‘topic islands’, as the embedded topic is a barrier for extraction (Rochemont 1989; Culicover [1992] 2013). Extraction over the embedded topic *Bill* in (6a) and extraction over *Tom* in (6b) is impossible.

- (6) a. *What does John think that Bill, Mary gave to?
 b. *This book, I know that Tom, Mary gave to. (Rochemont 1989: 147)

Culicover (2013) suggests different syntactic analyses for topic topicalization and focus topicalization. He assumes an additional complementizer-type position which he calls Polarity Phrase (PolP). Whereas topic topicalization involves movement to Spec-IP as in (7b), focus topicalization involves movement to SpecPolP, as in (7a).

- (7) a. [_{PolP} [_{Spec} XP_i] Focus [_{IP} ... t_i ...]]
 b. [_{PolP} Spec Pol [_{IP} XP_i [_{IP} ... t_i ...]]] (Culicover 2013: 248)

Culicover (2013) argues that in contrast to IP, PolP is not a barrier for extraction. Therefore, extraction over the focus in Spec-PolP is more acceptable than extraction over a topic in Spec-IP, although the judgments are subtle. Culicover (2013) provides the examples in (8).

- (8) a. To Robin, I gave a book. (Culicover 2013: 248)
 b. *Which book did Lee say that, to Robin, she gave? (Culicover 2013: 249)
 c. To ROBIN I gave a book. (Culicover 2013: 248)
 d. Which book/What did Lee say that to ROBIN she gave? (Culicover 2013: 250)

(8a) shows topic topicalization with the characteristic pause after the topicalized element *To Robin* and the focus on *book*. (8b) involves argument extraction out of the construction in (8a) and is ungrammatical. (8c) shows the same sentence as in (8a) but with focus topicalization in which the fronted element carries the primary pitch accent and forms one intonation unit with the rest of the sentence. In contrast to (8a), *book* is deaccented. The wh-question in (8d) contains extraction from the

sentence in (8c). According to Culicover (2013), (8d) is more acceptable than (8b). However, the difference between (8b) and (8d) is difficult to judge without context.

Culicover (2013) concludes that the two different types of topicalization in English can be captured by PoIP and that focus topicalization, in contrast to topic topicalization, does not create ‘topic islands’.

The examples in (6) and (8) show argument extraction over an embedded topic. The focus of my experimental study lies on subextraction from embedded topicalization. Lasnik and Saito (1992) discuss why subextraction from embedded topicalization is not possible, as in the example in (9).

- (9) ??Vowel harmony, I think that [_{IP}[_{NP} articles about *t*], [_{IP} you should read *t* carefully]]
(Lasnik and Saito: 101)

The sentence in (9) involves subextraction from the embedded topic *articles about vowel harmony*. At first, Lasnik and Saito (1992) consider violation of Subjacency to be the cause for the markedness of the construction.⁴ According to the Subjacency requirement, the NP *vowel harmony* cannot move out of the IP which is created by embedded topicalization. However, Lasnik and Saito (1992) doubt that Subjacency is the reason for the marginality of (9). They argue that extraction from topicalization as in (10b) should have the same ungrammatical status as subject condition violations as in (10a) if it violates Subjacency. However, according to Lasnik and Saito (1992), (10b) is more acceptable than (10a) and does not violate Subjacency, as the embedded topic is not a barrier for extraction. They argue that the embedded topic *pictures of t₁* is not a barrier for extraction, as it is an \bar{A} -binder (cf. Lasnik and Saito 1992: 102).⁵

- (10) a. ?*who₁ do you think that [pictures of *t*₁] are on sale
b. ??who₁ do you think that [pictures of *t*₁]₂, John wanted *t*₂
(Lasnik and Saito 1992: 101)

⁴ See e.g. Johnson (1986) for a similar analysis.

⁵ Lasnik and Saito (1992: 102) provide the following definition of *barriers*:

- y* is a *barrier* for β if
- y* is a maximal projection,
 - y* is not an \bar{A} -binder,
 - y* is not L-marked, and
 - y* dominates β .

Lasnik and Saito suggest that the marginality of (10b) is caused by the internal constituent effect which prohibits extraction out of clause internal constituents in general, i.e. extraction is only possible from constituents which are in a right-peripheral position (cf. Kuno 1973). However, their argumentation is based on very subtle differences between subject condition violations and extraction from topicalization. Moreover, extraction from topicalization is often considered to be not a marginal but ungrammatical construction (cf. Corver 2017: footnote 7).

Under the assumption that topicalization involves adjunction to IP, two syntactic constraints concerning freezing constructions can be applied to extraction from topicalization: *The Immediate Self Domination Principle* (ISP) by Ross (1974) and the *Freezing Principle* by Wexler and Culicover (1980). The ISP is stated in (11). This principle blocks extraction out of an adjunction configuration.

(11) *The Immediate Self Domination Principle* (ISP) (Ross 1974: 102):

No element may be chopped out of a node which immediately dominates another node of the same type.

According to the ISP, the IP of an embedded topic is a frozen node, as it immediately dominates another IP node.⁶ The ISP can therefore be applied to the examples in (9) and (10b) which involve subextraction from an embedded topic. In (9), the IP which contains the embedded topic *articles about vowel harmony* immediately dominates another IP which contains *you should read t carefully*. Therefore, no node can be extracted out of the embedded topic.

The Freezing Principle by Wexler and Culicover (1980) is stated in (12):

(12) *Freezing Principle* (Wexler and Culicover 1980: 143):

- a. If the immediate structure of a node in a phrase-marker is nonbase, that node is frozen.
- b. If a node A of a phrase-marker is frozen, no node dominated by A may be analyzed by a transformation.

According to (12a), a constituent which has been moved is frozen and cannot undergo further movements. (12b) additionally specifies that nodes which are dominated by a frozen node can also not be analyzed by a transformation. The Freezing Principle covers the examples which have been analyzed as topic

⁶ This only holds under the assumption that topicalization involves adjunction to IP but not under an account that assumes Split-CP constructions.

islands as in (6) and (8). In (8b), the topic *To Robin* is nonbase and therefore frozen. Extraction of the argument *which book* over this frozen node is prohibited, as the argument is dominated by the frozen topic and can therefore not be analyzed by a transformation. However, the Freezing Principle does not predict differences between extraction over a focus and extraction over a topic as Culicover (2013) suggests, as both embedded foci and embedded topics are nonbase and therefore frozen. According to the Freezing Principle, (8b) and (8d) should have the same ungrammaticality status. As mentioned earlier, judging these examples is difficult, as they are given without a context.

