Edward Göbbel

EXTRAPOSITION FROM NP IN ENGLISH

EXPLORATIONS AT THE SYNTAX-PHONOLOGY INTERFACE

INTERFACE EXPLORATIONS

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Interface Explorations

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Editors
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Volume 36

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Preface

The research for this study of extraposition from NP, which is based on my Habilitationsschrift, has been exciting and rewarding, particularly, because the outcome is so completely different from what I initially imagined. I was firmly convinced that the topic should be approached from the perspective of information structure and syntax, because this is what previous work actually led me to believe. With the influence that Richard Kayne had on the generative linguistic community since the mid nineties, the number of studies on rightward movement constructions was constantly diminishing. The effect was so drastic that terms like extraposition or heavy NP shift, let alone the description of these constructions, virtually disappeared from textbooks on English syntax. It was the right moment to take a fresh look at the syntax of rightward movement. I also conjectured that my previous experience of working on information structure would be of some avail in this undertaking.

My interest, however, quickly shifted away from syntax to phonology. Eventually, this study does contain a (not necessarily radically) new syntactic proposal, but the focus is on causes or triggers for extraposition, particularly phonological ones.

I would like to thank Carsten Breul, Horst Lohnstein and Katharina Hartmann for valuable critical comments on this book as well as Sigrid Beck for reading and commenting on a very early version of this monograph. Special thanks go to Gert Webelhuth for his constant encouragement to further pursue the direction that my work had taken and for providing a pleasant ambience for the presentation and discussion of my work.

I would also like to thank the following colleagues, friends, and mentors, who contributed in one way or other, either discussing or criticising my work or acting as informants: Jennifer Austin, Kirsten Brock, Peter Culicover, Remus Gergel, Erich Groat, Jutta Hartmann, Caroline Féry, Carol Geppert-Jolly, Tibor Kiss, Luis López, Linda Martin, Michael Rochemont, Vieri Samek-Lodovici, Manfred Sailer, Ian Strunk, Hubert Truckenbrodt, Heike Walker, and Susanne Winkler.

I would also like to thank for critical comments the audiences of talks on topics related to this study at the Universities of Wuppertal, Frankfurt, Tübingen, Bochum, Leiden, as well as at different conferences, such as OCP (Rhodes), WECOL (Fresno) and GLOW (Nantes), and workshops at annual meetings of the DGfS.

Finally, I would like to thank the German Research Foundation for providing financial assistance in the initial stages of this undertaking.

Contents

1 Introduction

1.1 Goals

This study explores the division of labour between syntax and phonology in one so-called rightward-movement construction, namely *Extraposition from NP*. Both extraposition of PP, as in (1b), and extraposition of relative clauses, as in (2b), will be discussed.

(1)   a.   *He sold a painting by Turner at Sotheby's.*
        b.   *He sold a painting at Sotheby's by Turner.*

(2)   a.   *Last night, a man who we'd never seen before arrived.*
        b.   *Last night, a man arrived who we'd never seen before.*

In this study, the term extraposition will be reserved for extraposition from NP. Occasionally, other rightward movement constructions, such as *Heavy NP Shift*, illustrated in (3b), and *CP shift*, shown in (4b) will also be discussed and compared to extraposition.

(3)   a.   *He gave a picture of John Lennon to Mary.*
        b.   *He gave to Mary a picture of John Lennon.*

(4)   a.   *She mentioned that her jeans were dirty to Bill.*
        b.   *She mentioned to Bill that her jeans were dirty.*

The main goal of this study is to establish the causes or triggers and to provide solutions for rightward movement of PP complements and adjuncts of nouns as well as of relatives. Extraposition is in principle optional and several factors have been suggested as triggers for the operation. Firstly, the extraposed constituent or discontinuous NP has been argued to form a presentational focus (Guéron 1980; Rochemont 1986). In other words, this construction has been claimed to be a focus construction. Secondly, syntactic complexity as well as the relative weight of the extraposed constituent and the constituent moved across have been argued to play an essential role (Quirk et al. 1985; Wasow 1997, 2002; Francis 2010). Thirdly, psycholinguistic experiments have led to the conclusion that a short extraposition distance (e. g., across one word) facilitates speech processing and/or production (Uszkoreit et al. 1998; Konieczny 2000; Francis 2010). Finally, Arnold et al. (2000) and Wasow (2002) argue in studies on heavy NP shift that a combination of these factors act as triggers for rightward movement.

     The present study considers extraposition from a quite different perspective. The main hypothesis to be verified is whether triggers for rightward movement can

be phonological constraints (cf. also Hartmann 2013). The reason for this perspective is that focus, syntactic complexity and relative weight are all reflected in the prosodic structure. For example, a focused non-peripheral complex noun phrase can induce a phonological structure that violates phonological wellformedness constraints. Rightward movement of the whole noun phrase or a constituent contained in it could give rise to a prosodic structure that satisfies those constraints. If this line of reasoning is correct, then focus structure and syntactic complexity would only play an indirect role.

The approach pursued here differs from the early focus-oriented work on extraposition, which concentrated on the relationship between focus and accentuation (cf. also section 4.3.3.5). More recently, Truckenbrodt (1995a) has shown that restrictions on extraposition can be stated if the hierarchical prosodic structure is taken into account, while Hartmann (2013) has argued that constraints on prosodic domination, embodying the *Strict Layer Hypothesis* (cf. Nespor and Vogel 1986), may actually be the cause for extraposition. My concern here is a similar one. I think it is important to investigate the prosodic structure of sentences like (2) above, which has an unaccented verb at the right edge, and ask whether the verb forms a prosodic constituent with the relative, as it is neither syntactically nor semantically related to this clause. If such an integration comes at a certain cost (i. e., violates constraints that are responsible for the correspondence of syntactic structure with prosodic structure or constraints on prosodic domination), then extraposition would lead to a prosodic representation in which the verb is phrased naturally with its argument and the relative forms a separate prosodic constituent. Such an approach no longer takes focus structure as a precondition for extraposition since both (2a) and (2b) can be presentational, in the sense of introducing a new situation into discourse. But the prosodic structure of (2b) would be more natural.

The phonological constraints that play a role in extraposition can only be established if the phonological representation of the canonical word order is compared with that of the scrambled order. Therefore, the guiding question underlying this study is: what improves from the phonological perspective if rightward movement occurs? Since extraposition is in principle optional, one also has to ask how the optionality of the operation can be captured.

The role that processing and/or production considerations play in this construction cannot be fully evaluated at the moment because prosodic factors are remarkably absent in the psycholinguistic experiments that have been conducted in the past. There is, however, a growing awareness that the parser should take into account prosodic information. Fodor (2002a, 2002b), for example, argues that a default prosodic contour is mentally projected by readers onto the written or printed word string and the parser favours the most natural (default) prosodic

contour for the construction. Similarly, Kentner (2017) argues that the parser should actually incorporate constraints that are independently established for the competence grammar, including phonological constraints. In other words, the parser parses the grammar, rather than the output of the grammar. It is therefore imperative that the default prosodic structures and relevant phonological constraints should first be established before any conclusions about the role of processing and/or production can be drawn.

Extraposition is essentially an interface phenomenon. If phonological well-formedness constraints have an effect on the position of PPs and relatives, one also has to ask what happens in the syntax. That is, the syntactic representation as well as the formal implementation of the displacement property has to be dealt with as well. I will initially resort to a distinction made by Chomsky (2001) between two types of displacement, namely, (i) syntactic movement to the edge of a phase, which correlates with interpretive effects (e. g., topic, focus), and (ii) movement in the phonological component (PF) which has no effect on the interpretation of the sentence. The distinction has been around since the seventies, PF movement essentially corresponding to the "stylistic rules" of that time (cf. Rochemont 1978, 1982).

A phase-based Minimalist approach (Chomsky 2001, 2008) imposes a particular methodological approach to the interface issue just mentioned. One important aspect of a phase-based model of the grammar, which it shares with the earlier Y model (Chomsky and Lasnik 1977), is that there is no direct relation between the semantic and phonological components. Any property that is interpreted by both components must be encoded in the syntax. A typical example is focus again, which has to be represented in the syntax since it is interpreted at both interfaces. If focus triggers extraposition, then rightward movement can be modelled in the syntax in the usual way, as a feature-driven operation. However, if focus or any other discourse-pragmatic property is not at stake and only default prosodic properties of utterances matter, then extraposition can be delegated to PF or formalised as part of Spell-Out, i. e., as occurring during the mapping from syntax to PF. In fact, extraposition from NP and other rightward movement constructions have occasionally been argued to occur at PF or as part of the linearisation of syntactic structure, particularly by Chomsky (1986, 1995, 2008), Johnson (1985), Fabb (1990), Ernst (2002) and Webelhuth (2013).

Let me now establish the types of movement operations that are relevant for a study of the syntax-phonology interaction:

A: Movement occurs in the syntax, but conforms to phonological properties of the language.

B: Movement occurs in the PF component and is only driven by phonological constraints.

C: Syntactic movement is followed by PF movement.

D: Separate PF and LF movement

Whether movement occurs in the syntax or at PF can be established empirically. Movement that occurs early in the syntax obeys syntactic restrictions (e. g., syntactic islands) and may also have semantic effects (e. g., binding-theoretic consequences). Movement that occurs at PF may flout syntactic restrictions and will go unnoticed by the semantic component. Semantically, it corresponds to 'full reconstruction' of the moved constituent. The third possibility, namely syntactic movement followed by PF movement (or rightward linearisation) can also be tested: the displaced constituent is interpreted in a position which is neither its surface nor its base position. While I am not aware of any evidence that would support this option in English, López (2009) argues that Catalan clitic right dislocation resorts to it. The last possibility involves separate PF and LF movement. That is, it does not obey conditions on overt movement, but has semantic consequences. While this last possibility looks questionable at first sight, it is worthwhile considering since it is superior to other solutions, such as base-generation of discontinuous constituents.[1]

In the following sections I will present essential aspects of the theoretical frameworks within which this study is embedded and which are needed throughout the book. The syntactic investigations are conducted within the framework of the Minimalist Program and the prosodic investigations within the framework of Optimality Theory. There is no contradiction in using both frameworks. Optimality Theory is currently the standard framework in phonology but also allows the parallel evaluation of various prosodic structures based on the canonical word order and on the scrambled order. Since the grammar is modular and the phonology only sees the output of the syntax, Optimality Theory is not needed for the syntactic description.

1.2 The road to the interfaces

This section addresses syntactic issues needed throughout the book, particularly the mapping of syntactic structure to phonological representations. It focuses on

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1 LF movement is generally considered to obey essentially restrictions also observed by overt syntactic movement, but it typically affects only DPs. Relative clauses, for example, are not the target of such an operation, but the DP containing them may be raised at LF.

the syntactic side of the syntax-phonology interface, the road to PF, as it were. In a minimalist phased-based model of the syntax, syntactic structure is transferred to PF incrementally, in a cyclic fashion. I will establish here my assumption about what is spelled out on each cycle and how syntactic material is linearised. The phonological side of the interface will be dealt with in considerable detail in chapter 3, where some of the issues addressed here will be taken up again, revised and expanded on.

1.2.1 Features

Chomsky (1995) introduced the distinction between *interpretable* and *uninterpretable* features. Interpretable features are features that play a role in the semantics. Uninterpretable features, on the other hand, may, but need not, receive a spell-out at PF. An uninterpretable feature may be a purely syntactic feature (e. g. the EPP) or a feature that is interpreted at PF.

In Chomsky (2000, 2001), features are introduced into the derivation as interpretable-uninterpretable pairs. Uninterpretable features are unvalued features which are assigned a value by agreeing with some head that has a valued (i. e. interpretable) feature. An unvalued feature F is a *Probe*, which scans its complement domain for another matching instance of F, a *Goal*, with which to agree. The value of the goal is then assigned to the probe under *Agree*. Once a feature is valued, it must delete so that it will not reach the semantic component. It is assumed that the Spell-Out operation takes care of feature deletion. For Chomsky, an unvalued feature is necessarily uninterpretable because the syntax cannot inspect a feature and determine whether the semantics will assign it an interpretation, but it can inspect a feature and determine whether it is valued or not. In what follows I will use the now standard notation [uF] and [iF] for unvalued and valued features, respectively.

Let us consider a concrete example like (5a), which has the underlying structure (5b). T agrees with the closest argument in vP, which values T's ϕ-features. In turn, the D head's case feature in the extended projection of the noun is valued by T.

(5)   a.   *The doctor examined the patient.*
      b.   [$_{TP}$ T [$_{vP}$ the doctor v [$_{VP}$ examined the patient]]]

We can express this formally by assuming that both T and D have sublabels for ϕ and case. Once T's ϕ-features are valued, they can be passed on to v, another instance of Agree. The uninterpretable sublabels of these heads are listed in (6). An-

other way to represent the pieces of inflection is to adjoin them to the interpretable head, in the manner practiced within the framework of Distributed Morphology (Embick and Noyer 2001, 2007; Embick 2015). This is shown in (7).

(6) a. T has sublabels [uPers; uNum]
     b. D has sublabel [uCase]
     c. v has sublabels [uPers; uNum; uTense]

(7)

```
                    T
                  /   \
                 T     [uNum: SG]
               /   \
          [past]  [uPers: 3]
```
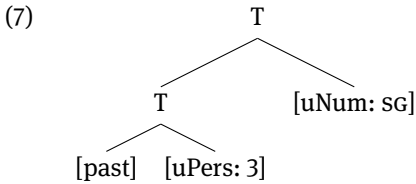
One way to think of features being interpretable was suggested to me by Sigrid Beck (p. c.), namely, if they are realised as lexical or functional heads for which a lexical entry can be posited (e. g. *n't, the, every*) or if they are accessed by the semantics in some other way. Hence T can be viewed as an operator as in classical tense logic or as a temporal predicate relating times in a Reichenbachian tense logic (cf. Stowell 1996; Butler 2005). Feature interpretability can be defined as in (8) and a possible lexical entry for [3Pers] on D is given in (9).

(8) Feature Interpretability
     A feature F is interpretable if it has content like a lexical item.

(9) $\llbracket 3\text{Pers} \rrbracket^s$ = [λx: x≠the speaker in s and x≠the hearer in s. x]

Chomsky (2001) maintains that uninterpretable features have to be deleted from the syntactic computation (or narrow syntax) before the construction is transferred to the semantic component. Only features that are interpretable at this interface lead to a convergent derivation. For example, the ϕ-features on T and *v* must be deleted, as well as the case feature on D. This approach imposes severe restrictions on what kind of formatives can be used as labels for projecting categories, only heads with an interpretable label being allowed. It also raises questions about the timing of Spell-Out, if this operation ships the structure to PF while at the same time deleting the uninterpretable features from the narrow syntax. When a feature is valued, it must be spelled out at once because the syntax can no longer distinguish between interpretable and uninterpretable instances of the same feature.

While considerable discussion in the literature is targeted at these issues (cf. for example Grewendorf and Kremers 2009), I think the situation is less dramatic than it appears to be. The syntax certainly also manipulates formatives that are

not interpreted in the semantics. For example, the copula *be*, the indefinite article of nominal predicates and presumably also nontensed *to* (cf. *I consider him to be a good doctor*), or the definite article sometimes introducing proper names (e. g. *the Hague*, *der Hans*) all project phrasal projections. Should these heads and their projections be simply pruned? Probably not. Current semantic theories can certainly ignore uninterpretable formatives and their projections in the compositional interpretation of phrase markers (cf. Heim and Kratzer 1998; von Stechow 2007). This in turn makes the timing of Spell-Out less dependent on issues of feature interpretability.

1.2.2 Derivation by phase

In the Minimalist Program, the derivation of a sentence proceeds in terms of phases. Phases define a cycle in the derivation of a sentence and have been identified by Chomsky (2000, 2001, 2004, 2008) with CP and transitive/unergative vP (often indicated with an asterisk: v*P). These are also called strong phases. The heads of these phases are C and v*. Once a phase is complete, part of it will be spelled out.

Spell-Out is an essential operation for a study of the syntax-phonology interface and will therefore be considered here in some detail. There are several theories of Spell-Out and linearisation, of which I will only discuss some standard options. On the one hand, Spell-Out can be seen as marking a domain "opaque" for further syntactic operations. On the other hand, it can be viewed as an operation which constructs a separate PF representation, leaving the initial syntactic structure intact.