Additionally, the Freezing Principle explains the ungrammaticality of subextraction from topicalization as in (9) and (10b). In (9), the IP of the embedded topic, which is nonbase and therefore frozen, dominates *vowel harmony* which can therefore not be analyzed by a transformation.

To sum up, both topic islands which involve extraction over a topic and also configurations which involve subextraction from embedded topics can be explained by the Freezing Principle which renders these constructions ungrammatical. Moreover, they have in common that they contain several movement transformations and are therefore complex structures. We argue here that the unacceptability of extraction from topicalization and extraction over a topic is a matter of syntactic complexity in processing. We therefore follow studies which argue against syntactic accounts on freezing and claim that the unacceptability of freezing constructions can be better explained by taking processing difficulties into account. These theories are discussed in the following section.

1.2 Processing accounts of extraction from topicalization

Various studies claim that extra-grammatical factors lead to the unacceptability of island phenomena. It has been proposed that extractions cause processing difficulties, as the filler must be held in working memory while the gap is searched for and while the material between the filler and its gap is processed (e.g. Hawkins 1999, 2004; Kluender 1992, 1998, 2004; Hofmeister and Sag 2010; Hofmeister, Casanto, and Sag 2013). The processing account that has been proposed for island phenomena has also been applied to freezing configurations (e.g. Hofmeister, Culicover, and Winkler 2015; Chaves this volume; Culicover and Winkler this volume). Hofmeister, Culicover, and Winkler (2015), for example, provide experimental evidence for the claim that the unacceptability of extraction from extraposition results from the processing complexities independently caused by extraposition and extraction. They argue that “key features of freezing cause acceptability drops even when these examples do not violate any putative grammatical principle” (Hofmeister,

Culicover, and Winkler 2015: 467). Culicover and Winkler (this volume) provide further evidence for the processing difficulties involved in freezing configurations and postulate the *No Freezing Hypothesis* in (13):

- (13) *No Freezing Hypothesis*: the unacceptability of freezing configurations, and perhaps all islands, is due to processing complexity.

According to this hypothesis, freezing constructions are not ungrammatical due to violating syntactical freezing constraints but are unacceptable due to processing costs.⁷

Our current study on extraction from topicalization supports the No Freezing Hypothesis. We argue that in this freezing configuration, topicalization, embedding and extraction are complexity factors which lead to processing difficulties and therefore to unacceptability.

2 Experimental evidence

We conducted two acceptability studies in order to investigate extraction from topicalization.⁸ In these studies, we focused on subextraction from embedded topicalization and did not take extraction over a topic into account. As we tested isolated sentences without a preceding context or prosodic information, we did not control for the type of topicalization, i.e. focus topicalization or topic topicalization. However, we do not expect a difference between extraction from focus or topic topicalization, as both configurations involve the same complexity factors of topicalization, embedding and extraction. The first experiment shows that extraction from topicalization is worse than extraction from SVO order and receives judgments at the lower end of the rating scale. Moreover, embedded topicalization without extraction also receives low ratings. Therefore, our follow-up study investigates whether embedding leads to a decline in acceptability of topicalization structures and to what extent embedding can be considered a factor which contributes to the unacceptability of extraction from topicalization.

⁷ It is important to distinguish ungrammaticality from unacceptability. Configurations which violate grammatical constraints are ungrammatical and as a consequence also unacceptable. However, there are also configurations which do not violate grammatical constraints but are nevertheless unacceptable due to processing difficulties (cf. Hofmeister, Culicover, and Winkler 2015).

⁸ The studies are joint work with Frauke Geibig. See Geibig (2015) for a pilot study on extraction from topicalization.

2.1 Experiment 1: Extraction from topicalization

2.1.1 Data elicitation

In order to test extraction from topicalization, we conducted a thermometer judgment study (cf. Featherston 2008).⁹ According to this method, participants judge sentences relative to two reference examples and assign any value to the target sentences on an open scale. This method gives participants more freedom in their judgments than a Likert scale, especially when testing highly marked sentences. Participants are informed that the first rather unnatural reference sentence is worth 20 and that the second natural reference example is worth 30. Participants are then instructed to rate the naturalness of the target sentence relative to the reference examples.

There were 20 experimental items. We used a two by two design with the within subject factors word order and extraction. An example item can be seen in (14). The sentences of condition 1 consisted of canonical SVO order with an embedded clause introduced by the complementizer *that*. We used verbs like *say* or *think* in the main clauses, as these verbs are so-called “bridge-verbs” which allow long extraction (e.g. Erteschik-Shir 1973; Featherston 2004; Kiziak 2010). The canonical word order in condition 1 served as the basis sentence which was manipulated for the other three conditions. The question of condition 2 consisted of long wh-extraction. Condition 3 consisted of embedded topicalization and condition 4 consisted of extraction from embedded topicalization.

- (14) a. George said that he made a copy of the lease.
 [Condition 1 = SVO]
 b. What did George say that he made a copy of?
 [Condition 2 = SVO + wh-extraction]
 c. George said that a copy of the lease, he made.
 [Condition 3 = Embedded topicalization]
 d. What did George say that a copy of he made?
 [Condition 4 = Embedded topicalization + wh-extraction]

⁹ This method is similar to magnitude estimation (Bard et al. 1996). In magnitude estimation, participants judge sentences relative to one reference example, in a thermometer judgment study, participants judge sentences relative to two reference examples. See Featherston (2008) for a discussion of and further differences between the two methods.

Additionally, there was a between subject factor referred to as *given answer*. Half of the participants saw the questions of conditions 2 and 4 together with a given answer, which should facilitate the processing of the complex questions. Conditions 2 and 4 of example (14) can be seen with the given answer in (15).

- (15) a. What did George say that he made a copy of? - The lease.
 [= SVO + wh-extraction]
 b. What did George say that a copy of he made? - The lease.
 [= Embedded topicalization + wh-extraction]

The given answer was short and elliptical. We did not use an answer without ellipsis as in (16), as the wh-question should be the focus of the participants' judgments.

- (16) He made a copy of the lease.

In addition to the 20 items, there were 40 filler items consisting of questions as well as statements. 15 of these filler items were normed sentences with different levels of acceptability, ranging from acceptable (A-Standards) to unacceptable (E-Standards) (Featherston & Gerbrich to appear). Items and fillers were run latin square and presented in random order.

The experiment was uploaded as an online questionnaire on the OnExp2 server of the University of Tübingen. Participants received a link to the experiment and conducted it online. Participants first read detailed instructions about the procedure of the thermometer judgments. The actual experiment started after two practice sessions. In the first practice session, participants had to estimate the length of lines relative to two reference lines which had the values 20 and 30. This should familiarize participants with the task to make judgments relative to given examples. In the second practice session, participants rated different sentences and questions relative to two reference examples.

62 American English native speakers participated in the experiment and were recruited via Amazon Mechanical Turk (23 women and 39 men; mean age: 36.4). Participants had no knowledge about the purpose of the study.

2.1.2 Hypotheses

The hypotheses for this experiment are listed in (17). We expected a significant main effect of word order (17a), as topicalization in English is a marked

construction, especially without context. Moreover, we expected a significant main effect of extraction (17b), i.e. (14b) should be worse than (14a) and (14d) should be worse than (14c). (14b) is a grammatical construction. The decline in acceptability from (14a) to (14b) is expected due to the processing complexity of the filler-gap dependency in long wh-movement. (14d) is expected to receive the lowest ratings, as extraction from embedded topicalization is a complex structure (17c). Moreover, we predicted that the between subject factor *given answer* should lead to higher ratings for the relevant conditions, as the given answer provides the processor with the intended gap. This hypothesis is stated in (17d).

- (17) a. Conditions with SVO order (conditions 1 and 3) should generally be rated better than conditions with topicalization (conditions 3 and 4).
 b. Conditions without extraction (conditions 1 and 3) should receive better ratings than conditions with extraction (conditions 2 and 4).
 c. Extraction from embedded topicalization is unacceptable (condition 4).
 d. Ratings for the conditions with extraction should improve with the given answer.

2.1.3 Results and discussion

Ratings were normalized by means of z-score transformation in order to account for the participants' individual scales. Figure 1 illustrates normalized mean ratings of the experimental items as well as mean ratings of the standard filler items.

The results of a 2 x 2 ANOVA revealed a significant main effect of word order ($F_1(1, 61) = 564.89, p < 0.001, \eta^2 = 0.9; F_2(1, 19) = 341.66, p < 0.001; \eta^2 = 0.95$), as the conditions with topicalization were rated worse than the conditions without topicalization. This confirms the hypothesis in (17a). We also found a significant main effect of extraction ($F_1(1, 61) = 135.93, p < 0.001, \eta^2 = 0.69; F_2(1, 19) = 168.92, p < 0.001; \eta^2 = 0.9$) which confirms the hypothesis in (17b). Items without extraction were rated better than items with extraction. Moreover, there was a significant interaction between word order and extraction ($F_1(1, 61) = 53.46, p < 0.001, \eta^2 = 0.47; F_2(1, 19) = 34.44, p < 0.001; \eta^2 = 0.64$). This interaction can be interpreted better when looking at Figure 2. This graph shows that the difference between the conditions with and without extraction is bigger for the SVO-conditions (conditions 1 and 2) than for the conditions with embedded topicalization (conditions 3 and 4). Paired t-tests show that the difference between conditions 3 and 4 is highly significant ($t_1(61) = 5.22, p < 0.001; t_2(19) = 6.64, p < 0.001$), but that the t-values are smaller than for conditions 1 and 2 ($t_1(61) = 12.94, p < 0.001; t_2(19) = 10.85, p < 0.001$).

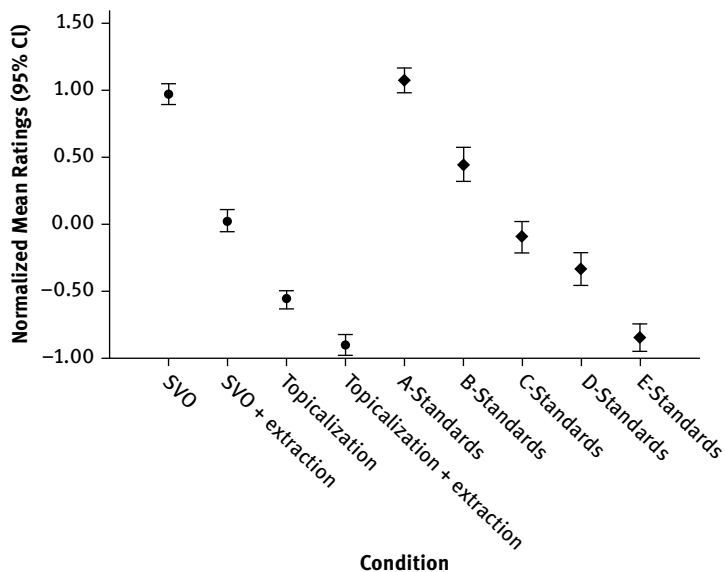


Figure 1: Mean ratings (z-scores) for experimental conditions and standard filler items.

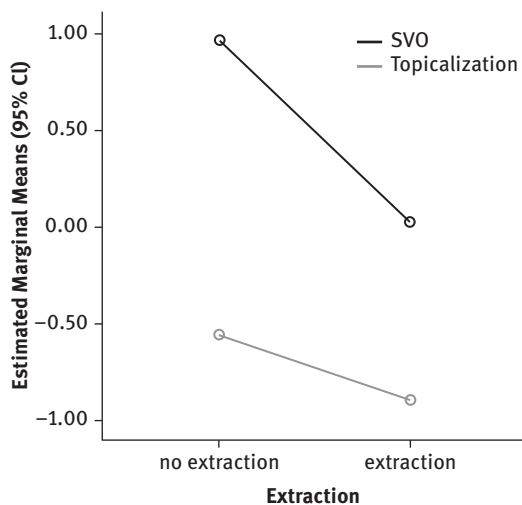


Figure 2: Interaction of word order and extraction.

The smaller difference between conditions 3 and 4 in comparison to conditions 1 and 2 could be due to a floor effect. However, as the difference is significant and as we used an open scale, a strong floor effect can be excluded. Ratings for condition 4

were as low as the ratings for the E-Standards and can therefore be considered to be unnatural in isolation.¹⁰ This confirms the hypothesis in (17c).