Creation of opaque domains is advocated by Svenonius (2004) and Adger (2007). Svenonius does not discuss how these opaque domains are created, but Adger presents an interesting and simple way of how this could be achieved. He considers Spell-Out to be an operation which substitutes phonological information for morphosyntactic information in the same phrase marker. This is sketched in (10), where capitals represent morphosyntactic objects and lower-case letters word forms. D is the phase head, which does not spell out on the first cycle. An immediate consequence of this approach is that no relation between elements in a higher phase and spelled-out material can be established (e. g., between E and a, b, c) because the latter do not have morphosyntactic features and are no longer accessible to the computational component. In other words, the effects of the *Phase Impenetrability Condition* (PIC) need not be stipulated. The PIC, as formulated in Chomsky (2000: 108), is given in (11).

(10) a. [A B] →
      b. [C [A B]] →
      c. [D [C [A B]]] → Spell-Out
      d. [D [c [a b]]] →
      e. [E [D [c [a b]]]]

(11) Phase Impenetrability Condition
      In a 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.

While the model just presented assumes that syntactic terminals are already linearised in the syntax, a large body of work going back to Chomsky (1995) assumes that merger of constituents produces sets of unordered pairs, as in (12). Linearisation of terminals only occurs during the Spell-Out process, which transfers the syntactic objects to PF.

(12) Merge(A, B) = {A, B}

As will be discussed extensively in chapter 3, recent work on the syntax-phonology interface presumes that the phonology can access the whole syntactic structure. The so-called *end-based* theory (Selkirk 1986, 1995a, 2000; Truckenbrodt 1999), which provides an account of the mapping of syntactic structure to prosodic structure (cf. section 3.2), is formulated in terms of interface constraints, particularly alignment constraints, which crucially refer either to maximal phrasal projections or heads of phrases. If hierarchical relations between syntactic nodes were simply converted to precedence relations between terminal elements during the Spell-Out process, then it would be unclear how phonological constraints can access the hierarchical structure in order to establish which strings of terminal elements constitute phrases and which terminals are the heads of those phrases. It is therefore necessary to assume that Spell-Out does not only linearise the syntactic terminals, but it also constructs a hierarchical *PF representation*. This hierarchical PF representation can be considered an interface representation, accessed by phonological interface constraints. Its role is similar to that of LF representations, which are interpreted by the semantics.[2]

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2 Note that in Distributed Morphology syntactic trees must also be available on the PF branch. Cf. also Selkirk (2006) and Grohmann (2007) for the need of a PF representation. For Selkirk, the PF representation is actually a surface syntactic representation, not necessarily distinct from a standard syntactic representation, and its terminals are shared by what she calls the Prosodic Representation. However, the PF representation must be kept separate from syntax if syntax only manipulates features and roots, which are given a form during Spell-Out. Vocabulary Insertion

Let's consider how such a model works. Assuming with Adger and the proponents of Distributed Morphology that Spell-Out involves substitution of phonological information for morphosyntactic information, this operation creates a separate representation, now with phonologically spelled-out terminals (i. e. roots and vocabulary items) in which the hierarchical syntactic relations are preserved. The derivation of PF representations is schematically outlined in (13), where D and F are phase heads, which, under standard assumptions, trigger Spell-Out. The Spell-Out Domain (SOD) is the complement of the phase head.[3]

(13)   a.   {A, B} →
       b.   {C, {A, B}} →
       c.   {D, {C, {A, B}}} → Spell-Out → [c [a b]]
       d.   {E, {D, {C, {A, B}}}} →
       e.   {F, {E, {D, {C, {A, B}}}}} → Spell-Out → [e [d [c [a b]]]]

In this model, the effects of the PIC need not be stipulated either. For overt movement, a constituent must be extracted to the edge of the phase, a second specifier of the phase head. Whatever moves after Spell-Out is covert movement (cf. Nissenbaum 2000 and Chomsky 2004). Let me go through concrete examples, one involving overt movement and one involving covert movement. The derivation of a simple wh-question is shown in (14) and it requires three applications of Spell-Out, of which the first results in a null Spell-Out. For ease of readability, regular bracketing is used instead of the set representation for pre-spell-out structures and traces are used instead of copies. *Do*-support is also ignored here.

(14)   *Who did Mary meet?*
       a.   Merge: [$_{VP}$ MEET WHO]]
       b.   Merge: [$_{vP}$ v [$_{VP}$ MEET WHO]]
       c.   Merge: [$_{vP}$ MEET$_i$ [$_{VP}$ t$_i$ WHO]]
       d.   Merge: [$_{vP}$ MARY MEET$_i$ [$_{VP}$ t$_i$ WHO]]
       e.   Merge: [$_{vP}$ WHO$_j$ MARY MEET$_i$ [$_{VP}$ t$_i$ t$_j$]]
       f.   Spell-Out: [$_{VP}$ ϕ]
       g.   Merge: [$_{TP}$ T [$_{vP}$ WHO$_j$ MARY MEET$_i$ [$_{VP}$ t$_i$ t$_j$]]]
       h.   Merge: [$_{TP}$ MARY$_k$ T [$_{vP}$ WHO$_j$ t$_k$ MEET$_i$ [$_{VP}$ t$_i$ t$_j$]]]
       i.   Merge: [$_{CP}$ C [$_{TP}$ MARY$_k$ T [$_{vP}$ WHO$_j$ t$_k$ MEET$_i$ [$_{VP}$ t$_i$ t$_j$]]]]
       j.   Merge: [$_{CP}$ WHO$_j$ C [$_{TP}$ MARY$_k$ T [$_{vP}$ t$_j$ t$_k$ MEET$_i$ [$_{VP}$ t$_i$ t$_j$]]]]

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also applies to this representation. Consequently, this second approach only differs from Adger's in that the PF representation is a separate phrase marker.

3 Spell-Out Domains will be reconsidered in section 1.2.3.

     k.   Spell-Out: [$_{TP}$ Mary T [$_{vP}$ meet]]

     l.   Root Spell-Out: [$_{CP}$ who C [$_{TP}$ Mary T [$_{vP}$ meet]]]

The example in (15) is a multiple wh-question which can be analysed as involving two instances of covert movement.[4] More importantly, the C node can and must be able to access the object within VP, hence the PIC is just a generalisation over overt movement operations.

(15)   *Who met whom?*

     a.   Merge: [$_{vP}$ WHO MEET$_i$ [$_{VP}$ t$_i$ WHOM]]

     b.   Spell-Out: [$_{VP}$ whom]

     c.   Merge: [$_{TP}$ WHO$_j$ T [$_{vP}$ t$_j$ MEET$_i$ [$_{VP}$ t$_i$ WHOM]]]

     d.   Merge: C [$_{TP}$ WHO$_j$ T [$_{vP}$ t$_j$ MEET$_i$ [$_{VP}$ t$_i$ WHOM]]]

     e.   Spell-Out: [$_{TP}$ who T [$_{vP}$ met whom]]

     f.   Merge: [$_{CP}$ WHO$_j$ WHOM$_k$ C [$_{TP}$ t$_j$ T [$_{vP}$ t$_j$ MEET$_i$ [$_{VP}$ t$_i$ t$_k$]]]]

Both approaches just described have advantages and disadvantages. A direct spell-out model, like Adger's, which results in opaque domains, is simpler in design, but it must do without covert movement operations like QR. It is also not clear how reconstruction works in this approach. A syntactically opaque domain is opaque for any kind of (syntactic) operation. It does, however, present an important advantage over the second approach, which creates a parallel PF representation. It allows movement of a constituent properly containing one or more phases. In an example like (16), the conversion to a PF string can begin while the complex subject, which contains two phases, is still being assembled. The conversion process can be completed when the DP has reached SpecTP.

(16)   [$_{DP}$ The demonstration [$_{CP}$ that the engineer has [$_{vP}$ used the wrong technique]]] will anger his employer.

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4 Overt movement of wh-subjects is and remains controversial. The main evidence that they do not move in overt syntax comes from the fact that they do not trigger *do*-support. Empirical evidence that wh-objects move covertly in the syntax comes from *weak crossover* (WCO). Like quantified NPs they cannot be coindexed with a pronoun that is contained in a DP that c-commands the wh-phrase. Cf. the ungrammaticality of example (ib).

(i)   a.   *Which man said that the company sent which woman$_i$ to visit her$_i$ secretary?*

     b.   **Which man said that the company sent her$_i$ secretary to visit which woman$_i$?*
         (Safir 2004: 61)

The second approach, which creates a parallel PF representation seems problematic because it potentially distributes the DP over two positions. Assume, for the purpose of the argument, that transitive v* and C are phase heads and VP and TP are the respective SODs. Then it seems possible to spell out the complement of N in two phases and eventually pronounce two SODs in the VP-internal subject position, while the noun and the determiner are pronounced after movement to SpecTP, yielding the gibberish in (17). In the syntactic representation, there will be two copies of the DP, as shown in (18), or a DP and a trace, for that matter. But the integrity of the subject DP is not preserved in the PF representation.

(17)　PF:
　　　$[_{TP}$ **the demonstration that** $[_{T'}$ will $[_{vP}$ **the engineer has used the wrong technique** anger his employer]]]

(18)　Syntax:
　　　$[_{TP}$ the demonstration that the engineer has used the wrong technique $[_{T'}$ will $[_{vP}$ <the demonstration that the engineer has used the wrong technique> anger his employer]]]

One way to enforce pied-piping would be to prevent discontinuous Spell-Out with the condition in (19).

(19)　Spell-Out is banned within a constituent which is the target of movement.

Clearly, (19) is no more than a descriptively adequate condition on overt movement operations. It also requires a good dose of look-ahead. When the inner phase is completed, the derivation will have to know that it is embedded in a constituent to be moved at a later stage. The same is true for (20). In (20a), there is a vP phase embedded in the CP to be moved to topic position. In (20b), the VP cannot be spelled out *in situ* if v is attracted to the CP domain.

(20)　a.　$[_{CP}$ That Jason's aunt $[_{vP}$ beats her children]]$_i$ $[_{TP}$ he T $[_{vP}$ admitted t$_i$ only yesterday]]
　　　b.　... and $[_{vP}$ read$_j$ $[_{VP}$ the book t$_j$ last night]]$_i$ $[_{TP}$ he did t$_i$]

The ban in (19) can be refined as in (21). Such a condition is assumed explicitly or implicitly in a considerable body of current work on syntax (cf. Chomsky 2001: 13). However, it does not eliminate look-ahead in the derivation if a chain contains one or several phases.[5]

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5 Covert movement does create new links, but chains can only be spelled out and pronounced once, namely when they are transferred to PF.

(21)   Chain Spell-Out Condition
        Only the head of a chain spells out.

The Chain Spell-Out Condition rules out any discontinuous spell-out analysis of extraposition (22). However, it does not prevent separation of the right-peripheral PP at a later stage in the derivation of the prosodic representation. Nor does it prevent extraction of the PP in the syntax if it forms a separate chain. It only prevents Spell-Out to give rise to these constructions directly.[6] I will assume this second model of Spell-Out, particularly because it can deal with covert movement, which is not possible in a direct spell-out model like Adger's.

(22)   *Which picture have you chosen of who?*
        (Radford 2004: 179)

My discussion so far has focused on "strong" phases. The term strong phase certainly implies the existence of weak phases. On various grounds it has been suggested that other phrases are also phases, for example DP and within DP, nP, matching vP in the verbal domain (Svenonius 2004). Passive and unaccusative vP have been argued to be phases in Legate (2003), while Müller (2010) argues that every phrase is a phase, with interesting consequences for an explanation of CED effects. Marušič (2007, 2009), on the other hand, argues that PF phases should be distinguished from LF phases, the former being identified by various phonological properties, whereas the latter by syntactic/semantic properties, like reconstruction. My concern here are clearly "PF phases," the chunks that are transferred to PF. As will become obvious in the next section, these chunks are larger than nP, DP or PP. This is the reason I am addressing only the strong phases (v*P and CP). A critical question that remains to be addressed is what exactly the Spell-Out Domain is.

1.2.3 Spell-Out Domains

There are several proposals in the literature as to what exactly spells out when Spell-Out targets a phase Ph. One possibility is the complement of the phase head

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6 Certain theories of linearisation exploit this option, for example Sheehan (2009, 2010). However, it is unclear to me how discontinuous Spell-Out could be constrained in order to distinguish between grammatical and ungrammatical cases. Concretely, what prevents a discontinuous spell-out like (i)?

(i)   *Which have you chosen picture of who?*

(Chomsky 2000, 2004; Nissenbaum 2000). If v* and C are phase heads, then the SOD is VP and TP. This is the model used for expository purposes in the previous section.

(23) a. $[_{vP}$ v* $[_{VP}$ V ...$]]$
      b. $[_{CP}$ C $[_{TP}$ T ...$]]$

A second possibility is that a phase spells out as a whole. In Chomsky (2001), a phase is spelled out when the derivation reaches the next higher phase; v*P is spelled out once C is merged (24a) and CP is spelled out once v* is merged (24b). In this approach, a phase Ph_1 is evaluated at Ph_2 and C/v* are triggers for Spell-Out of lower phases. Extraction and Spell-Out occur simultaneously, so the edge will be cleared of any movable constituents and any specifiers/adjuncts of v* as well as v* itself are spelled out if they remain *in situ* (Chomsky 2001: 13).[7]

(24) a. C $[_{TP}$ T $[_{v*P}$ ...$]]$
      b. v* $[_{VP}$ V $[_{CP}$ ...$]]$

Support for this model of Spell-Out comes from Icelandic, a language in which T must be allowed to value nominative case on DPs embedded in a strong phase and also agree with them to value their ϕ-features, as in the following example from Sigurðsson (1996: 25).

(25) *Mér*   *þóttu*   *þær*   *vera duglegar*
      me.DAT thought.3PL they.NOM.PL be   industrious
      'I thought they were industrious.'

(26) $[_{TP}$ Mér T $[_{v*P}$ þóttu $[_{TP}$ þær vera duglegar$]]]$

I have presented two Spell-Out Domains and I will have to take a decision on which one to use. Eventually, it is an empirical question as to what exactly spells out (i. e., VP or v*P, TP or CP) if Spell-Out really means *transfer to PF*, not just marking something opaque for syntactic operations.

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7 Cf. also Svenonius (2004) for discussion of this possibility and Inaba (2009) for a defence of this spell-out version. Note that it is possible to formulate the trigger for Spell-Out differently, namely, a phase is spelled-out once all its unvalued features have been valued. For example, the phase head v* and the subject in Spec-v*P cannot be spelled out as long as they contain any unvalued features. Unvalued features will alert the computational system and prevent Spell-Out because PF requires features to have values. So, spell-out of v*P must wait at least until T is merged, since T agrees with both v* and the external argument in its specifier. And an operator in Spec-v*P which moves further into the CP domain will also delay Spell-Out of v*P until C is merged. Whatever option is chosen, this approach does not solve the look-ahead problem posed by example (16) above because the DP contains two embedded phases.

One argument Chomsky evokes for the reality of phases is their phonological integrity.[8] For example, the syntactic cycle has also been considered a cycle in the computation of phrasal stress (cf. Legate 2003 and Adger 2007), an idea that can be traced back to Chomsky and Halle (1968) and Bresnan (1971). The correspondence between phases and stress assignment is also exploited by Kahnemuyipour (2004) and Kratzer and Selkirk (2007). Although these accounts differ in detail, it is certainly true that in a sentence with a transitive verb both the subject and the object are assigned phrasal stress, whereas passive and unaccusative constructions, which constitute one strong phase, may have only one phrasal stress, eventually associated with a pitch accent. Examples are given in (27).

(27) a. *Jáson read the páper.*
      b. *The cát's disappeared.*
      c. *My wállet's been stolen.*

However, this argument only goes through if one assumes there is only one phrasal stress within a phase. A second argument or adjunct in the verb phrase requires an additional equally prominent accent, as shown in (28). Without any further qualifications, the correspondence between stress domain and phase necessarily breaks down. In fact, the domain of phrasal stress is smaller than the phase, namely the lexical XP (cf. Truckenbrodt 2006 and section 3.2.3.1 for further discussion), and a lexical XP certainly does not necessarily correspond to a strong phase.