There was no effect for the between subject factor *given answer*. This factor was also not significant when analyzing the relevant conditions 2 and 4 separately. Therefore, the hypothesis in (17d) could not be confirmed. We expected the given answers to facilitate processing of the marked extraction constructions. That the answer did not improve judgments could be due to the presentation of the items. The question and the answer were just separated by a hyphen and each participant only saw five experimental items and five filler items with a given answer. Participants were not informed in the instructions that there are questions with answers and not told how to deal with these cases. Therefore, it might have been unexpected for participants to encounter these items which differed from the other 50 items without a given answer. Another explanation might be that extraction from topicalization is so unnatural in isolation that it cannot be saved by a short following context.

The items with topicalization consisted of embedded topicalization. Topicalization without embedding is already a marked construction in English. Embedded topicalization is more complex than topicalization without embedding and should thus be even more marked. Therefore, we expect that embedding also had an impact on the judgments of the items with topicalization. In this study, the items with embedded topicalization without extraction (condition 3) received low ratings, although the ratings were significantly better than those for extraction from topicalization. In the follow-up study of the next subchapter, we further tested the impact of topicalization and embedding and elaborate the consequences of these complexity factors on the theory of freezing.

In the first study, we tested isolated sentences without context. It has been shown that topicalization in English contributes to the cohesion of a text (Hietaranta 1989) and is often used for expressing contrast in a discourse (Netz and Kuzar 2007). In experiment 2, we therefore added a small context by means of a negatively marked contrastive phrase which provides a contrast to the topicalized element.

2.2 Experiment 2: Topicalization and embedding

2.2.1 Data elicitation

We again conducted a Thermometer Judgment Study (cf. Featherston 2008). There were 40 experimental items and 80 fillers. The two by two design of this

¹⁰ Further experiments are needed in order to test whether these sentences can be improved by a preceding context.

study consisted of the factors word order and embedding. An example item is shown in (18).

- (18) a. I interviewed the secretary of state, not the president.
[Condition 1 = SVO]
- b. Courtney thinks that I interviewed the secretary of state, not the president.
[Condition 2 = SVO + embedding]
- c. The secretary of state I interviewed, not the president.
[Condition 3 = Topicalization]
- d. Courtney thinks that the secretary of state I interviewed, not the president.
[Condition 4 = Topicalization + embedding]

Items of condition 1 consisted of SVO order and items of condition 2 consisted of SVO order and embedding. Items of condition 3 consisted of topicalization and items of condition 4 consisted of topicalization and embedding. In order to improve the conditions with topicalization, we added a small context to the items by means of a negatively marked contrastive phrase. The noun phrase of the negatively marked contrastive phrase and the noun phrase of the target clause were both subsets of the same inferred superset. In example (18), *not the president* is the negatively marked contrastive phrase. The noun phrase *the president* and the noun phrase of the target clause *the secretary of state* both belong to the inferred superset “politicians” and are therefore in a poset relation. The topicalized element provides a contrast to the noun phrase of the negatively marked contrastive phrase. Netz and Kuzar (2007) consider the expression of contrast to be an essential property of topicalization.

15 of the 80 filler items were again normed filler sentences which corresponded to the normed filler sentences of the preceding experiment.

The online questionnaire was uploaded on the OnExp2 server of the University of Tübingen. Participants were recruited via Amazon Mechanical Turk. 56 native speakers of American English took part in the study (28 women and 28 men; mean age: 32.8). They were naïve as to the topic of the study and did not take part in the previous experiment. The procedure and task corresponded to the preceding experiment.

2.2.2 Hypotheses

The hypotheses for this follow-up study are listed in (19). We expected a significant main effect of word order (19a), as SVO order is the preferred construction in English. Moreover, we expected a significant main effect of embedding

(19b), as embedding makes the items more complex. However, this effect should be more prominent for the conditions with topicalization than for the conditions with SVO order (19c).

- (19) a. Conditions with SVO order (conditions 1 and 2) should receive higher ratings than conditions with topicalization (conditions 3 and 4).
 b. Conditions without embedding (conditions 1 and 3) should be rated better than conditions with embedding (conditions 2 and 4).
 c. There should be a significant interaction between word order and embedding, as embedding should only have an effect on the conditions with topicalization (conditions 3 and 4) but not on the conditions with canonical word order (conditions 1 and 2).

2.2.3 Results and discussion

Mean ratings were transformed into z-scores. Figure 3 shows the mean z-scores per condition and also the mean z-scores for the normed filler items.

We investigated the effects of word order and embedding by means of a 2 x 2 ANOVA. A significant effect of word order ($F_1(1, 55) = 843.471, p < 0.001, \eta^2 = 0.94$; $F_2(1, 39) = 711.71, p < 0.001, \eta^2 = 0.95$) confirmed the hypothesis in (19a). As

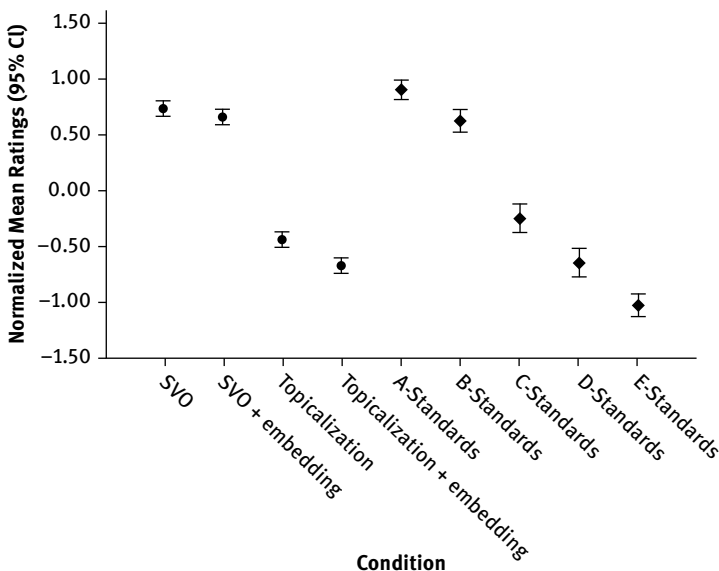


Figure 3: Mean ratings (z-scores) for experimental conditions and standard filler items.

expected, the conditions with SVO order received high ratings while the conditions with topicalization received significantly lower ratings. We also found a significant effect of embedding ($F_1(1, 55) = 13.92, p < 0.001, \eta^2 = 0.2$; $F_2(1, 39) = 16.9, p < 0.001, \eta^2 = 0.3$), which confirms the hypothesis in (19b). Moreover, there was a significant interaction between word order and embedding ($F_1(1, 55) = 4.87, p < 0.05, \eta^2 = 0.2$; $F_2(1, 39) = 4.01, p < 0.001, \eta^2 = 0.09$). Paired t-Tests confirmed that there was no significant difference between conditions 1 and 2 ($t_1(55) = 1.68, p > 0.05$; $t_2(39) = 1.65, p > 0.05$). Therefore, items with SVO order did not receive significantly lower ratings with embedding than without embedding. The difference between topicalization with and without embedding was, on the other hand, significant ($t_1(55) = 3.73, p < 0.001$; $t_2(39) = 3.82, p < 0.001$). These results confirm the hypothesis (19c).

In summary, all three hypotheses could be confirmed. The results show that topicalization is a marked construction in English. Embedding adds another complexity factor to this construction which makes embedded topicalization even more marked.

3 General discussion

The results of experiment 1 confirmed the claim in the literature that extraction from topicalization is unacceptable in English. This is expected by syntactic accounts on freezing like the ISP (Ross 1974) and the Freezing Principle (Wexler and Culicover 1980). Syntactic accounts claim that extraction from topicalization is banned, as the embedded topic is frozen to extraction. We argue, however, that the unacceptability of this configuration can be better explained in terms of processing difficulties.

Hawkins (1999: 246) observed that “ungrammaticality in a complex environment implies ungrammaticality in all more complex counterparts”. In our study, we observed that “unacceptability in a complex environment implies unacceptability in all more complex environments”, as even grammatical configurations result in unacceptability due to certain complexity factors. In experiment 2, we found that topicalization is judged significantly worse than SVO order, although topicalization is a grammatical configuration. Topicalization is more complex than SVO order, as it involves movement of the object to the sentence initial position and therefore a filler-gap dependency which makes the configuration less acceptable. Additionally, it is a less frequent structure in English. Due to the lower frequency of topicalization in English, it is likely that this structure is less

expected by the parser. See Chaves (this volume) for a discussion of the relation between low frequency and low acceptability of a structure.¹¹

Ratings for embedded topicalization were significantly lower than ratings for topicalization without embedding. We infer from these results that embedding adds additional processing costs to the marked structure of topicalization, as it makes the structure more complex. This complexity may arise from the unexpected object after the complementizer *that* which can lead to a temporal ambiguity. In (18d), the parser expects *the secretary of state* to be the subject of the embedded clause. By encountering the pronoun *I*, this analysis has to be revised which increases processing costs.¹² However, this assumption has to be verified by on-line experiments like eye-tracking.

Extraction from embedded topicalization makes the already marked structure of embedded topicalization even more complex, as another filler-gap dependency comes into play. Adding another complexity factor to a marked construction is expected to lead to unacceptability. It is therefore not surprising that this configuration received ratings at the lower end of participants' individual scales. In summary, we could identify the three factors topicalization, embedding and extraction which lead to lower acceptability judgments.¹³

Moreover, experiment 1 provides further evidence for the assumption that filler-gap dependencies involve higher processing costs. Items with long wh-extraction from SVO order received significantly lower ratings than SVO order without extraction, although the sentences are grammatical. This can be explained by the processing costs caused by the search for the gap. Furthermore, it can be argued that the processor runs into a garden path in items which contain wh-extraction of an inanimate object. We demonstrate this argument by means of example (14b) repeated in (20). While reading the sentence, the processor searches for the closest gap and finds a potential gap after the verb *say*. By further encountering the complementizer *that*, the processor has to revise this analysis and has to look for the intended gap which he only finds at the end of the sentence. Hawkins refers to this process as a *first resort strategy*, which is defined as the *Active Filler Hypothesis* by Frazier and Clifton (1989).

11 See also Weskott et al. (2011) and references therein who claim that low frequency and processing difficulty belong to the correlates of marked word orders like OVS which lead to their dispreference compared to the respective unmarked word orders.

12 See Chaves (this volume) who argues that ambiguities in certain freezing constructions "likely cause processing difficulty, and as a consequence, can lower acceptability."

13 In order to determine how much these factors independently lower judgments and whether the judgments are additive, all three factors have to be tested in a single experiment.

(20) What did George say that he made a copy of?

This temporal syntactic ambiguity may also lead to processing costs in both the items with *wh*-extraction from SVO order and the items with extraction from topicalization. However, this has to be confirmed by on-line experiments like eye-tracking or self-paced reading studies.

To sum up, the items with extraction from SVO order demonstrate that processing difficulties lead to a decrease of acceptability, even in grammatical structures. Extraction from a marked construction like embedded object topicalization involves additive processing costs which lead to unacceptability.

4 Conclusion and outlook

We conducted two thermometer judgment studies in order to investigate extraction from topicalization and identified three factors which lead to the unacceptability of this configuration: object topicalization, embedding and extraction. Each of these factors adds complexity to the structure which makes the structures less acceptable. This is nicely reflected in the ratings of our studies: object topicalization without extraction and without embedding received significantly lower ratings than SVO order. Embedded object topicalization received significantly lower ratings than topicalization without embedding, and extraction from embedded topicalization received the lowest ratings. These results support the idea that the unacceptability of freezing constructions like extraction from topicalization can be better explained by processing complexity than by syntactic constraints. Accordingly, these studies provide further evidence for the No Freezing Hypothesis postulated by Culicover and Winkler (this volume).

Further experiments could strengthen the results. Studies arguing against syntactic freezing accounts have shown that the ratings for freezing configurations can be improved by a preceding context which facilitates processing (see Culicover & Winkler this volume and references therein). We therefore expect that the ratings for topicalization, embedded topicalization and extraction from topicalization can also be improved when the sentences are preceded by a suitable context, especially since topicalization is a discourse oriented phenomenon. Moreover, on-line studies like self-paced reading could give further insights into the processing of the structures under consideration. We expect that the factors object topicalization, embedding and extraction should be reflected in longer reading times for each added factor.