(28) a. *Jáson read the létter to Máry.*
      b. *Melínda knócked on the dóor twíce.*
      c. *Melínda cárefully opened a wíndow.*

A much stronger correspondence can be established between phases and certain prosodic categories, as argued by Dobashi (2006, 2009), An (2007), Ishihara (2007), Göbbel (2007a, 2013a, 2013b), Revithiadou and Spyropoulous (2009) and Samuels (2011). In English, this category is the *phonological phrase* (PPh), aka major phrase (Selkirk 2000) or intermediate phrase (Beckman and Pierrehum-

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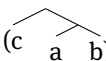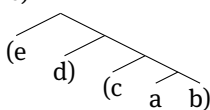
8 Another argument he evokes is that transitive v*P has full argument structure and counts as propositional. However, it is unclear to me why unaccusative/passive vP does not count as having full argument structure or why it should not count as propositional. Cf. also Matushansky (2005) and the critical discussion in Boeckx and Grohmann (2007). Questions remain regarding non-propositional CPs, like restrictive relative clauses, which are semantically predicates but have a full argument structure. Phonologically, they form separate phonological domains and should therefore be considered phases. In this study I will only concentrate on phonological properties.

bert 1986). Besides (29a/b), this correspondence is supported by (29c/d), in which the complement clauses correspond to separate phonological phrases. Throughout this study, unlabelled round brackets indicate phonological phrases, other prosodic constituents will be indicated with appropriate labels.

(29)   a.   *(Melínda) (knócked on the dóor twíce)*
           b.   *(Melínda) (cárefully opened a wíndow)*
           c.   *(She alléged) (that her wállet had been stolen)*
           d.   *(I've nó idéa) (when the néw mánager will be appointed)*

I will therefore assume that Spell-Out does not only construct a PF representation, but the transferred string also corresponds to a phonological phrase in prosodic structure. This correspondence can be achieved if phases are spelled out in full and not only the complement of a phase head (i. e., VP if v⋆ is the phase head). For example, the second phonological phrase in (29b) contains an adverb adjoined to vP.

    Summing up, Spell-Out creates a PF representation in which the terminals are linearised word forms and which preserves the hierarchical syntactic organisation of the sentence. Besides creating a hierarchical PF representation, the terminals are also grouped together due to the fact that Spell-Out occurs in a successive cyclic fashion. This is illustrated in (30), where H is the head of a phase. On the first cycle, the terminals *c a b* are given a phonetic form, on the second, the terminals *e d*. These sequentially spelled-out terminals form chunks that correspond to phonological phrases in prosodic structure. In other words, they form the phonological phrases (*c a b*) and (*e d*). The first Spell-Out in (30a) thus creates a partial hierarchical structure containing the terminals *c a b*. The second Spell-Out complements the PF representation with a new prosodic domain (30b).

(30)   a. $\{H_1, ...\{C, \{A, B\}\}\} \rightarrow$ Spell-Out: $\rightarrow$ (c a b)

           b. $\{H_2, ...\{E, \{D, \{C, \{A, B\}\}\}\}\} \rightarrow$ Spell-Out $\rightarrow$ (e d) (c a b)

Since phonology cannot access syntactic structure directly, the PF representations form the *interface* accessed by phonological interface constraints. Note that the correspondence between phases and phonological phrases is just a tendency and does not take into account a number of other factors, such as constraints on the size of phonological phrases, focus and deaccenting, the role of phrasal edges on phonological phrasing, etc. In chapter 3, I review current approaches to the syntax-phonology correspondence, particularly the end-based model, and even-

tually bring it in line with the phase-based syntactic model. Since I have not said anything about how linearisation of terminals is achieved, I will briefly sketch a model of linearisation in the following subsection.

1.2.4 Linearisation

In oder to derive a PF representation from a hierarchical syntactic structure, the terminals must be linearised. The PF representation must also retain the information about the hierarchical structure because phonological interface constraints must have access to it. A number of current theories of linearisation, including Chomsky (1995), take (some version of) Kayne's (1994) *Linear Correspondence Axiom* (LCA) as the basis for imposing an order on terminals. For example, the one developed by López (2009) says that if a node x c-commands a node y (xCy), as in (31), then x precedes y (xPy). If x does not c-command y, but x^{max} does, as in (32), then x also precedes y.

(31) $xCy \rightarrow xPy$:

$$X'$$
$$\overbrace{\quad}$$
$$x \quad YP$$
$$\overbrace{\quad}$$
$$y \quad ZP$$

(32) $x^{max}Cy \rightarrow xPy$:

$$YP$$
$$\overbrace{\qquad\qquad}$$
$$XP \qquad Y'$$
$$\overbrace{\quad} \quad \overbrace{\quad}$$
$$x \quad WP \quad y \quad ZP$$
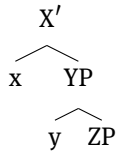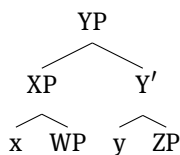
The problem with such a theory is that it inherits the commonly criticised aspects of Kayne's LCA. Firstly, head-final structures cannot be linearised directly but must be derived by movement of the complement. Secondly, adjuncts of XP can never follow XP and are consistently linearised to the left of the terminals dominated by XP. For example, if *yesterday* is adjoined to vP, as in (33a), it will be linearised as (34a), which is not altogether excluded if the adverbial is temporal, but unacceptable for all other adverbials, for example, the locative adverbial in (34c). If *yesterday* is adjoined to VP, as in (33b), it will be linearised as (34b), which is unacceptable in any case.[9] Finally, all information about hierarchical structure is lost in such a model, but, as will be discussed at length in chapter 3,

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9 Examples likes this one have standardly been treated as ungrammatical and GB theory tried to exclude them by imposing an adjacency condition holding between case assigner (the verb) and its object. Such a condition is certainly no longer tenable. If unacceptable means that it is

current phonological theories require access to a representation that specifies the hierarchical organisation of phrases and sentences.

(33)   a.   John [$_{vP}$ [$_{vP}$ read$_i$ [$_{VP}$ t$_i$ a book]] yesterday]
       b.   John [$_{vP}$ read$_i$ [$_{VP}$ [$_{VP}$ t$_i$ a book] yesterday]]

(34)   a.   ?*John yesterday read a book.*
       b.   **John read yesterday a book.*
       c.   **John in the library read a book.*

In order to derive the linear order and at the same time preserve the hierarchical information, I will instead resort to an approach developed by linguists from the optimality-theoretic syntax camp, particularly Grimshaw (1997, 2001) and Zepter (2003). These authors rely on alignment constraints, which simply tell us where in a phrase certain constituents are pronounced.[10] Here I follow Grimshaw (2001) and assume the following constraints, which all define alignment with respect to the left edge of a phrase.

(35)   Linearisation (X-bar theory) constraints

       a.   HEAD-L: Heads are at the left edge of XP
       b.   COMP-L: Complements are at the left edge of XP
       c.   SPEC-L: Specifiers are at the left edge of XP

In a SVO language like English, any specifier within a phrase will lead to violations of HEAD-L and COMP-L, hence SPEC-L must be ranked higher than these two constraints and HEAD-L must be ranked higher than COMP-L, as in (36a). In a SOV language like Japanese, COMP-L must dominate HEAD-L, as in (36b). SPEC-L must also dominate COMP-L in order to prevent the complement from being pronounced before the specifier is.[11]

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excluded by some other component of the grammar, then a possible phonological solution can be pursued, cf. section 4.4 for a proposal.

10 Alignment constraints have been introduced and applied successfully in morphophonology (McCarthy and Prince 1993). A good example of a phenomenon that alignment constraints can handle with ease is infixation, where the position of affixes does not follow from the hierarchical structure of the word. For further discussion and a formal definition of alignment see section 3.2.2.1.

11 The factorial typology of the ranking of the three constraints certainly predicts the existence of languages with specifiers at the right edge of phrases. Although current syntactic theory denies their existence, Öztürk (2013) argues that Uyghur is such a language. Furthermore, positive evidence is sufficient for language learners to establish the ranking of these constraints, even different rankings for subsets of grammatical or functional categories in so-called mixed languages like German or Dutch.

(36)   Rankings:

    a.   SPEC-L ≫ HEAD-L ≫ COMP-L (SVO)

    b.   SPEC-L ≫ COMP-L ≫ HEAD-L (SOV)

Note that adoption of this system does not commit me to embrace an optimality-theoretic syntax, which has to deal with and constrain movement operations as well. It only constrains the positions in which heads, complements and specifiers are pronounced in typologically different languages. These constraints simply recast the parameters of standard X-bar theory, which are also statements about the positions of heads, complements and specifiers.[12]

    In a standard optimality-theoretic grammar (Prince and Smolensky [1993] 2004; Kager 1999), the *generator* provides a set of candidates from an input. This candidate set is the input to the *evaluator*, which evaluates the candidates against a hierarchy of ranked constraints. If the three constraints introduced here are gradable (cf. Grimshaw 2001), in the sense that the number of violations they incur depends on the number of constituents separating a particular constituent from the left edge of the maximal XP projection, then the rankings in (36) derive the two major word order patterns found across languages. This can be inspected in the two tableaux in Figure 1.1.

{Spec {H, Comp}}	Spec-L	Head-L	Comp-L
☞ [Spec H Comp] a.		*	**
[H Spec Comp] b.	*!		**
[Spec Comp H] c.		**!	*
[H Comp Spec] d.	*!*		*
[Comp H Spec] e.	*!*	*	

{Spec {H, Comp}}	Spec-L	Comp-L	Head-L
[Spec H Comp] a.		**!	*
[H Spec Comp] b.	*!	**	
☞ [Spec Comp H] c.		*	**
[H Comp Spec] d.	*!*	*	
[Comp H Spec] e.	*!*		*

Figure 1.1: SVO vs. SOV.

Turning to the positions of adjuncts and assuming that they can only be adjoined to maximal projections (cf. Chomsky 1995), two alignment constraints are sufficient to establish their linearisation. Adjuncts can be pronounced either on the left or right side of their XP sister, illustrated with traditional "linearised" trees in (37). The constraint ADJUNCT-L in (38a) requires adjuncts to be pronounced right before their XP sisters are pronounced and ADJUNCT-R in (38b) requires adjuncts to be pronounced right after their XP sisters are pronounced.

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12 Cf. Kremers (2009) for a more recent approach which parameterises Spell-Out.

(37) a.

```
              XP
            /    \
         ADJ      XP
                /    \
             SPEC     X′
                    /    \
                 COMP     X
```

b.

```
              XP
            /    \
          XP      ADJ
        /    \
     SPEC     X′
            /    \
           X     COMP
```
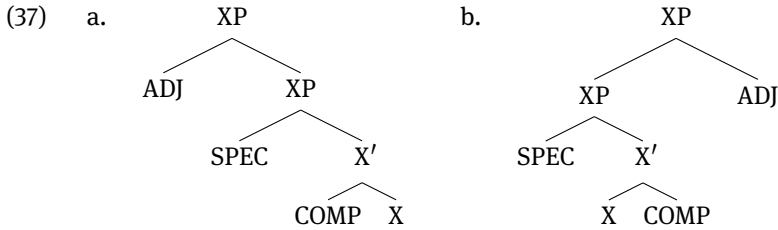
(38) a. ADJUNCT-L: The right edges of adjuncts are aligned with the left edges of XPs

b. ADJUNCT-R: The left edges of adjuncts are aligned with the right edges of XPs

Languages may either rank ADJUNCT-L higher than ADJUNCT-R or ADJUNCT-R higher than ADJUNCT-L, and sometimes the two constraints are not ranked with respect to each other. In head-final languages, adjuncts typically follow the directionality of their complements, achieved by the ranking ADJUNCT-L ≫ ADJUNCT-R. English has a mixed pattern, roughly as follows: (i) adjectives and sentential adverbs are pronounced before their sister XP is pronounced, (ii) VP adverbs are pronounced before or after vP/VP is pronounced and (iii) adverbials (NP, PP, CP) are pronounced after their sister XP is pronounced. The following constraint rankings apply:

(39) English adjuncts

a. Adjectives/S-adverbs: ADJUNCT-L ≫ ADJUNCT-R

b. VP adverbs: ADJUNCT-L, ADJUNCT-R

c. Adverbials: ADJUNCT-R ≫ ADJUNCT-L

Two examples illustrating the variable positions of VP adverbs are given below. The preferred position of adverbs often depends on information-structural considerations and true optional positions are best illustrated with examples in which focus is broad (cf. Göbbel 2007b).

(40) a. *With the new technology, we can (quickly) melt gold (quickly).*

b. [$_{TP}$ we can [$_{vP}$ (quickly) [$_{vP}$ melt$_i$ [$_{VP}$ t$_i$ gold]] (quickly)]]

(41) *What are the children doing? They are unusually quiet.*

a. *They are (attentively) listening (attentively) to their granny (attentively).*

b. [$_{TP}$ they are [$_{vP}$ (attentively) [$_{vP}$ listening$_i$ [$_{VP}$ (attentively) [$_{VP}$ t$_i$ to their granny] (attentively)] (attentively)]]

Example (40) shows that an adverb like *quickly* can be pronounced on either side of its vP sister and example (41) shows that *attentively* can be pronounced on either side of vP or VP. Some patterns (adjectives and sentential adverbs) may in fact be derived from the linearisation of specifiers, for example, if adjectives and adverbs are introduced as specifiers of functional heads (Cinque 1999, 2010; Scott 2002) and predicative adjectives move to a specifier position (Kayne 1994; Alexiadou, Haegeman, and Stavrou 2007). Other patterns do not follow straightforwardly from the syntactic representation, namely adverbials, manner adverbs and clausal adjuncts. Hence, linearisation statements are needed for at least a subset of adjuncts.

1.3 Roadmap

The main focus of this study is on phonological issues concerning extraposed PPs and relative clauses, which is reflected in the structure of the book. Only chapter 2 deals exclusively with the syntax of this construction. The book is structured as follows:

Chapter 2 reviews a number of syntactic properties of extraposition constructions, particularly the pros and cons for a syntactic movement analysis. While there is considerable evidence, for example from island constraints, that extraposition cannot be movement in the syntax, there is also compelling evidence that, under certain conditions, there can be two copies of the displaced constituent. The solution developed in this chapter relies on both PF and LF movement. Extraposition of PPs and relative clauses does not occur in the syntax, but at PF. In the syntax, the PP or relative and the noun they modify are not separated, hence the whole DP can be subject to covert movement. This is in essence the explanation for the existence of two copies of the extraposed constituent. LF movement is mainly motivated by Condition C effects associated with extraposed relatives in English, illustrated in (42).

(42)   a.   *I sent her$_i$ many gifts that Mary$_i$ didn't like last year.*
        b.   *I sent her$_i$ many gifts last year that Mary$_i$ didn't like.*
             (Rochemont and Culicover 1997: 282)

This chapter examines in considerable detail the coreference possibilities between an r-expression contained in a relative and a co-referential pronoun in the main clause because co-reference is not only constrained by Condition C of the Binding Theory (BT). Other factors, such as precedence, focus-structure and logophoricity also constrain co-reference. Last but not least, data will be reviewed which shows that bleeding of Condition C is also possible without extraposition.

LF movement for the resolution of such effects is therefore not dependent on extraposition.

Chapter 3 prepares the ground for the phonological investigations in the last two chapters. It contains a detailed discussion of the interaction between syntax and phonology, particularly of those aspects which are traditionally considered to be central topics of research at the syntax-phonology interface. These include the correspondence between syntactic structure and prosodic structure (i. e. phonological phrasing), the relation between syntactic structure and phrasal stress as well as the effect of information structural features like [focus] on both phonological phrasing and accentual prominence. This chapter also revises and extends the end-based theory of phonological phrasing (Selkirk 1986, 2000, 2005; Truckenbrodt 1995b, 1999) and brings it in line with the phase-based model of Spell-Out outlined in section 1.2.3.

Chapter 4 discusses the prosodic properties of extraposed PPs and relatives from both subject and object. It considers extraposition in focus-neutral contexts as well as in informationally structured contexts. The main goal of this chapter is to examine the role of different phonological constraints on extraposition with the aim to provide phonological solutions for this operation and its optionality. The main result of this chapter can be summarised as follows: extraposition occurs because there is a preference for the argument and the predicate to be phrased together, which allows the PP or relative to also form a separate phonological phrase. The optionality of the operation is due to an optionality in the formation of phonological phrases. Hence, the constraints that are eventually responsible for extraposition are interface constraints that account for the mapping between syntactic structure and prosodic structure. The basic ideas developed in this chapter were first laid out in Göbbel (2007a) on the basis of PP extraposition. The discussion of relative clause extraposition draws on Göbbel (2013b), but this chapter provides an extensive and much more detailed presentation of the data and analyses.