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Index

Acceptability

- acceptability judgment 14–15, 196, 322, 357–361, 366, 369, 390, 433, 446
- acceptability rating 201–204, 318, 337–338, 410, 413, 415–16, 440–442, 444–445

Activity Condition (AC) 69, 89, 285

Adaptation 404, 411, 418

Additive 9, 14–15, 19, 360, 366, 370, 390, 446, 447

Adjective

- predicative adjective 179
- transitive adjectives 145, 180–182

Adverb 14, 39–40, 43, 60, 227–229, 231–232, 234, 246–248, 253–254, 274–276, 279, 291–292, 369–370, 390

Agree 72, 75, 76, 80, 82, 83, 118, 286, 288

Agreement 12, 34, 35, 53–56, 75, 81–84, 98–99, 232–233, 240–241, 256–257, 287–288, 304–306, 321, 326, 331, 339

- anti-agreement 287, 300

Alpha-over-beta 118–119, 121–126, 135

Alternative semantics 268, 270–272, 281

Ambiguity 31, 180, 244, 251, 265, 267, 306, 330, 405, 407, 446–447

Amelioration 13, 217, 339, 404–405, 413, 416–417, 423–424

American Sign Language (ASL) 293–294

Applicative 128

Argument

- external argument 11, 236, 322–323, 326 (*see also* Subject)
- internal argument 8, 149–150, 179, 286, 288, 294, 300, 306, 322–323, 326–327, 341

A-to-Q movement 162, 181

Background 12, 324, 373, 394

Bare noun phrase 177–178

Barrier 113, 115, 132, 273, 433–434

Basque 287, 290–292, 306

Binding 126, 236, 288, 290, 300

- chain-binding 115

- Principle A 114–115

Bleeding 112–114, 116

- counter-bleeding 113–116

Blocking effects 304

Buffer 118–126, 133, 135

Cartography 29–43, 47, 49, 76, 98–99, 190

Case 38–39, 53, 67, 72, 181–182, 285, 291–292, 298–299, 300, 329

- accusative 38–39

- nominative 38–39, 74, 90, 256

- oblique 182, 333–334, 409, 412

- dative 182, 333

C-command 55, 75, 82–83, 112–113, 115, 118, 120–123, 127–128, 134–135, 230, 232, 248–250, 269, 278

CED. *See* Condition on Extraction Domains

Chain 90, 115, 277, 279–280, 321, 323, 339–340, 357–358, 364–367, 370–371, 378–380, 389, 391, 394–395, 399–400

Chain Uniformity 11, 76, 321

Chamorro 306–308

Clause-mate 106–107, 132

Clause type 226, 229, 232, 240, 258

Cleft 9, 17, 195–221

Clitic 33, 84, 239, 288, 290, 295, 299, 308

Common ground 206, 207, 226, 244

Comparative 145, 153–154, 157–158, 160, 162, 171–172, 175, 180–182

Complexity 8, 12, 43, 72, 357, 359, 364–365, 380, 393, 395, 398, 400, 436–437, 440, 442, 445–447

Condition on Extraction Domain (CED) 8, 11, 76, 113–118, 121–123, 318–320, 326, 331, 339, 344

Constituency 132, 158, 184–185, 241, 255–256, 289–290, 293, 309

Contamination 118–119, 133

Context 13, 114, 196, 206, 209–213, 215–218, 327, 360, 364, 366–367, 370, 371, 373, 377–380, 388–391, 394, 396, 398–400, 414, 418, 436–437, 439, 442–443, 447

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- Contrast 13, 95–96, 198, 205–206, 208–213, 219, 253–254, 296, 363–364, 378–379, 404, 405, 417, 432, 442–443
- Coordination 184–185, 234
- Copula 30, 38–39, 42, 46–47, 53
– Hebrew copular sentence 38, 59, 61
– Inverse copular sentence 30, 41–43, 56–57, 61
- Crucial configuration 29, 31–32, 34, 37, 57, 78
- Crucial position 5–6, 9–10, 32, 36, 68, 77, 87, 95–96, 118–120, 133, 135, 189, 233, 246, 253, 259, 277, 279, 371
– crucial goal 6, 77–78, 280
– crucial head 51, 57, 259
- Criterion
– Subject Criterion 30–35, 37, 81, 89 (see also Island, Subject Island)
– wh-criterion 5, 242
- Crossing 49, 341, 343, 344, 358, 380, 417, 424
- Cross-linguistic variation 286, 309, 344
- Cyclicity 4, 72, 121, 128, 135, 289, 318, 339–341, 344
– counter-cyclic 121
– cyclic node 113
- Dative shift 3
- Decontamination 118–120, 124, 125, 133–134
- Definiteness 195, 334, 392
- Dependency. *See also* Movement
– A-bar dependency 73, 320, 333
- Derivation 14–15, 30, 47, 48–53, 55, 62, 71–72, 78, 85, 91, 95–97, 112, 115–119, 121–125, 130, 132–134, 149–151, 158, 168, 171–172, 181, 183, 232, 233, 238–242, 250, 256–257, 271, 276, 278, 305, 318, 322–323, 330, 339–340, 344, 356–357, 395
- Derived position 83, 133, 143–144, 166, 169, 171–176, 179, 183, 187–188, 191, 200, 281, 285
- Deverbal 146, 151–156, 158–160, 162–163, 166, 168–171, 175, 177, 180, 192
- Discourse particle 10, 17, 225–234, 253
- Displacement 1, 7, 17, 73, 75, 106, 144, 147–149, 151, 158, 164–172, 188–192, 240, 321, 406, 417, 419. *See also* Movement
- Ditransitive 293, 300
- D-linking 44
- Double object 409
- Dutch 143–192, 244, 254, 257–258
- ECM. *See* Exceptional case marking
- ECP. *See* Empty Category Principle
- Edge
– edge feature (EF) 71, 119
– phase edge 16, 68, 87, 91, 93, 95, 98, 116, 117, 119–120, 122, 240, 298, 323, 326, 339, 344
- Ellipsis
– sluicing 128
– Verb Phrase Ellipsis (VPE) 411
- Embedding 20, 97, 200, 335, 430, 437, 442–447
- Emphasis 237–238, 240, 250–251, 259
- Empty Category Principle (ECP) 8, 33, 61, 69, 81, 89, 90, 91
- EPP. *See* Extended Projection Principle
- Exceptional case marking (ECM) 320
- Extended Projection Principle (EPP) 10, 87, 74–75, 91, 89, 93, 285
- Extension condition 239
- Extraction. *See also* Wh-extraction, Subextraction, Movement
– extraction from CP 107
– extraction from DP 188, 292–293, 387, 389, 399–400
– extraction from extraposition 360, 361–364, 366–367, 371, 378–380, 436
– extraction from NP 217
- Extraposition 2, 4–5, 9, 14–15, 157, 165, 227, 229, 319, 353, 356, 361–367, 371, 378, 380, 390, 403–404, 406–407, 412–414, 417–418, 420–421, 423–424, 431, 436
- Feeding 94, 120, 124
– counter-feeding 120, 124–125

- Filler-gap dependency 417, 440, 445–446.
See also Wh-movement
- Filter *See* Index filter
- Finite 105, 148, 153, 166, 172, 321, 324,
 329–330, 337
- Focus
- contrastive focus 95–96, 196–198,
 204–221, 364, 373, 377–380,
 388
 - focus association 249, 251, 274
 - focus domain 196, 204–218, 228, 374
 - focus feature 233, 321
 - focus particle 10, 225, 229, 234, 237, 244,
 246–257
 - focus phrase(FocP) 17, 49, 198, 206,
 208–210, 213, 218–221, 267, 273
- Focus-background partition 12
- Force 226–227, 230–232
- illocutionary force 226, 230, 232
- Freezing
- agreement-relativized freezing 331, 339
 - anti-freezing effect 110–112, 114–116,
 133
 - criterial freezing 5–6, 8–10, 16, 18, 29–62,
 77–78, 86–88, 92–98, 225–259, 276,
 279–281, 325, 340, 356, 371
 - freezing constraints 175, 357, 367, 437
 - freezing generalization 2, 6–7, 199, 321
 - Freezing Principle 1–8, 12, 14–15, 172,
 176, 183, 196, 197, 354–355, 370–372,
 388–389, 394, 435–436, 445
 - Generalized Freezing 319–322, 326, 331, 339
 - scope freezing 18, 239, 241
- Frequency 20, 258, 364–365, 366, 404,
 407–408, 411, 413, 418, 423, 445,
 446
- Fronting 106, 109–110, 127, 130–132, 173,
 179, 184, 238, 250–251, 253–254,
 258–259, 318, 326, 329, 331–332,
 342–344, 432
- multiple fronting 106
- Frozen Structure Constraint 2, 354
- Functional head 32, 35, 39, 46, 54, 72, 75,
 77, 149–150, 157, 164, 170, 231, 234,
 240, 247–250, 257–259, 274, 286
- Gap 9, 13, 19, 173, 204, 217, 355, 358, 378,
 380, 405, 409, 411–414, 417–418, 422,
 436, 440, 446
- Garden-path 389, 406–407, 446
- German 7, 13, 16, 105, 107, 110–111,
 130, 133, 135, 182, 225, 229, 234,
 246–249, 254, 257–258, 322, 324,
 327, 341–342, 344, 355, 371, 373–375,
 377
- Givenness 392, 400
- Given-new distinction 394, 398. *See also*
 Newness
- Government 61, 319
- Halting 16, 32, 34–40, 47, 67–68, 87–88,
 92, 98
- Head movement 55, 60, 92, 94, 106, 151, 162,
 181, 229, 231
- Heaviness 388, 391, 393, 395
- Heavy-NP shift 14–15, 19, 356, 360, 367–371,
 387–400
- Hebrew 16, 30, 33, 38–40, 42–43, 46–48,
 51–57, 61–62
- Hindi 18, 297–299, 306, 310
- HNPS. *See* Heavy-NP shift
- HPSG 418, 422
- Hungarian 10, 12, 18, 294, 318–319, 322,
 325–326, 329–335, 337–343
- Immediate Self-Domination Principle (ISP)
 353, 435, 445
- Inclusiveness Condition 70, 119
- Indefiniteness 41, 45, 178, 187, 195, 330,
 334–335, 342, 392
- Index filter 120, 123–125, 127, 133, 135
- Information structure 8–9, 12–13, 19–20,
 205, 324–325, 342, 360, 373–375,
 387–400
- Interface 16, 30–31, 33, 35, 68–69, 73, 87,
 92–98, 189–191, 325, 340
- Interrogative 57, 69, 95–96, 144, 158, 161,
 187, 189, 226, 231, 233, 250
- Intervener 50, 298, 306
- Inversion 158, 161–162, 330

- Island 10, 66, 89, 143, 172, 189, 209,
266–268, 273, 278, 299–308, 358–359
- adjunct island 11, 343
 - complex NP constraint 2–3, 266, 277
 - left-branch condition 289, 296, 298, 301
 - relative clause island 266, 277
 - strong island 317, 324
 - subject island 10–12, 317–344, 406, 408
 - weak island 335
- It-clefts. *See* Cleft
- Judgment study *See* Acceptability
- Labeling 6, 29–38, 57–62, 69–70, 79–81, 83,
86–91, 97, 188–191
- Last resort (LR) 67, 74–76, 131
- Left periphery 32, 49, 67, 77, 95, 167–170,
172–173, 178–179, 183–190, 235, 240,
253, 274, 304, 340
- Locality 30, 49–51, 66–67, 76, 116, 233, 285,
289, 298, 300
- Look-ahead 117
- Mandarin Chinese 304
- Markedness 13, 158, 204, 248, 254, 280, 379,
388–391, 415
- Matrix 6, 68, 76, 96–97, 119, 128, 132, 230,
244, 251–252, 265, 278, 307, 335, 377,
419, 430
- Maximality 30–33, 35, 57–61, 86
- Melting 7, 12–13, 355–356, 372–373,
375–380
- Merge 6–8, 30–31, 34–35, 40–42, 49,
60–61, 66–99, 111, 128–130, 133,
149–150, 189, 233, 239–240, 251,
274–280, 323
- Minimal Link Condition (MLC) 113, 121–122
- Minimality *See* Relativized Minimality
- MLC *See* Minimal Link Condition
- Modal particle 13, 225, 376–377
- Modifier
- attributive modifier 167, 173, 185, 334
 - degree modifier 148, 153, 156–157,
159–161
- Movement *see also* Extraction, Wh-Extraction,
Subextraction
- A-bar movement 69, 80, 234, 240, 290,
298, 320–323, 332, 341
 - A-movement 32, 40, 285, 320, 323, 326
 - copy movement 243
 - LF-movement 231, 270–273
 - rightward movement 14, 149, 151, 165, 356,
404, 419
 - Wh-movement 14–15, 44, 50, 57, 84, 85, 89,
92, 107, 111–112, 114, 198, 230–234, 236,
240, 242, 246, 259, 307, 333–343, 390,
406, 430, 438–440.
- Müller-Takano generalization 112–113, 117,
125–126
- Negation 40, 59, 254–257, 297
- Nesting 357–358, 380
- Newness 391–392, 400
- discourse new 392–394, 396–399, 407
- No Tampering Condition (NTC) 68, 70–73, 75,
84–86, 121
- Only
- adverbial only 264–275, 277–281
 - constituent only 264–270, 272–275,
277–279, 281
- Only raising 265, 267, 271–277, 279,
281
- Opacity 286, 305, 308, 317–344
- topic opacity 317–344
- Operator 58, 93, 207–210, 217, 220–221,
236, 254–256, 258, 267, 272,
275–276, 279
- Parsing 8, 379, 405, 411, 423
- Participial 146, 177
- Passive 11, 32, 50, 128, 200, 202, 320,
322–323, 334
- Person-Case Constraint (PCC) 300
- Phase 7, 12, 50, 68–70, 72–73, 84, 87–88,
91–93, 95, 98, 116–117, 119–122, 128,
231, 240, 242, 273, 298, 303, 306,
317–344
- Phase Impenetrability Condition (PIC) 68, 73,
87, 116, 119, 121–123
- Phi-features 286, 299–300, 302, 305,
308–309