The analysis of extraposition in this study is mainly based on grammaticality judgements and production data (cf. section 1.4). Section 4.4 addresses one of the most difficult aspects of extraposition, namely the effect of weight or syntactic complexity on extraposition. As is well known, the more complex a constituent, the more likely it is extraposed. While weight is not a prerequisite for extraposition, it is nevertheless statistically relevant. Following Anttila's (2007) contention that *tendencies* observed in grammatical phenomena are not necessarily due to extrinsic factors (i. e., performance factors), but are often rooted in the grammatical system itself, this section shows how weight effects can be integrated into a formal model of the grammar. The discussion is restricted to PP extraposition

from objects and also takes into account heavy NP shift, with which it directly competes.

Chapter 5 discusses two neglected cases of extraposition in English, namely, extraposition of defocused and clitical PPs, illustrated in (43b) and (44b). The latter are prosodically deficient lacking lexical stress and for this reason will be called "light" PPs.

(43)   *In an effort to protect the environment, the EU has decided to ban cars older than five years from European roads.*
    a.   *All member states will sign a declaration on this matter in May.*
    b.   *All member states will sign a declaration in May on this matter.*

(44)   *Philip Roth's new book hit the stands about a fortnight ago.*
    a.   *Strangely, no review of it has yet appeared.*
    b.   *Strangely, no review has yet appeared of it.*

Rightward displacement in these cases is optional, too, but the reason for extraposition cannot be attributed to any phrasing preferences. It will be shown that in (43b) the defocused constituent is moved into the postnuclear stretch because only there it is also completely deaccented and identified as defocused by the hearer. In other words, it is a grammatical means that facilitates processing of information structure. On the other hand, a careful analysis of the data involving light PPs like (44) reveals that only a subset of extrapositions gives rise to a more optimal phonological structure. This chapter is based on Göbbel (2013a). The presentation and discussion of the data is largely extended and the analyses are considerably revised. Specifically, the analysis in Göbbel (2013a) is only partially confirmed.

The book also contains an appendix, which is a list of constraints and their definitions, alphabetically ordered, provided for the convenience of the reader.

1.4 The data

The intonational data described and discussed in this study stems from several recording sessions performed with three American and one British English speaker. They all have some background in linguistics, while one American informant has considerable experience with recording intonational data. The purpose of these recordings was to acquire a reasonable amount of production data. Sentences were simply read from lists, preceded by context questions or statements. Many examples, like (1) and (2), were provided without context questions or statements, which is appropriate for focus-neutral renditions. The lists also contained

a reasonable amount of filler sentences (e. g., verbs with clausal or heavy NP/PP complements, which were intended for another study) and many of the sentences were the same for the study participants. Several examples were just similar but had the same expected prosodic properties. All examples were analysed and annotated with *Praat*, developed by Paul Boersma and David Weenink at the University of Amsterdam.[13] All light PPs, as in (44), were also transcribed in order to determine whether the weak or strong forms of function words were pronounced.

The database contains 225 recorded sentences with PP complements and adjuncts of nouns in their base and extraposed position. Of these PPs, 82 are light, 28 are defocused and the rest are narrowly focused, part of larger foci or part of neutral sentence renditions. Ungrammatical examples were not counted because they were not recorded. They are nevertheless taken into account in the description and discussion at various stages in this study. The database also contains 111 recorded sentences with relative clauses in their base and extraposed position, of which 17 are defocused relatives. It also contains 16 examples with finite sentential complements of nouns and 7 examples with infinitival complements. Three informants were involved in the elicitation of sentences with PP extraposition, while only two participated in the recording of relative clauses and other sentential complements of nouns. The study also draws on a database with recordings of a sizeable amount of examples containing heavy NPs (ca. 170 examples) and sentential complements of verbs (ca. 60 examples), in their base and sentence-peripheral position. Chapter 3 on the syntax-phonology correspondence also relies on intonation data recorded for Göbbel (2003b) as well as for Winkler and Göbbel (2008).

All data are production data. The purpose of simple production experiments is to elicit default prosodic structures (cf. section 1.1). The most remarkable result is that the prosodic structure of extraposition from subject and object, regardless of whether a PP or relative is extraposed, is largely invariable. The whole sentence normally forms one intonational phrase (IP) containing two phonological phrases, as shown in (45). Only 3 examples of extraposed relatives and no example of extraposed PPs in my corpus form separate intonational phrases. This construction contrasts with heavy NP shift in (46), in which an intonational phrase boundary preceding the heavy NP occurs much more frequently in my data. This boundary is typically marked with a continuation rise (L-H%). Mapping of heavy NPs to separate intonational phrases is only an option and not obligatory.

(45)   a.   [(A man arrived)$_{PPh}$ (who we'd never seen before)$_{PPh}$]$_{IP}$

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13 http://www.fon.hum.uva.nl/praat

b. [(He donated a vase to a museum)$_{PPh}$ (that shows Zeus and Apollo fighting)$_{PPh}$]$_{IP}$

c. [(You'll find a review in your in-tray)$_{PPh}$ (of Turner's important diary)$_{PPh}$]$_{IP}$

(46)   [(He sold at Sotheby's)$_{PPh}$]$_{IP}$ [(a portrait of Turner)$_{PPh}$]$_{IP}$

The prosodic pattern exhibited by extraposition constructions is expected under current theories of the syntax-phonology correspondence, where root clauses in English form intonational phrases (Downing 1970; Nespor and Vogel 1986; Selkirk 2005). Extraposition within root clauses should not have an effect on intonational phrasing. The theoretical discussion will therefore mainly focus on phonological phrases, rather than on intonational phrases. Variation in the data will be addressed at several stages, but one aspect of frequent variation, namely, that of accent type and of the position of secondary accents in the prenuclear stretch is expected and often theoretically irrelevant for the constructions considered here. This aspect will not be further addressed unless it is relevant, but accentuation marking in the examples is always based on the recorded data.

The discussion of the syntax of extraposition in chapter 2 largely resorts to data from the literature. Several native speakers have been consulted for various aspects, but no systematic data mining has been undertaken.

2 Syntactic issues

2.1 Preliminary remarks

This chapter is devoted to the syntax of extraposition from NP. Since there already exist two excellent recent critical overviews, namely Baltin (2006) and Webelhuth, Sailer, and Walker (2013), I will not begin by recapitulating the main problems of previous analyses. Rather this chapter begins with a puzzle, which lies at the very heart of the debate of the proper syntactic analysis of this construction. Previous analyses will be addressed in due course. The puzzle can be illustrated with examples of relative clause extraposition.

On the one hand, there is compelling evidence, at least from English, that an extraposed relative clause is in a hierarchically higher position than its host. The following examples discussed by Culicover and Rochemont (1990) and Rochemont and Culicover (1997) show that extraposition from object can bleed Condition C of the Binding Theory if the r-expression is co-referential with the indirect object, but violates this condition if the r-expression is co-indexed with the subject. The subject, therefore, c-commands the r-expression in the extraposed relative, but the indirect object does not. Condition C is defined in (48), taken from Chomsky (1981: 188).

(47)   a.   *I sent her$_i$ many gifts [that Mary$_i$ didn't like] last year.
       b.   I sent her$_i$ many gifts last year [that Mary$_i$ didn't like].
       c.   *She$_i$ invited many people to the party [that Mary$_i$ didn't know].

(48)   Condition C of the Binding Theory
       An r-expression is free.[1]

These examples strongly suggest that the extraposed clause is not properly contained in the (extended) verb phrase. For example, it can be adjoined to the vP, but not higher, as shown in (49), where OX indicates the constituent extraposed from an object. And indeed much of the literature so far converges on this point (Baltin 1981, 2006; Rochemont and Culicover 1990; Fox and Nissenbaum 1999; Webelhuth, Sailer, and Walker 2013).

---

1 That is, x is free iff there is no y such that y c-commands x and x and y are co-indexed.

(49)

```
              TP
            /    \
          SU      T′
                /    \
              T        vP
                     /    \
                   vP      OX
                  /\
                V OBJ
```
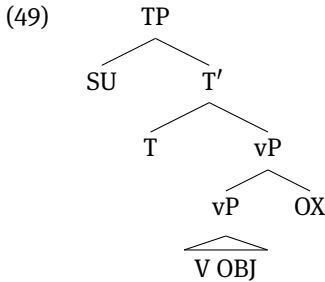
On the other hand, there is evidence from bound variable pronouns, pointed out by Haider (1994), that relatives extraposed from objects are low within the verb phrase. Example (50) shows that the quantified indirect object can bind a pronoun contained in a relative clause extraposed from the direct object. This contradicts the observation above that OX can bleed Condition C since variables must be bound syntactically and semantically (Heim and Kratzer 1998). In other words, the quantified NP (QNP) must be able to c-command the pronoun contained in the relative. The relative, therefore, does not seem to be represented in a structurally higher position, as in (49)/(51). In fact, (51) is a weak crossover configuration and the sentence would wrongly be predicted to be ungrammatical. The relative containing the pronoun c-commands *anyone* under that analysis. Hence, (51) should be as bad as (52b), in which a topicalised clause containing a pronoun c-commands a QNP and the pronoun and the QNP are co-indexed.

(50) *She refused to send anyone$_i$ the presents yesterday [that she had bought for them$_i$].*

(51) She refused to [$_{vP}$ [$_{vP}$ send anyone$_i$ [$_{DP}$ the presents _] yesterday] [$_{CP}$ that she had bought for them$_i$]]

(52) a. *Mary did not tell anyone$_i$ [that she had bought presents for them$_i$].*
      b. ??*[that she had bought presents for them$_i$] Mary did not tell anyone$_i$.*

This chapter is mainly concerned with solving this paradoxical situation. First of all, these data strongly suggest that there is a copy of the relative within the verb phrase, accessible for the indirect object in (50), and there is a copy of the relative in a structurally higher position in (47b), outside the c-command domain of the indirect object. Standard syntactic theory deals with such a configuration in terms of movement, either overt or covert movement. Yet this does not necessarily mean that it is only the relative that has moved. Consequently, what has to be established is what moves where at which level of representation.

What can be excluded from the very start is a syntactic configuration in which the extraposed relative is base-generated in a vP-adjoined position, as in

Rochemont and Culicover (1990), since such a structure cannot handle variable pronoun binding. Furthermore, it cannot be interpreted compositionally. Despite denoting properties, relatives intersect with the denotation of nouns, not verb phrases, and as such go into the restriction of the determiner. For instance, (53a) has the interpretation (53b). The only semantic contribution of the relative pronoun in a restrictive relative is to bind a trace, which is interpreted as a variable and used for the definition of a set of individuals, namely the set of individuals that Mary loves.

(53)   a.   *every boy who$_i$ Mary loves t$_i$*
         b. $\forall x \, [B(x) \wedge L(m,x)]$

In comparison, appositive relatives are outside the scope of the determiner and are more restricted in their distribution if the antecedent is a quantified NP. According to Demirdache (1991), the relative pronoun in (54) is a resumptive pronoun. As such it requires an antecedent DP and a universally quantified NP cannot serve this purpose. It can also not be properly contained in the DP, because the resumptive pronoun wouldn't be able to refer to it.

(54)   a.   *John, [who$_i$ I met t$_i$ only yesterday], is a hero.*
         b.   **John, [who I met t$_i$ only yesterday], is a hero.*

Hence, the underlying syntax must involve a structure along the lines argued for by Jackendoff (1977) and Demirdache (1991), in which restrictive modifiers are lower than non-restrictive ones. For example, (55) has the structure in (56).

(55)   *the picture of John that was on the table, which had been painted by Mary*

(56)
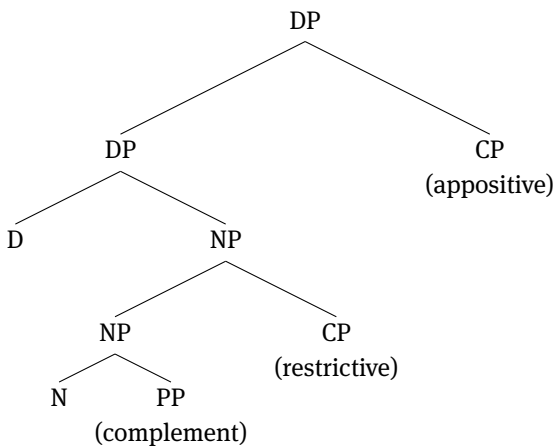
The Jackendoff/Demirdache analysis can be further refined to take into account that N raises to n within an extended NP, as in (57).[2] This analysis can be reasonably extended to restrictive PP modifiers, as in (58).
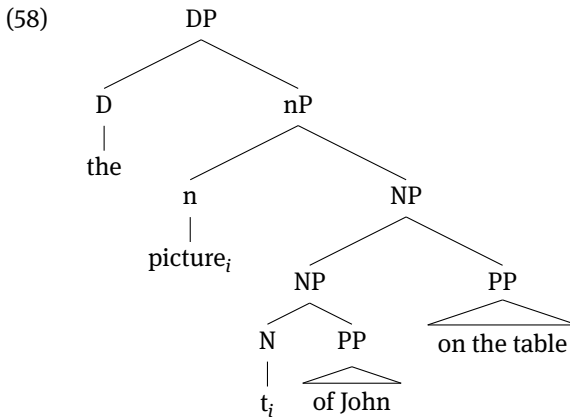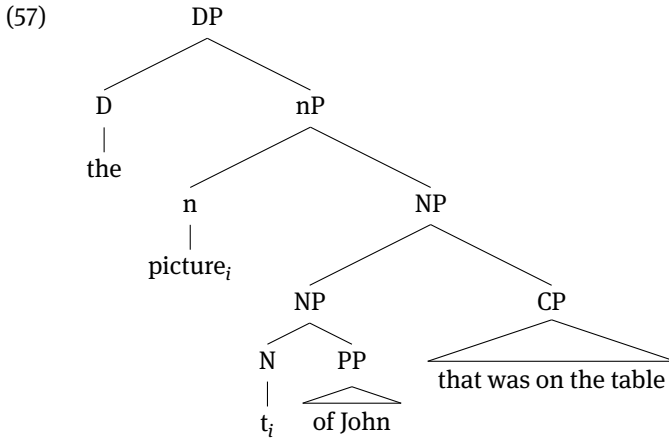
(57)

```
                        DP
                   ┌─────┴─────┐
                   D           nP
                   │       ┌────┴────┐
                  the      n         NP
                           │    ┌────┴────┐
                       picture_i NP        CP
                              ┌──┴──┐    ┌──┴──┐
                              N    PP   that was on the table
                              │   ┌┴┐
                              t_i of John
```

(58)

```
                        DP
                   ┌─────┴─────┐
                   D           nP
                   │       ┌────┴────┐
                  the      n         NP
                           │    ┌────┴────┐
                       picture_i NP        PP
                              ┌──┴──┐    ┌──┴──┐
                              N    PP   on the table
                              │   ┌┴┐
                              t_i of John
```

(i)   *Jason's gifts [of diamonds to Miriam] and [of bracelets to Melinda].*

(ii)   a.   *the consul's gift of the gladiator to himself*
         b.   **the consul's gift of himself to the gladiator*
                (Adger 2003: 268)

The position of the restrictive modifiers is fairly low within the DP (see also Fabb 1990, Platzack 2000 for relatives and Drubig 1997b for restrictive PP modifiers). Some evidence for such a low position comes from negative polarity items (NPI) licensed by *only*, as in (59). *Only* precedes and c-commands N and the relative, presumably being adjoined to nP, as in (59c).[3]

(59)   a.   *the only students from any Western Australian university*
       b.   *the only men who have any chance of winning*
       c.   [$_{DP}$ the [$_{nP}$ only [$_{nP}$ men$_i$ [$_{NP}$ t$_i$ who have any chance of winning]]]]

Returning to the puzzle mentioned above, binding of variable pronouns requires obligatory reconstruction, whereas obviation of Condition C of the Binding Theory would prohibit such a step, if what is assessed in both cases is the LF representation, i. e., the level relevant for interpretation of syntactic structures (cf. Fox 1999 and Sportiche 2006 for Condition C). In chapter 4 and 5 I will argue at length that phonological constraints play an important role in triggering extraposition. The puzzle is therefore more complex: how can phonological constraints trigger a movement operation that has semantic effects if phonology does not interface with the semantic component?

Focusing on relatives, there are several options to consider:

A: Movement occurs in the syntax
     The relative moves in the syntax in order to satisfy PF requirements. That is, the operation conforms to phonological properties of the language in question. This is the standard option pursued by the Minimalist Program, in which displacement occurs to satisfy interface requirements. As a side effect, the operation has "surface semantic effects," accounting for the Condition C data

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3 Sauerland (2003) and Hulsey and Sauerland (2006) argue convincingly that restrictive relatives are ambiguous between a head-external and a head-internal (i. e. raising) analysis. A head-internal analysis can be enforced, for example, by idiom chunks like (i). Kayne (1994) argues that the head raises to SpecCP (but see Bhatt 2002, Donati and Cecchetto 2011 for different proposals). It is important to acknowledge that two analyses are in principle needed. Good discussions of the problems facing a head-internal only analysis can be found in Borsley (1997) and Alexiadou et al. (2000).

(i)   a.   *Mary praised the headway that John made.*
      b.   [$_{DP}$ the [$_{CP}$ headway$_i$ [$_{C'}$ that John made t$_i$]]]

Hulsey and Sauerland (2006) claim that, if the head is internal, the relative does not extrapose, a claim that has been questioned by Douglas (2016: 58–59) and will not be pursued any further here.

noted above. There are two copies of the relative, one within VP and one outside the extended verbal projection.

Movement in the syntax is conceptualised as a feature-driven operation.[4] The PF requirements, whatever they are, must be representable in the syntax in terms of (uninterpretable) features or they are epiphenomenal on discourse-semantic properties (e. g., focus). The operation targets a specifier of a functional projection, which is linearised to the left of the head at PF. Linearisation to the left must be followed by remnant movement of other constituents, on which see section 2.2.1.

B: Movement occurs in the phonological component

Dislocation has no syntactic or semantic motivation (semantically, it corresponds to complete ''reconstruction'' of the moved constituent, accounting for the behaviour of variable pronouns). Constraints on the operation are solely phonological. Since movement is not associated with syntactic features (checking or valuation), it does not necessarily target a specifier and therefore rightward dislocation cannot be excluded *a priori*. In fact, Chomsky has suggested on several occasions that extraposition occurs at PF (Chomsky 1986, 1995, 2008).

PF movement can be conceptualised in two different ways. Either the canonical word order is spelled out and transferred to PF followed by displacement to the right, or the relative is simply linearised at the right edge during Spell-Out. The second option is currently highly favoured in the syntax camp, but the two options are just theoretical variants. However, this approach cannot account for the Condition C effect noted above.

C: Movement occurs at PF and LF.

The PF component is fed the canonical word order and displacement to the right occurs at this level. The semantic effects are captured by covert movement, which normally affects the whole DP containing the relative.

In this chapter I will eventually argue for the third option, namely, that extraposition does not exhibit regular properties of syntactic movement operations and should not be analysed as a syntactic operation. It should be delegated to PF. The semantic effects can then be captured by LF movement. The chapter aims at providing an interface solution that can handle both PF and LF effects.

It should be noted at this stage that LF movement targets the whole DP, not the relative clause alone. There are several reasons why the whole DP is affected.

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4 Cf. Adger and Svenonius (2011) for a classification and motivation of the different feature types employed in the vast literature within the Minimalist Program, including those that drive syntactic operations in order to meet interface requirements (a subset of their ''second-order'' features).

Firstly, relative clauses and other adjuncts cannot be extracted from NP in English overtly, hence cannot also be extracted covertly. This is discussed at length in later sections. Secondly, covert movement does not target some abstract quantificational feature, but the whole quantified NP (QNP) raises at LF. If it is an object, it has to undergo QR in order to resolve a type mismatch. If it is a subject, QR is not necessary. Hence, the quantifier plus the material in its restriction (N+relative) will be raised. Thirdly, nothing prevents covert raising of definite DPs at LF (cf. Heim and Kratzer 1998).

PF and LF are certainly not linked, which follows from the standard generative model of the grammar. In fact, as will be discussed later in this chapter, obviation of Condition C effects also occurs without extraposition, so extraposition and LF movement are not necessarily correlated. Therefore, the question and challenge is why QR (say of an object QNP containing a relative) does not necessarily obviate a putative Condition C violation. For this reason, a large part of this chapter will focus on Condition C effects. This is necessary because coreference of a pronoun with a linearly following r-expression is a fairly complex issue, not constrained by Condition C of the Binding Theory alone.

2.2 Syntactic properties of extraposition

2.2.1 Lack of syntactic trigger

A number of previous approaches to extraposition dating back to the 70's were essentially movement analyses (cf. Baltin 1978, 1981; Chomsky 1981; Guéron and May 1984; Büring and Hartmann 1997). Movement could be postulated freely (Move α) and constraints on this operation were stated in terms of Subjacency, the Empty Category Principle as well as other conditions and filters that are no longer part of the theoretical apparatus. In current minimalist theory, the displacement property is handled in terms of features on functional heads which agree with and trigger movement of some constituent to the specifier of that functional head. Features that drive syntactic movement can be purely syntactic (e. g., the EPP in English or V2 in the rest of Germanic) or they encode properties relevant at the interfaces, such as the semantico-pragmatic features [focus] and [topic].

A potential trigger for extraposition could be focus because extraposition has often been considered an English focus construction, for example by Guéron (1980), Johnson (1985), Rochemont (1986), Rochemont and Culicover (1990), Huck and Na (1990), Möck (1994) and Drubig (1997a). Example (60) and (61) show that extraposition can isolate a focused PP or relative and one could in principle invoke a Focus-movement analysis.

(60)   a.   *Did he leave a review on the table?*
       b.   *He left a review on the table [*$_F$ *of Turner's PAINTINGS].*

(61)   a.   *What kind of a magazine did you read on the train?*
       b.   *I read a magazine on the train [*$_F$ *which someone had left on the table].*

An analysis from a current perspective would be extraction of the focused constituent to the edge of the v*P-phase, followed by remnant movement of the defocused vP, as in (62), in analogy to the analyses of heavy NP shift in Rochemont (1998), Kayne (1998), Jayaseelan (2001) and Takano (2003).

(62)   a.   [$_{vP}$ left a review [$_F$ of Turner's PAINTINGS] on the table]
          F-movement:
       b.   [$_F$ of Turner's PAINTINGS]$_i$ [$_{vP}$ left a review t$_i$ on the table]
          Remnant vP-movement:
       c.   [[$_{vP}$ left a review t$_i$ on the table]$_j$ [$_F$ of Turner's PAINTINGS]$_i$ [$_{vP}$ t$_j$]]

For a full technical implementation, one could postulate a more articulated vP periphery, similar to the CP periphery made popular by Rizzi (1997). Crosslinguistically, structural (i. e., narrow) foci are encoded either at the left-periphery (i. e., the CP area) or at the edge of vP. Focus at the edge of the vP has been documented, for instance, for Kirundi (Ndayiragije 1998, 1999) and a number of Chadic languages (Tuller 1992). This would motivate the postulation of a FocP or some other functional projection that can host foci and other operators (say, negative quantifiers) as well as a functional projection that can host topics and/or defocused constituents, as in (63).[5]
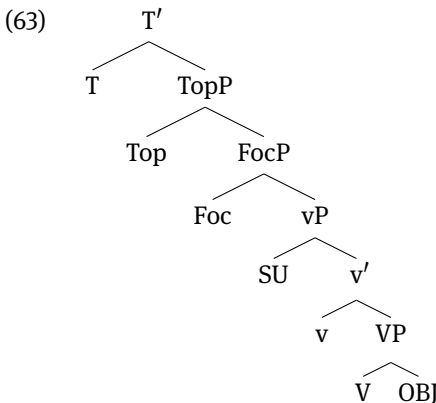
(63)

Focus movement can be handled in terms of focus agreement, as defined in (64). The head of FocP has an uninterpretable operator feature, which is valued by an interpretable F(ocus)-feature which marks the focused constituent of the sentence.

(64) Focus agreement
    a.   Foc has (sub)label [uOp] valued by [iF].
    b.   Foc can attract an F-marked constituent to its specifier.

The representation of focus at the edge of the verb phrase can be given substance by evoking the structured meaning approach to the semantics of focus (von Stechow 1991, cf. also Krifka 2006, who supplements it with the standard alternative semantics to focus). Movement of foci is necessary in that approach. If it is not overt, it is delayed to LF. The syntactic evidence for covert focus movement goes back to Chomsky (1976), who shows that (narrowly) focused constituents, like QNPs, give rise to WCO effects (65), hence move at LF. While earlier approaches to LF movement extracted QNPs to the edge of the clause (May 1985), more recent approaches extract them to the edge of vP (Heim and Kratzer 1998; Fox 2003). I have adopted this analysis of QR in later sections, the same can be done with focus.

(65) a. *His$_i$ mother LIKES John$_i$.*
      b. ??*His$_i$ mother likes JOHN$_i$.*

However, it is doubtful that such an analysis is correct. If extraposition were a focus construction and could be accounted for in terms of Focus-movement, then one would not expect only a subconstituent of a phrase marked as focus to move. Concretely, problematic are examples in which extraposition results in a sentence with a discontinuous focus, such as (66) and (67). In these examples, the two F-marked constituents each contain a prosodically prominent constituent. However, an F-movement analysis is questionable for such examples because there is also the possibility of shifting the whole focused object, by way of heavy NP shift, as in (68).

(66) a. *What did he leave on the table?*
    b. *He left [$_F$ a REVIEW] on the table [$_F$ of TURNER].*

(67) a. *What did he leave on the table?*
    b. *He left [$_F$ a REVIEW] on the table [$_F$ that someone had written about MONDRIAN].*

(68) a. *He left on the table [$_F$ a review of TURNER].*

    b.   *He left on the table [$_F$ a review that someone had written about MON-DRIAN].*

Another problem for syntactic Focus-movement is the fact that extraposition is always possible in broad focus (i. e., focus neutral) contexts, and it is generally optional regardless of whether it occurs from object (69) or subject (70).

(69)   *What do you want to tell me?*
        a.   *You'll find a review of Turner in your in-tray.*
        b.   *You'll find a review in your in-tray of Turner.*

(70)   a.   *Pictures of every terrorist will be distributed.*
        b.   *Pictures will be distributed of every terrorist.*

Clear evidence for extraposition in broad focus contexts comes from the fact that extraposition from subject is fairly frequent in news reports. Cf. the following examples collected from BBC Online:

(71)   *Reports are coming in of what appears to have been a second explosion.* (September 14, 2005)

(72)   *The aid agency said real advances had been made on aid and debt relief, but opportunities were being missed on fairer trade and arms dealing.* (March 11, 2006)

(73)   *Microsoft said the six versions (of Vista) were designed to match the demands different users have for its software and sound. No details have been given about the pricing of the separate versions.* (March 22, 2006)

(74)   *No deal has yet been struck on Russia joining the World Trade Organization, said Sean Spicer …* (July 15, 2006)

Now one could argue that what is moved is a constituent that contains the "focus exponent" and examples like (73) even seem to have a nested focus structure, shown in (75). Therefore, what moves is an F-marked constituent which pied pipes additional material to SpecFoc, including the G(ivenness)-marked PP *of the separate versions*.[6]

(75)   [$_F$ no details have been given about [$_F$ the pricing] [$_G$ of the separate versions]]

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6 The PP here could be extracted to a lower FocP before the remnant subject and vP is moved.

But such an argument can easily be rejected because extraposition of defocused material is also frequent and it is optional, too. This can be seen in the following examples. Example (76) shows that a defocused PP can be displaced and example (77) shows that a prosodically deficient or light PP can be shifted rightwards. In each case movement targets the edge of a phonological phrase (PPh), marked throughout by round brackets.

(76) *In an effort to protect the environment, the EU has decided to ban cars older than five years from European roads.*
   a.   *(All member states) (will sign a declaration on this matter in May)*
   b.   *(All member states) (will sign a declaration in May on this matter)*

(77) *Pinker's new book is really amazing.*
   a.   *(I read a review of it today) (in Time magazine)*
   b.   *(I read a review today of it) (in Time magazine)*
   c.   *(I read a review today) (in Time magazine of it)*

In this case, one could argue that movement of the PPs is due to some topic feature. Although topics in English need not be topicalised, they are nevertheless encoded intonationally, forming separate PPhs or intonational phrases and being associated with phonologically prominent pitch accents (e. g., L+H⋆).[7] Example (77) has no grammatically encoded topic because it contains a phonologically weak pronoun, which is not normally marked as topic in topic-prominent language (e. g., Romanian). In (76), the topic is presumably the subject *all member states*, but certainly not the PP *on this matter*.[8] Also note that examples like (77b) are not readily compatible with the syntactic analysis sketched above, in which the moved constituent targets, or is attracted to, the vP edge, followed by remnant movement of the rest of the verb phrase.

   The fact that defocused material can be extraposed has not gone unnoticed in the literature. For example, Rochemont and Culicover (1990) and Huck and Na (1990) mention examples like those below, but only Bolinger (1992) has given them proper consideration.

(78) a.   *Is there anyone here that Mary likes?*
      b.   *YEAH, a SOLDIER just came in [that Mary likes].*
           (Rochemont and Culicover 1990: 64)

---

7 Cf. Hedberg and Sosa (2007) for a critical evaluation of the literature.

8 That defocused material can be contained in a broad focus is a well-established fact. The recognition of this fact has led to theories of "focus projection" (cf. Selkirk 1984, 1995a; van Hoof 1993; Winkler 1996; Drubig 2003; Breul 2004).

(79) a. *Is there anyone here with blond hair?/Is there anyone with blond hair here?*

   b. *YEAH, a SOLDIER just came in [with blond hair].*
    (Rochemont and Culicover 1990: 176, FN 55)

(80) a. *Did a guy come in here who was holding a duck?*

   b. *No, but a GIRL came in here [who was holding a duck].*
    (Huck and Na 1990: 59)

Bernhard Drubig (p. c.) once remarked that in this construction either the noun or the extraposed constituent must be focused. Concerning these examples, one could claim that the relative is part of a larger focus "projected" by the focused head of the relative. But why should the completely defocused relative move into a structural focus position? Like extraposition of defocused PPs, displacement of defocused relative clauses is also optional. This is shown in (81), an example modelled after one by Bolinger (1992). In this example, even the head of the relative is defocused. Extraposed defocused relatives also do not qualify for topichood. They are not referential expressions, but denote properties (cf. section 2.1).

(81) a. *Aren't you going to invite Rupert and Martin?*

   b. *Don't you know they fight all the time.*
    I don't WANT people who are so quarrelsome in my house.
    I don't WANT people in my house who are so quarrelsome.

From the point of view of focus structure and its encoding in the syntax, it can be concluded that a range of extraposition constructions cannot be accounted for in terms of movement to a structural focus or even topic position. Hence features like [focus] and [topic] cannot be evoked for the displacement. Further note that languages often distinguish scrambling of defocused material from movement to a structural topic position and/or morphological topic marking (cf. Göbbel 2003b for an overview and discussion). Extraposition of defocused constituents in English is similar to (clitic) right-dislocation in languages like Catalan and Italian (cf. Vallduví 1992; Samek-Lodovici 2006; López 2010) or to leftward VP-internal scrambling in languages like Spanish and Romanian (cf. Zubizarreta 1998; Winkler and Göbbel 2002; Göbbel 2003a, 2003b). Such displacement is largely a consequence of the interaction of prosody with syntactic structure, as argued by virtually all of the studies just cited. I will discuss extraposition of defocused constituents in considerable detail in chapters 4 and 5, where I will show that prosody plays a crucial role here as well. However, the fact that semantico-pragmatic triggers cannot be established is not sufficient an argument to exclude syntactic movement. The following subsections elaborate on this point.

2.2.2 The locality of extraposition

The following two sections review the status of some classical restrictions on extraposition, particularly the role of Subjacency and Conditions on Extraction Domains. Since extraposition from NP is both more restricted and more liberal than leftward movement, it will be concluded that the operation cannot be syntactic, but must be delegated to PF.