- Pied piping 155, 240, 256, 278
 Pivot 196–200, 204–221
 Plausibility 227, 230
 PP-displacement 144, 147
 Prefield 7, 16, 105–135
 Preposition stranding 109, 328, 406
 Priming 364, 408
 Principle of End Weight 393
 Principle of Full Interpretation (PFI) 68, 87, 94
 Principle of Interface Freezing (PIF) 68–69, 87–88, 92–98
 Probe 53, 55–56, 72–73, 75–76, 80, 82–83, 88, 118, 149, 226, 231, 232–234, 278, 279, 292, 300, 305
 Processing 1, 12–15, 114, 195, 196, 217, 280, 324, 327, 353–381, 406, 407, 411, 414, 418, 423, 436–437, 439, 440, 442, 445–447
 Processing complexity 8, 12, 14–15, 359, 361–371, 380, 437, 440
 Pronoun
 – R-pronoun 107–110, 136, 168–169, 172, 187, 188
 – weak pronoun 147, 227, 229
 – resumptive pronoun 46, 318, 333
 – reflexive pronoun 114–115, 304
 Pseudocleft 3
 Psych predicates 50, 322, 372

 Quantifier Raising (QR) 247–248, 256, 259, 267–270, 277
 Question 31, 58–59, 77, 81, 85, 88, 89, 95–97, 200, 208–210, 218–220, 225–227, 230–232, 235, 237, 238, 268, 431, 433, 439

 Radical unacceptability hypothesis 380
 Raising Principle 3–4, 197–198, 199, 201–204, 319, 354–355, 371
 Reanalysis
 – syntactic reanalysis 78, 128
 – parsing reanalysis 406, 422
 Reconstruction 115, 242–243, 252, 254, 290, 324, 340
 Recoverability 132, 182
 Recursion 157, 167, 185, 325, 330, 341

 Reflexivization 114–115, 304
 see also pronoun, reflexive
 Relativization 57, 387
 Relativized Minimality (RM) 30–31, 41–42, 49–53, 62
 Remove 111, 118, 121–127, 128–132, 133–134
 Resumption 46, 318, 333
 Right dislocation 9, 420
 see also movement, rightward
 Russian 301–302, 304–305, 328, 342–343

 Scope 29, 41, 77, 126, 230–233, 236, 237–244, 246–250, 252–257, 258–259, 264–277, 277–279, 291, 321, 329, 330, 333, 356
 Scrambling 107–111, 112, 119, 133–134, 144, 147, 148, 168, 170, 176, 183, 186–187, 227, 230, 284, 319, 329, 330, 356, 372–373, 376
 – Subscrambling 284, 289
 see also subextraction
 Sign language 292–294, 306
 Small clause 29–62, 80, 82, 178, 320
 Smuggling 49–55
 SOV 152
 Speech act (SA) 232–233
 Strict Cycle Condition (SCC) 113–114, 122, 132
 Structure removal 127–134
 Subextraction 3–15, 237–244, 78, 143–188, 195–204, 218–220, 284–299, 302–308, 317–344, 354, 357, 371, 387–400, 430–448.
 See also Extraction, Wh-Extraction, Movement
 Subjacency 4, 8, 76, 293, 434
 Subject
 – derived subject 11, 198–204, 273–277, 277–279
 – subject position 32–34, 37, 39, 40, 41, 43, 47, 51, 178, 204, 322, 329, 363, 375
 – subject raising 80, 85, 321
 see also island, subject island
 Successive cyclic movement 83, 98, 133, 231
 Superadditivity 14
 Surfing
 – left surfing 357, 378

- right surfing 357
- Surprisal 364, 373, 411

- Taglicht sentences 265, 271, 277
- Thematic role *see* Theta role
- There-existentials 320, 324
- Theta-assignment 151–152, 159, 179
- Theta role 78, 93, 94, 99, 149, 151, 159, 334
- Topic
 - aboutness topic 228, 324, 329, 340, 342
 - contrastive topic 341
 - topic feature 5, 119
- Topicalization 4, 9, 10, 46, 67, 76, 97–98, 119, 242, 267, 269, 273, 277, 280, 291, 293, 319, 334, 339–344, 354, 387, 419, 430–447
 - see also* Fronting
- long-distance topicalization 107, 130
 - see also* VP Topicalization
- Transfer 35, 72–73, 83–84, 87–98
- Transformation 2–3, 66, 67, 199, 264–266, 281, 321, 354, 389, 435–436
- Transitive 286, 293, 318, 322–323, 326–329, 331–333, 335, 337, 338–339, 342, 343, 344, 372, 377
 - see also* adjective, transitive
- Tsez 18, 296–299, 306

- Unaccusative 11, 19, 195, 286, 292, 297, 307, 322–344
- Unergative 195, 322, 327, 333, 334

- V2. *See* Verb-second
- Valence 418, 419
- Verb be. *See* Copula
- Verb-second (V2) 105, 148, 167, 172, 229, 234, 236, 241, 248, 251, 252, 253, 274, 342, 374
- VP fronting 127, 130–131
- VP topicalization 106–110, 111–112, 130, 132, 134

- Warlpiri 290
- Was-für construction 13, 327, 371–373, 375–379
- Wh-extraction 36, 111, 189, 198–210, 214–220, 231, 232, 324, 328, 333, 375–380, 446, 447
 - see also* Extraction, Subextraction, Movement
- Wh-movement *see* Movement
- Wh-phrase 6, 10, 67–69, 72, 81, 89, 95–97, 119, 209, 218, 235–244, 246, 307, 333, 356, 389, 394, 404, 423
- Williams Cycle 119–120, 123–125, 133, 135