2.2.2.1 Subjacency

Historically, extraposition from NP has played an important role in the development of Bounding Theory, particularly for the formulation of the *Subjacency Condition* (Chomsky 1973, 1981; Akmajian 1975; Baltin 1978, 1981, 2006; Freidin 1992). An early definition is given in (82) and the cyclic nodes, also known as bounding nodes, where eventually identified as NP and S/IP (now DP and TP) for English.

(82)   No rule can move an item from position Y to position X in the structure
         $[_\beta ...[_\alpha ...Y ...] ...] ...X ...$
         where $Y \neq \alpha$ and α, β are cyclic categories, ... (Chomsky 1973: 271)

The Subjacency Condition essentially says that no more than one bounding node may be crossed. This constraint accounts for the fact that extraposition is clause bounded (i. e., subject to the Right Roof Constraint) and that intra-clausal extraction from a DP containing another DP is only possible if the moved constituent is a complement/modifier of the highest nominal. Some examples from the literature are given below. Example (83c) illustrates the Right Roof Constraint: the relative clause is separated from the source NP by the bounding nodes TP and DP, as can be seen in (83d).

(83)   a.   *That a man who I want to meet is coming to dinner is unusual.*
        b.   *That a man is coming to dinner who I want to meet is unusual.*
        c.   **That a man is coming to dinner is unusual who I want to meet.*
        d. $[_{CP}$ That $[_{TP} [_{DP}$ a man _$]$ is coming to dinner$]]$ is unusual who I want
              to meet.
              (Freidin 1992: 99)

In (84b) and (85b), the extraposed constituent is separated from its source by two DP nodes. For (86a), Akmajian (1975: 122) claims that the extraposed adjunct *by three authors* can only be interpreted as a modifier of *review*. Baltin (2006: 249) provides the parallel example (86b) with extraposition from object, also claiming that it is not ambiguous.

(84)   a.   *A review of a new book about French cooking came out yesterday.*
       b.   *A review of a new book came out yesterday about French cooking.*
       c.   [$_{DP}$ A review of [$_{DP}$ a new book _]] came out yesterday about French cooking.
          (Akmajian 1975: 118)

(85)   a.   *Pictures of several people are for sale which I like.*
       b.   **Pictures of several people are for sale who I like.*
          (Chomsky 1981: 80)

(86)   a.   *A review of a book appeared last year by three authors.*
       b.   *I read a review of a book yesterday by three authors.*

The Subjacency Condition and other putative universal principles of grammar, like the *Empty Category Principle*, also constrained leftward movement. They were eventually replaced by *Relativised Minimality* (Rizzi 1990) and the *Minimal Link Condition* (Chomsky 1995). Since the latter do not apply to rightward movement, the status and role of subjacency in the grammar remains an open question. In fact, the empirical adequateness of the Subjacency Condition for restricting intra-clausal extraposition has been questioned by Stucky (1987), who claims that (87) is grammatical. Haider (1997) and Kiss (2005) have questioned its empirical validity for German.

(87)   *The names of all the painters are unknown whose work is being exhibited in the Chicago Art Institute next week.*
       (Stucky 1987: 391)

More recently, Strunk and Snider (2013) have conducted a more thorough investigation into the empirical adequateness of this condition for both English and German, by examining relative clause extraposition. On the one hand, they provide several grammatical examples collected from the Internet and different corpora which show that subjacency violations occur in non-constructed data. Two example are reproduced below. In (88), two DP nodes are crossed. In (89), it is three bounding nodes. If PP is also counted as a bounding node, as proposed by Baltin (1978, 1981), then five such nodes are crossed in (89). Placement of the temporal adverb at the end of the complex sentence would incur a heavy parsing load on the hearer/reader of this sentence and extraposition in such examples is strongly favoured, if not obligatory.

(88)   A wreath was placed [$_{PP}$ in [$_{DP}$ the doorway of [$_{DP}$ the brick rowhouse _]]] yesterday [$_{CP}$ which is at the end of the block with other vacant dwellings].
       (Strunk and Snider 2013: 110)

(89)   For example, we understand that Ariva buses have won [DP a number [PP of [DP contracts [PP for [DP routes [PP in [DP London]] _]]]]] recently [CP which will not be run by low floor accessible buses].
       (Strunk and Snider 2013: 111)

Baltin himself questions the validity of the Subjacency Condition in his state of the art article (Baltin 2006). He originally proposed PP as a separate bounding node in order to deal with examples of extraposition from preposed PPs, as in (90). Baltin (2006) notes that stranding the P in (91a) only slightly improves the examples and in (91b) the PP node does not block extraposition at all. He suggests that a solution could be found if the *Barriers* framework (Chomsky 1986) were adopted, in which the *in situ* PP is governed by the verb and L-marked, whereas the *ex situ* PP/DP is not L-marked and a barrier for extraction. However, Strunk and Snider (2013) also reject the barriers explanation, citing naturally occurring examples like (92).

(90)   *In which magazine did you see it which was lying on the table?*
       (Baltin 1978: 34)

(91)   a. ??*Which magazine did you see it in which was lying on the table?*
       b.   *I saw it in a magazine yesterday which was lying on the table.*
            (Baltin 2006: 240)

(92)   *In what noble capacity can I serve him that would glorify him and magnify his name?*
       (Strunk and Snider 2013: 106)

If subjacency does not constrain extraposition, what could be the cause of the grammaticality judgements reported in the early literature? If the judgements were not fairly consistent, they wouldn't have persisted so long, making it even into textbooks like Freidin (1992). Let us reconsider the lack of ambiguity in (86b), repeated in (93).

(93)   *I read a review of a book yesterday by three authors.*

The lack of ambiguity may be rooted in parsing preferences. In a now classical perception study of the influence of prosody on disambiguation of sentences, Price et al. (1991a, 1991b) found out that in examples like (94), where the PP can be attached "high" or "low," a prosodic break before the PP adjunct, as in (94a) practically blocks low attachment (i. e., the interpretation as adjunct of the embedded noun *nasality*). For the PP to modify *nasality*, it must form a phonological phrase with that noun, as in (94b).

(94)   *I read a review of nasality in German.*
    a.   *(I read a review of nasality) (in German)*
    b.   *(I read a review) (of nasality in German)*

I am not aware of any perception studies of this sort in the case of extraposition, but given the fact that extraposed PPs form separate phonological phrases, as in (95), it is extremely likely that the low attachment interpretation will also be blocked, maybe even if the sentence is not ambiguous.

(95)   *(I read a review of a book yesterday) (by three authors)*

However, the disambiguation of similar examples involving relative clauses like (96) does not seem to rely on prosody, as Bergmann, Armstrong, and Maday (2008) show in a production and perception study. In English, low attachment of relative clauses is generally preferred (cf. also Fodor 2002b), but such clauses at the right edge tend to be mapped to separate phonological phrases regardless of whether they are extraposed or not (cf. also chapters 3 and 4). Speakers can therefore not rely on phonological cues because the phonological structure is the same for both high and low attachment, namely the one in (96b).

(96)   a.   *Someone shot the servant of the actress who was on the balcony.*
    b.   *(Someone shot the servant of the actress) (who was on the balcony)*

The prediction for unambiguous examples of extraposed relatives is that high or low attachment should not play any essential role. In fact, Strunk and Snider (2013) have conducted an acceptability judgement experiment which confirms this prediction. For pairs of examples like (97) and (98), in which the relative is extraposed from the most deeply embedded DP_3 (violating Subjacency) or the containing high DP_1 (observing Subjacency), they did not find any significant acceptability differences.

(97)   I consulted [$_{DP1}$ the diplomatic representative [$_{PP}$ of [$_{DP2}$ a small country [$_{PP}$ with [$_{DP3}$ border disputes _]]]]] early today [$_{CP}$ which threaten to cause a hugely disastrous war]

(98)   I consulted [$_{DP1}$ the diplomatic representative [$_{PP}$ of [$_{DP2}$ a small country [$_{PP}$ with [$_{DP3}$ border disputes]]]] _] early today [$_{CP}$ who threatens to cause a hugely disastrous war]

Acceptability, however, decreases if a separate PP complement occurs between the source DP and the extraposed relative. Example (99), which has a complex PP following the source DP, receives a mean acceptability rating that is worse than

(98), but significantly better than (100), in which the first DP is complex. In neither (99) nor (100) is Subjacency violated.

(99) I consulted [$_{DP1}$ the diplomatic representative _] [$_{PP}$ about [$_{DP1}$ a small country [$_{PP}$ with [$_{DP3}$ border disputes]]]] early today [$_{CP}$ who threatens to cause a hugely disastrous war]

(100) I consulted [$_{DP1}$ the diplomatic representative [$_{PP}$ of [$_{DP2}$ a small country]] _] [$_{PP}$ about [$_{DP3}$ border disputes]] early today [$_{CP}$ who threatens to cause a hugely disastrous war]

Strunk and Snider (2013) conclude that it is extraposition "distance" that matters, rather than Subjacency, either in its original formulation by Chomsky (1973) or Baltin's Generalised Subjacency, which takes into account PP nodes. But extraposition distance is not formalised in their paper.

Summing up, we have seen that extraposition of PPs seems to exhibit Subjacency effects, but there is a possibly different explanation of the data which resorts to processing or default attachment of PPs that are phrased separately. The situation for relatives seems more complex in that the phonology is not a good cue for attachment preferences. It seems that extraposition distance plays a more important role than depth of embedding.

Extraposition distance has also been addressed in phonological work on this construction, notably by Truckenbrodt (1995a). It is also discussed in section 4.3.1.3, the basic idea developed in chapter 4 being that extraposition of relative clauses (and also PPs) allows the verb plus its dependents to form one phonological phrase, while the relative forms a separate one. This is schematically shown in (101), where three phonological phrases are restructured into two as a result of extraposition of the clause. While I have not recorded examples as complex as those discussed by Strunk and Snider, it can be asserted with confidence that the complexity of examples like (99) and (100) does not allow such a restructuring, hence extraposition of the relative would not give rise to a more optimal, less fragmented prosodic structure.

(101) (V DP) (CP) (PP) → (V DP PP) (CP)

2.2.2.2 Subject island effects

Subject and adjunct islands are known as *Conditions on Extraction Domains* (Huang 1982). There is a subject-object asymmetry in extraposition from NP, which suggests that the operation is sensitive at least to the subject island constraint. Such islands were initially subsumed under Subjacency and later on received an

explanation in the *Barriers* framework (Chomsky 1986), but alternative explanations are also available. In this section I will first consider an argument for syntactic movement and then an argument against extraposition as a syntactic operation.

A case for movement

The examples in (102) show that a PP cannot be extracted from the subject of unergative and transitive verbs, whereas the examples in (103) show that PPs can be extracted from the internal argument of an unaccusative and passivised verb, respectively. (104) constitutes a minimal pair, showing the same restriction.

(102)　a.　*[An agent _] shouted at me from the FBI.*
　　　　b.　*[A criminal _] shot a lawyer (yesterday) from the Cosa Nostra.*

(103)　a.　*In 1911, [a steamer _] sank from the Cunard Line.*
　　　　b.　*[Pictures _] will be distributed of every terrorist.*

(104)　a.　*A young man walked in today from India.*　　　　(unaccusative)
　　　　b.　**A young man walked in the park from India.*　　　(unergative)

This is exactly what one would expect if extraposition from NP were a syntactic movement operation: external arguments are also islands for wh-movement, while internal arguments allow extraction. However, research carried out in the late eighties and early nineties also identified clear differences between rightward and leftward movement. While extraposition is possible from an internal argument in SpecTP, as in (103), (104a) and (105a), wh-movement and topicalisation is ungrammatical, as in (105b/c).

(105)　a.　*A man came into the room with blond hair.*
　　　　b.　**With what colour hair did [a man t] come into the room?*
　　　　c.　**With blond hair, [a man t] came into the room.*
　　　　　　(Culicover and Rochemont 1990: 24)

On the basis of contrasts like (105), Culicover and Rochemont (1990) and Haider (1994) conclude that extraposition cannot involve syntactic movement and that the extraposed constituent must be base-generated in a right-peripheral position (cf. also Kiss 2005).[9] Nevertheless, a syntactic movement analysis would be preferable if it could be defended, given the fact that discontinuous base-generation

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9 I will return to the details of their analyses later in this chapter, as they are not essential for the discussion here.

runs into trouble with the generally accepted compositional interpretation of sentences (cf. also section 2.1.)

The contrast in (105) can in principle be captured by a movement analysis if the different movement types, namely extraposition, A-movement and wh-movement, have different timings. Extraposition must occur BEFORE the internal arguments of (104a) and (105a) move to SpecTP and wh-movement applies last. Let us assume that extraposition from an internal argument targets the vP-edge and is extracted when the DP is still *in situ*. Once T is merged, the remnant DP is attracted to SpecTP. The derivation proceeds as in (106), assuming, for the sake of the argument, classical rightward movement of the PP and adjunction to vP.[10]

(106) a. $[_{vP}$ come$_i$ $[_{VP}$ a man with blond hair $[_{V'}$ t$_i$ into the room]]]
Move PP:
   b. $[_{vP}$ $[_{vP}$ come$_i$ $[_{VP}$ $[_{DP}$ a man t$_j$] $[_{V'}$ t$_i$ into the room]]] with blond hair$_j$]
Move DP to SpecTP:
   c. $[_{TP}$ $[_{DP}$ a man t$_j$]$_k$ $[_{T'}$ T $[_{vP}$ $[_{vP}$ come$_i$ $[_{VP}$ t$_k$ $[_{V'}$ t$_i$ into the room]]] with blond hair$_j$]]]

The ungrammaticality of wh-movement in (105b/c) can now be attributed to the "freezing" effect documented for different types of displaced constituents (cf. Wexler and Culicover 1980 and Corver 2006 for an overview). A moved constituent is an island for extraction and a DP in SpecTP is no exception, as argued by Haider (2010) and Haegeman, Jiménez-Fernández, and Radford (2014). Wh-movement or topicalisation can only occur once C or Top is merged with TP.

The derivation in (106) crucially depends on the assumption that extraposition from subject (SX) has a landing site at the vP edge and therefore patterns with extraposition from object (OX), as in (107). Note that the (grammatical) subject is actually an internal argument. Hence, SX represents an extraposed constituent from a derived subject that ends up in SpecTP and not from an external argument. The ordering of operations in (106) is clearly stipulated. This is so because the edge of vP must be available as a landing site for extraposition but not for wh-movement although it is not a (strong) phase edge.

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10 For an early analysis along these lines see Johnson (1985), for whom extraposition of PP from unaccusative verbs is syntactic and extraposition of PP from unergative verbs (to the extent that it is possible) is stylistic. However, he argues that the target of extraposition from subject is S/IP, for which he has to reformulate the Subjacency Condition.

(107)

```
              TP
            ╱    ╲
          SU      T′
                ╱   ╲
               T     vP
                   ╱    ╲
                 vP     SX/OX
                ╱ ╲
               V OBJ
```
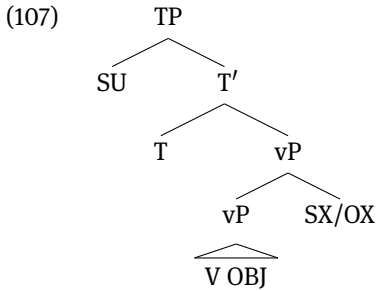
Nevertheless, one can ask whether there is evidence for the position of SX in (107). Some support for this analysis may be adduced from examples like the following, discussed by Guéron (1980: 650), who presents them as evidence against extraposition as a stylistic rule since they seem to feed LF rules. Syntactically, the negative polarity items (NPI) contained in the extraposed PP/relative are in the scope of negation, hence could be lower than T, which hosts the negative auxiliary. Semantic scope is usually translated as c-command in the syntax, for which there is considerable evidence from various phenomena (e. g., different types of adverb interaction, the interaction of different modals with negation, crossover data and variable pronoun binding).

(108)   a.   *The names of any of those composers weren't called out yet.
        b.   The names weren't called out yet of any of those composers.

(109)   a.   *M. thinks that the extraposition transformation which has the slightest effect on LF hasn't been found yet.
        b.   M. thinks that the extraposition transformation hasn't been found yet which has the slightest effect on LF.

NPI licensing is a popular (textbook) test for c-command relations, popularised by Larson (1988), but it is not a reliable one. Particularly licensing by sentential negation and negative quantifiers is problematic. The reason is that the syntactic position of negation at the edge of vP does not necessarily match its semantic scope and negative quantifiers can have wide (sentential) scope, too. These data are therefore not suitable to draw any conclusions about the overt syntactic configuration (cf. in particular de Swart 1998 and Hoeksema 2000).

If strict c-command were the correct condition for NPI licensing by negation or negative quantifiers, then the position of the NPI in most cases must be assumed to be lower than the licenser.[11] Consider, for instance, the following examples from

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11 There are well-known exceptions. Linebarger (1980: 227) notes that indefinites which contain an NPI can occur in subject position (i). Heycock and Kroch (2002: 161) show that they can also be topicalised (ii).

Culicover (1981). If c-command played a role, then (110a) would be properly excluded. This test would tell us that the extraposed PP in (110b) is lower than T, say adjoined to vP. For (110c), the test would predict that the extraposed PP is lower than the PP complement of the verb.

(110) a. *Pictures of any of the women weren't hanging on any of the walls.
      b. Pictures weren't hanging on any of the walls of any of the women.
      c. Pictures were hanging on none of the walls of any of the women.

While the structure for (110b) can be derived in the way outlined in (106), the structural representation of (110c) cannot be derived straightforwardly by movement. The extraposed PP would have to be represented as a second complement of the verb, along the lines of Haider (1994, 1997), roughly as in (111). Needless to say, in this structure it cannot have been stranded by the noun *pictures*, which must originate in a structurally higher position than the PP *on none of the walls* and therefore cannot be interpreted as a complement of the noun.

(111) Pictures were [$_{vP}$ hanging$_i$ [$_{VP}$ on none of the walls t$_i$ of any of the women]]

If the verb has only one complement, a stranding analysis can in principle be implemented, for example in (112) and (113), but a uniform analysis of extraposition would be lost.[12]

(i)   *A doctor who knew anything about acupuncture was not available.*

(ii)   *We found various doctors, but a doctor who knew anything about acupuncture, we couldn't find.*

The possibility of reconstruction plays an important role in the distribution of such NPIs. In (iii), from Sauerland and Elbourne (2002: 287), it must reconstruct below negation in the embedded clause since negation there does not have matrix scope.

(iii)   *A doctor with any reputation is likely not to be available.*

12 In the case of NP-internal extraposition, as in (i) and (ii), in which the NPI is licensed by the nouns *denial* and *rejection*, a head-movement analysis, in which N moves stranding its complement, is also conceivable.

(i)   *Despite [the Home Office's hasty denial yesterday **of any such plans**], it is not difficult to see why such a notion might appeal to Albania.*
     (The Guardian; March 11, 2003)

(ii)   *The United States and Britain plan to push for a vote on a UN resolution sending peacekeeping troops to Darfur, despite [a new rejection by Sudan yesterday **of any deployment of UN troops there**].*
     (Irwin Arieff, Reuters; August 30, 2006)

(112)   *Mr. Speaker, again, I was given no notice yesterday of any questions with respect to megavitamins or vitamins.*[13]

(113)   *There was no sign yesterday of any change in the relationship.*
(The Scotsman; July 21, 2006)

It is certainly desirable that these data receive a uniform syntactic solution, but not necessarily one that is established in terms of overt syntactic configurations (formerly S-Structure). The required configuration may also be established at LF, where reconstruction as well as the scope of negation and of negative quantifiers are taken into account. Therefore, the contrast exhibited in the examples (108) and (109) may be indicative of a low position for constituents extraposed from subjects, but it is not reliable. Hence, additional evidence for the representation in (107) is needed.

    Such evidence may come from VP ellipsis. Culicover and Rochemont (1990), Rochemont and Culicover (1990), Frazier, Clifton, Jr., and Carlson (2004) argue that the constituent extraposed from subject can adjoin to VP or S/IP. They argue that VP ellipsis can target the verb phrase including the extraposed constituent, as in (114a) and (115). In (114b), the extraposed constituent would be adjoined to S/IP. It is generally assumed that ellipsis is subject to a parallelism constraint which requires the elided verb phrase to be identical to the antecedent verb phrase.

(114)   a.   *A MAN came in with blond hair and a WOMAN did ~~come in with blond hair~~ TOO.*
        b.   *A MAN came in with blond hair and a WOMAN did ~~come in~~ with BROWN hair.*
             (Culicover and Rochemont 1990: 30)

(115)   *A girl left who was laughing and so did a boy.*
        (Frazier, Clifton, Jr., and Carlson 2004: 6, FN3)

Note that, for the analysis sketched in (106) to go through, vP adjunction/edge position of the PP is the only possibility to deal with the leftward/rightward movement asymmetry. So there should be no optional positions for extraposition from subject. However, the relevance of sentences like (114a) for establishing the syntactic structure of extraposition from subject has recently been criticised by Webelhuth, Sailer, and Walker (2013), who argue that the property *with blond hair* associated with *a woman* is just an inference. They strongly endorse earlier work that constituents extraposed from objects can only adjoin to VP and constituents

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13 http://www.leg.bc.ca/hansard/31st2nd/31p_02s_770811p.htm (accessed 28 August 2013).

extraposed from subjects only to S/IP. They also point to earlier work by Asakawa (1979), who presents more robust ellipsis data.[14] The following sentences show that VP ellipsis obligatorily deletes the constituent extraposed from an object (116), but cannot delete the constituent extraposed from a subject (117).

(116) a. *I saw the bricklayer yesterday who earned more money than a college professor, and my wife did ~~see the bricklayer yesterday who earned more money than a college professor~~, too.*
       b. **I saw the bricklayer yesterday who earned more money than a college professor, and my wife did ~~see the bricklayer yesterday~~ who earned less money than a carpenter.*

(117) a. *The gardener appeared on TV who earned less money than a carpenter, and the bricklayer did ~~appear on TV~~ who earned more money than a college professor.*
       b. **The gardener appeared on TV who earned more money than a college professor, and the bricklayer did ~~appear on TV who earned more money than a college professor~~, too.*

The same point is made by Baltin (1981, 2006), who presents examples like (118). They show that constituents extraposed from subject can be stranded by VP ellipsis, while constituents extraposed from object cannot. Note, however, that obligatory deletion of the latter under VP ellipsis is not compatible with a vP-adjunction analysis since adjuncts can normally be stranded if the verb phrase is elided. I will return to this issue in section 2.2.3.

(118) a. *Although not many people would ride with Fred who knew just him, some would ~~ride with Fred~~ who knew his brother.*
       b. **Although he didn't call people up who are from Boston, he did ~~call people up~~ who are from New York.*

Evidence from wh-clefts provides additional support for two different positions for constituents extraposed from subject and object, respectively. As the following examples drawn from Webelhuth, Sailer, and Walker (2013: 11) show, only a constituent extraposed from object can occur in the focus position of the cleft if

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14 Culicover and Rochemont (1990) themselves admit that inferences may play a role in certain contexts, citing the following examples, which they attribute to James McCawley.

(i)   a. *If you find a man who has lived in Boston, or a woman, please tell me.*
      b. *A MAN who is convicted of bank robbery will get a ten-year sentence, but a WOMAN would get only five years.* (p. 32, FN 21)

the VP is clefted, but not a constituent extraposed from a subject.[15]

(119)   a.   What we should do is [VP [VP call people up] who live in Boston].
         b.   *[CP What we should do who live in Boston] is [VP call people up].

(120)   a.   *[CP What [IP someone did _]] was [VP come into the room] who lives
               in Boston.
         b.   ?[CP What [IP [IP someone did _] who lives in Boston]] was [VP come
               into the room].

Rochemont and Culicover (1990) are certainly aware of these cases and exclude
them by adopting a version of the Complement Principle prosed by Guéron and
May (1984), which requires the extraposed constituent and the source NP be in a
government/m-command relation. The Complement Principle also constrains the
interaction of VP topicalisation and extraposition (cf. Rochemont and Culicover
1990: 34–36). Only PPs or relatives extraposed from object can be topicalised with
the vP, but not constituents extraposed from a subject. The resulting S-Structure
violates this principle in (122), but not in (121).

(121)   *John said he would meet a man at the party (who was) from Philadelphia,
         and [vP meet a man at the party (who was) from Philadelphia] he did.*

(122)   a.   *They said that a man would come in with blue hair, and [vP come in
               with blue hair] a man did.*
         b.   *They said that a man would come in who had lived in Boston, and [vP
               come in who had lived in Boston] a man did.*

From a theoretical point of view the Complement Principle is not unproblematic
as it requires two maximal projections, the source NP and the PP/relative, to be
in a government relation. The traditional notion of government in Government
Binding Theory actually defined a local relation between a head and a maximal
projection.[16] From a current minimalist perspective it makes even less sense be-
cause it is a condition on S-Structure, a level of representation that is no longer

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15 Note again that adverbs can occur in the wh-clause of the cleft, as in (i), so it is doubtful that
constituents extraposed from object are adjoined to the verb phrase.

(i)   *What we should do immediately is [call people up who live in Boston].*

16 Even if the condition were relaxed to maximal projections, as intended by Rochemont and
Culicover, there still remain some problems. Given the by now well-established fact that nominal
constituents are DPs and not NPs and a nonextraposed relative/PP is adjoined to NP due to the
fact that it goes into the restriction of D (cf. section 2.1), then an extraposed relative/PP cannot

assumed in syntactic theory. What these data however show is that there is robust evidence that constituents extraposed from subject are not contained in the vP.

Summing up the discussion so far, I first presented examples that suggest that extraposition is restricted to internal arguments. Then I explored a syntactic solution in which the extraposed constituent is extracted from the internal argument in its base position, namely the derivation in (106). This strictly derivational analysis only works if the landing site of the extraposed constituent is a vP-peripheral position. However, the empirical data that could motivate such a position is unreliable. Extraposition from subject does not pattern with extraposition from object: a constituent extraposed from a subject is structurally higher than a constituent extraposed from an object. There is also a problem with the timing of the operations because extraposition has to occur before wh-movement occurs and target the edge of a vP that is not a (strong) phase edge. This ordering of the two operations remains a stipulation.

A case against movement

A closer examination of the extraction data that the derivation in (106) is based on reveals that such an ordering of operations might not even be necessary. Ross ([1967] 1986) shows that complements of nouns in subject position can in fact be questioned, as in (123a). Only preposition stranding is ungrammatical in subject position.[17]

(123)   a.   *Of which cars were [the hoods t] damaged by the explosion?*
        b.   **Which cars were [the hoods of t] damaged by the explosion?*
             (Ross 1986: 148)

A minimal pair with extraposition is given in (124). The verb is unaccusative and both leftward and rightward extraction is possible.[18]

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be associated with NP under the Complement Principle since NP and the relative would not be contained in the same maximal projection.

17 Cf. also Kuno (1973), Kuno and Takami (1993) and Sheehan (2009, 2010). Kuno (1973: 381) formulated the constraint in (i) to cover such cases, whose exact nature, like the Freezing Principle, is still a matter of debate.

(i)   The Clause Nonfinal Incomplete Constituent Constraint
         It is not possible to move any element of phrase/clause A in the clause nonfinal position
         out of A if what is left over in A constitutes an incomplete phrase/clause.

18 It should be noted, however, that there is variation among speakers in acceptability judgements. Rochemont and Culicover (1990: 67) provide the following contrast between rightward and leftward movement:

(124)   a.   *About what did a great disturbance arise about that time?*
        b.   *A great disturbance arose about a Coptic secretary.*

So the timing of syntactic operations required for (106) is not an issue. In fact several linguists, among them Schütze (1995) and Fox and Nissenbaum (1999), have pointed out that leftward extraction of adjuncts from NP is ungrammatical. Schütze (1995) shows that PP adjuncts cannot be extracted even from nominal predicates and *in situ* objects (125). Extraction does however improve if the preposition is stranded (126).

(125)   a.   **With what color hair are you a student?*
        b.   **In which house did you like a picture?*
        c.   **On which shelf did you dislike a book?*
             (Schütze 1995: 113)

(126)   a.   ?*Which factory do you fear a strike in?*
        b.   ??*Which factory do you fear a long and dangerous strike in?*
             (Schütze 1995: 112)

Consequently, the correct generalisation seems to be that complements of an internal argument can be extracted rightward and leftward, while adjuncts of an internal argument can only be extracted rightward. External arguments are "islands" for both rightward and leftward movement.

A more recent discussion of subject islands can be found in Chomsky (2008), who addresses the subject/object asymmetry with respect to leftward extraction. His examples are given in (127) and they show that a complement can be extracted leftward from a promoted internal argument, but not from an external argument.

(127)   a.   *It was the CAR (not the TRUCK) of which [[the driver t] was found].*
        b.   **It was the CAR (not the TRUCK) of which [[the driver t] caused a scandal].*

The grammaticality of extraction from (promoted) internal arguments like (127a) is attributed to the fact that the wh-phrase is extracted to the edge of the CP phase from the DP in its base position, shown in (128), not from its derived SpecTP position. The solution involves formation of an A and A′-chain in parallel. Chomsky

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(i)   a.   *A book just appeared on the possibility of nuclear war.*
      b.   **On what subject did a book just appear?*

argues that T inherits its ϕ-features from C. Therefore, the case feature of the external argument in the Spec-v*P is only valued after C has merged with TP. Since both T and C are part of the structure already built, the external argument and the wh-phrase can be extracted at the same stage in the derivation.

(128) $[_{CP}$ C $[_{TP}$ T $[_{vP}$ v $[_{VP}$ V OBJ]]]] (unaccusative/passive)

In order to capture the ungrammaticality of extraction from an external argument two conditions are required: (i) a ban on subextraction from the edge of a phase, which Gallego and Uriagereka (2007), Haegeman, Jiménez-Fernández, and Radford (2014) call the *Edge Condition* and (ii) an invisibility condition on A-chains that have their features already valued. The first condition bans extraction from the subject in the configuration in (129) and accounts for the ungrammaticality of (127b).[19]

(129) $[_{CP}$ C $[_{TP}$ T $[_{v*P}$ SU v* $[_{VP}$ V ...]]]] (transitive)

The invisibility condition on A-chains with valued features is motivated by examples like (130), which according to Chomsky are grammatical. Extraction occurs from the intermediate trace position in the embedded SpecTP, where the external argument is not at the edge of a phase and has its case feature not valued yet.

(130)   It is the CAR (not the TRUCK) of which $[_{TP}$ the driver is likely $[_{TP}$ t to $[_{vP}$ t cause a scandal]]].

A similar syntactic configuration, however, does not ameliorate extraposition from an external argument, as can be seen in (131b). Chomsky suggests that ex-

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19 Note that without a separate ban on extraction from the v*P edge, this approach would not be able to account for the subject/object asymmetry exemplified in (127). This is so because the configurations for extraction from subject of a transitive verb and object of a passive/unaccusative verb are essentially the same. Both SU and OBJ in (i) are accessed within the same phase and they are accessed only after C is merged (which transfers its ϕ features to T). Both SU and OBJ agree with T and have to move overtly to SpecTP, forming an A-chain. In both cases a parallel A$'$-chain can be formed, hence subextraction should be possible in both cases.

(i)   a. $[_{CP}$ C $[_{TP}$ T $[_{v*P}$ SU v* $[_{VP}$ V ...]]]] (transitive)
       b. $[_{CP}$ C $[_{TP}$ T $[_{vP}$ v $[_{VP}$ V OBJ]]]] (unaccusative/passive)

Only extraction from the object of transitive v* has a different derivation, requiring the wh-phrase to be first extracted to the edge of the v*P and then move on to SpecCP. For critical discussion of Chomsky's approach see Broekhuis (2005), Grewendorf and Kremers (2009), Haegeman, Jiménez-Fernández, and Radford (2014).

traposition is restricted to the interior of the phase and the operation is part of the mapping to the sensorimotor (SM) interface, hence part of Spell-Out (cf. also Chomsky 1986, 1995).

(131) a. *The driver caused a scandal of the car.
       b. *The driver is likely to cause a scandal of the car.

So far we have seen that extraposition obeys different restrictions from regular wh-movement. On the one hand, it is more restricted in that it is clause-bounded (cf. section 2.2.2.1). On the other hand, it is less constrained clause-internally. In fact, other islands for leftward movement not mentioned above, but which allow extraposition freely are indirect objects, objects preceding particles and moved wh-phrases.

(132) a. *I think it's more fun when you give [someone _] a present who you hardly know.*
       b. *It is rather difficult to buy [someone _] a present who has everything.*
       c. **What did you say John sent [friends of t] a picture of his baby?*

(133) a. *He called [a woman _] up who he had met in Rome.*
       b. *It will bring [all the memories _] back, you know, of when my husband was alive.* (BNC [KRM])
       c. **What did John sent [books about t] back?*

(134) a. *How angry are you with her?*
       b. *What hope could there be for anything to change?*
       c. ??*Who do you wonder [which picture of t] Mary bought.*
           (Lasnik and Saito 1992: 102)

Extraposition, therefore, only seems constrained from an external argument (i. e., the subject of an unergative or transitive verb), as in (102), repeated in (135). This restriction, however, seems to hold of PPs only, as relative clauses can be extraposed if they are "heavy enough," as in (136). This undermines a syntactic account of the data (cf. also Rochemont and Culicover 1990) and another explanation is required. In section 4.3.1.4, I present a (non-syntactic) solution that can account for the unacceptability of (135).

(135) a. *[An agent _] shouted at me from the FBI.*
       b. *[A criminal _] shot a lawyer (yesterday) from the Cosa Nostra.*

(136) *[An agent _] shouted at me who claimed to be from the FBI.*

Assuming that Chomsky is right in claiming that extraposition is part of Spell-Out, what kind of additional evidence can be adduced for postsyntactic displacement?

I will return to this in the next section, but as far as island-sensitivity is concerned, it makes a clear prediction: extraction should be possible from the extraposed constituent because wh-movement is an overt syntactic operation and it should precede extraposition. At the point at which wh-movement occurs the NP would be *in situ* and not frozen. This prediction is fulfilled: Huck and Na (1990), Bolinger (1992), Stucky (1987) and Sheehan (2009, 2010) have shown that, contrary to general belief, extraction from extraposed PPs is in principle possible.

(137)   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 files TO Chambers, certainly, but I'm not sure I can remember whom he found letters in the files FROM.*
             (Huck and Na 1990: 66)[20]

(138)   a.   *You keep denying your responsibility here, but tell me: what did you see a report just YESterday about? Wasn't it those very same overdrafts?* (Bolinger 1992: 301)
        b.   *Who did you see a picture in THERE of?*
             (Bolinger 1992: 309)

The same point certainly cannot be made with relative clauses, which are true syntactic islands, whether extraposed or not. The relative pronoun in SpecCP of the relative clause blocks movement in (139b).

(139)   a.   *I met a commie last night who was waving a red flag.*
        b.   **What did you meet a commie (last night) who was waving t?*

Extraction from a constituent extraposed from a subject is also possible. In (140), the wh-phrases are extracted from extraposed reduced relatives. Extraposition in this case is practically obligatory, as can be seen in (141).

(140)   a.   *What did a picture arrive porTRAYing?*
        b.   *What did a detachment of troops come today purSUing?*
             (Bolinger 1992: 311)

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20 Huck and Na claim that extraposition of the preposition is only possible if it is focused and accented, but Bolinger argues against this view. For example, a possible context for (138b) is an art gallery and *there* refers to a hidden alcove in that gallery.

(141) a. *Which topic did a book appear [about t]?*
       b. **Which topic did [a book about t] appear?*
           (Sheehan 2009: 107)

At first glance, the possibility of extraction from an extraposed constituent seems to provide evidence against an analysis of extraposition as a postsyntactic operation. If extraposition occurs only after the DP has moved to the subject position, the wh-phrase would have been extracted from a constituent in SpecTP. And indeed Sheehan (2009, 2010) explores an analysis in which extraposition is analysed as distributed spell-out in moved nouns that contain PP complements. That is, part of the higher and lower copies are pronounced, which essentially amounts to complement stranding. An analysis of extraposition in which the complement of N is pronounced in the lower copy faces a number of shortcomings. Firstly, it does not capture extraposition across adjuncts, a problem which she does not address at all. Secondly, adjunct PPs also extrapose, which she suggests should be assimilated to extraposition of complement PPs. Thirdly, extraposition of PP from object, which frequently occurs across adjuncts, is also not addressed in her work.

Example (141b) only shows that preposition stranding in a non-final position is severely degraded, an instance of Kuno's Clause Nonfinal Incomplete Constituent Constraint already discussed above. Pied-piping the preposition improves the acceptability of certain examples for certain speakers. Moving the preposition to the right edge, as in (141a) is the optimal solution. In Bolinger's examples (140), it is a reduced relative that is obligatorily extraposed.

The range of solutions in the literature for (141b) range from purely syntactic ones (Chomsky 1981, 1986; Uriagereka 1999; Müller 2010; Sheehan 2009, 2010) to processing accounts (cf. Chaves 2013; Haegeman, Jiménez-Fernández, and Radford 2014 and references therein). I do not intend to solve the unacceptability of P-stranding in subject position here, as this is currently a highly debated and controversial research topic, but if a processing account of P-stranding in subject position is viable, then extraposition of the preposition alone after wh-movement is just a PF repair strategy that amends a structure that is difficult to process. Some support comes from an observation by Chaves (2013: 311–312), who states that intonational phrasing can facilitate parsing of subject gaps. In (142), the brackets signal the presence of prosodic breaks, which makes me believe that the question is segmented into three intonational phrases, which is a rather unnatural rendition for a question.

(142) *(Which book) (did a review of) (appear in the Times)?*

The gap left by the wh-phrase is at the right edge of an intonational phrase. In (141a), extraposition of P alone also places the cue for the gap at the right edge of an intonational phrase. Finding the gap in this case does not require an unnatural prosodic rendition as the right edge of the sentence coincides with the right edge of an intonational phrase anyway. In section 5.2 it will be argued that extraposition of certain non-prominent PPs also only occurs in order to facilitate processing, in that case of the information structure of the sentence, which is cued by the prosody.

2.2.3 Further arguments against overt syntactic movement

In the previous section, I have examined putative subject island effects in extraposition from NP. In this section, I take a closer look at extraposition from object and argue that extraposition cannot involve overt syntactic movement at all. I then show that well-known syntactic facts can be accommodated naturally if the operation is postsyntactic.

As could be seen in section 2.2.2.1, extraposition is subject to the right-roof constraint. It is generally believed that all rightward movement operations are so constrained. However, Postal (1974: 92–93) presents data that shows that heavy NPs and also CP complements can be extracted from infinitival clauses, though not from finite clauses. Cf.:

(143) a. *I have expected [$_{CP}$ to find _] since 1939 the treasure said to have been buried on that island.*
       b. **I have expected [$_{CP}$ that I would find t] since 1939 the treasure said to have been buried on that island.*

(144) *I have wanted [$_{CP}$ to know _] for many years exactly what happened to Rosa Luxemburg.*

These are the contexts in which long distance scrambling is possible in German (145) and also Dutch. This construction is also targeted by gapping in English, which can delete a control infinitive clause, but not, for example, a *for*-infinitive clause, as illustrated in (146) with examples from Johnson (2003).

(145) *weil   meinen Bruder$_i$ Maria gestern   [t$_i$ zu schlagen] versucht hat*
       because my   brother Maria yesterday   to beat   tried   has
       'because Maria tried to beat my brother yesterday'

(146) a. *Some tried to drink pernod and others ~~tried to drink~~ buttermilk.*
       b. **Vivek wanted for Nishi to buy the video, and Carrie ~~wanted for Nishi to buy~~ the ice cream.*

This is a typical case of restructuring or clause union, in which the selecting verb can be reanalysed with the infinitival clause as a complex vP. However, a comparison of heavy NP (147a) and CP-shift (148a) with extraposition from NP reveals that the acceptability of the latter is considerably decreased. Cf.:[21]

(147) a. I have [$_{vP}$ tried [$_{CP}$ to discover _] for many months] the rule that generates all grammatical extrapositions.
       b. ??I have [$_{vP}$ tried [$_{CP}$ to [$_{vP}$ discover [$_{DP}$ the rule _]]] for many months] that generates all grammatical extrapositions.

(148) a. I have [$_{vP}$ wanted [$_{CP}$ to know _] for many years] why Melinda vanished.
       b. ??I've wanted to know the reason for many years why Melinda vanished.

If restructuring is reanalysis as a complex vP, then rightward movement, as well as scrambling, would be intra-clausal and therefore local. For gapping, Johnson argues that the gapping remnant moves out of VP, followed by across the board movement of the VP, which creates the gap in the second conjunct. A slightly simplified derivation is given in (149), following the analysis in Johnson (2009).

(149) Some$_k$ [$_{VP}$ tried to drink t$_j$]$_i$ [$_{vP}$ t$_k$ v [$_{VP}$ [$_{VP}$ t$_i$] pernod$_j$]] and [$_{vP}$ others v [$_{VP}$ [$_{VP}$ t$_i$] buttermilk$_j$]]

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21 Three informants were consulted, of which only one found extraposition acceptable. One informant who found extraposition ungrammatical still saw a contrast between extraction from a nonfinite vs. finite clause in (i).

(i) a. ??*I have expected to find [the rule _] for many months that generates all grammatical extrapositions.*
     b. **I have expected that I would find [the rule _] for many months that generates all grammatical extrapositions.*

Both extraposition and heavy NP shift from subjunctive clauses is ungrammatical:

(ii) a. **The President has been requesting that he should find a [solution _] ever since last week to the United States' growing mortgage crisis.*
      b. **The President has been requesting that he (should) find _ ever since last week a solution to the United States' growing mortgage crisis.*

But why is extraposition from NP degraded if movement in all the grammatical examples above is arguably local? The answer can only be that extraposition does not involve syntactic movement at all.

This can also be demonstrated with pseudo-gapping constructions. In these constructions, a focused constituent is extracted to the edge of the vP before the latter is deleted, as argued by Lasnik (1999), Jayaseelan (2001), Winkler (2005) and Johnson (2009). Though the analyses proposed by these authors differ in detail, they all agree on the fact that the remnant of ellipsis must be moved. Example (150) shows that a whole DP can be focused and become the remnant of ellipsis. A PP contained in a DP can certainly also be narrowly focused, yet it cannot move, as the example (151) shows.[22]

(150)   *John hasn't given a book about John Lennon to Mary, but he has ~~given to Mary~~ pictures of Marilyn Monroe.*

(151)   **John hasn't given a book about John Lennon to Mary, but he has ~~given a book to Mary~~ about the scandal-ridden actress Marilyn Monroe.*

Consider also the following minimal pair involving a relative clause. In (152a), the relative clause is the remnant of pseudo-gapping. In (152b), the vP is just deaccented, but not deleted. If pseudo-gapping were just deletion of deaccented material or a radical case of deaccenting, then one would not expect any difference in grammaticality. However, pseudo-gapping requires overt movement of the remnant and it is ungrammatical because the relative clause cannot be extracted in the syntax. The extraposition example is fine because this operation is postsyntactic.

(152)   a.   **John hasn't given a watch that he bought in London to Mary, but he has ~~given a watch to Mary~~ that he bought at an auction.*
         b.   *John hasn't given a watch that he bought in London to Mary, but he has* given a watch to Mary *that he bought at an auction.*

A similar argument can be made from stranding under VP topicalisation. While DP, PP and CP complements of verbs can be stranded if they are "heavy enough," it is a well-known fact that extraposition from NP is excluded (cf. Baltin 1981, 2006; Rochemont 1992).[23] The heavy and focused constituents in the following examples are extracted to the vP edge in the syntax, presumably to a structural

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22 Note, however, that stranding a DP is not fully acceptable for all speakers, but even for speakers who don't like (150) there is a significant difference between the two examples.

23 Constituents stranded by vP topicalisation form a separate intonational phrase and are preceded by an obligatory pause. "Heavy enough" should be understood as heavy enough to form an

focus position (cf. Kayne 1998 and Rochemont 1998 for heavy NP shift). If extraposition occurred in the syntax, it would not be clear why the relative clause in (156) cannot be extracted before the vP is topicalised.

(153)   *He promised to read to the children, and [_{vP} read _ to the children] he did a tale about wombats and kangaroos.*

(154)   *He promised to talk to Martin, and [_{vP} talk to him _] he did about the dangers of travelling alone in the Middle East.*

(155)   *He promised to tell Mary, and [_{vP} tell her _] he did that he wouldn't organise the meeting.*

(156)   **They said John would invite everyone to the party that he knew, and [_{vP} invite [_{DP} everyone _] to the party] he did, that he didn't know.*
        (Rochemont 1992: 376)

If extraposition is postsyntactic, the data reviewed in section 2.2.2.2 receives a straightforward explanation. Consider again the interaction of vP topicalisation and extraposition. The relevant examples are repeated below.

(157)   *John said he would meet a man at the party (who was) from Philadelphia, and [_{vP} meet a man at the party (who was) from Philadelphia] he did.*
        (Rochemont and Culicover 1990: 34)

(158)   a.   **They said that a man would come in with blue hair, and [_{vP} come in with blue hair] a man did.*
        b.   **They said that a man would come in who had lived in Boston, and [_{vP} come in who had lived in Boston] a man did.*
             (Rochemont and Culicover 1990: 36)

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intonational phrase (cf. chapter 3 for further discussion). The extraposition example (156) does not improve even with a pause (Michael Rochemont, p. c.). The situation seems more complex, though. If the extraposed constituent is heavier and contains a contrastively focused constituent the examples improve. One of my informants accepted (i) with a pause preceding the relative and a strong accent on *French*, while Culicover and Rochemont (1990) also remark that focus improves such examples, offering the example in (ii).

(i)   *John promised to give Mary a watch from a famous London jeweller, and give her a watch he did, that he had bought from a FRENCH jeweller.*

(ii)   *?John said he would meet a man at the party who was from Philadelphia, and meet a man at the party he did, who was from New York.* (p. 28, FN 11)

Assume that postsyntactic means movement at PF. In a PF-movement analysis extraposition occurs after topicalisation and the fronted vP in (158) does not contain the NP argument. So there is nothing to extrapose from. However, nothing prevents extraposition to the right edge of the sentence in (159), where the relative has been extraposed from the subject after topicalisation of the verb phrase.

(159) *They said that a woman would appear on the stage, and appear on the stage a woman did who was wearing a hat with long feathers.*

A similar argument can be adduced from German, where the verb can be topicalised without the object. Example (161) is derived from (160) by scrambling of the object out of the vP followed by topicalisation of the remnant vP.

(160) *Ich habe einen Mann von   der Gewerkschaft eingeladen.*
       I   have a   man from the trade union   invited
       'I have invited a man from the trade union.'

(161) [$_{CP}$ [$_{vP}$ t$_i$ eingeladen]$_j$ habe [$_{TP}$ ich [$_{DP}$ einen Mann von der Gewerkschaft]$_i$ t$_j$]]

If extraposition occurred before topicalisation, then we would expect an extraposed constituent adjoined to vP to be carried to SpecCP without its source NP. But this is clearly not possible. Extraposition is post-syntactic and there is nothing to extrapose from in (162). Extraposition within a topicalised vP is only possible if the source is also topicalised, as in (163). (cf. Koster 2000 for similar facts in Dutch, but a different analysis).

(162) **[$_{vP}$ eingeladen von der Gewerkschaft] habe ich einen Mann.*

(163) *[Einen Mann eingeladen von   der Gewerkschaft] habe ich bestimmt nicht.*
       a   man invited   from the trade union   have I   definitely not
       'I have definitely not invited a man from the trade union.'

Let us also reconsider the interaction of ellipsis with extraposition by looking at Asakawa's (1979) examples again, repeated below. The fact that a constituent extraposed from a subject cannot be deleted with the vP, as in (164b), now follows from the fact that the extraposed constituent is not separated from the subject in the syntax and is located in SpecTP. The relative therefore cannot be targeted by vP ellipsis if it is not contained in the vP. For constituents extraposed from objects, as in (165), it correctly predicts that the extraposed constituent, which is recoverable from the previous sentence, must be deleted with the vP, since it is not separated from the object in the syntax. If the relative is not recoverable from the previous sentence and could move in the syntax, then (165b) should be grammatical and

count as a case of pseudo-gapping (cf. the discussion of (152a) above). Note that a vP-adjunction analysis of extraposed relatives, with or without movement, cannot explain why the extraposed constituent is obligatorily deleted because vP adjuncts can normally be stranded by vP ellipsis in English.

(164)   a.   *The gardener appeared on TV who earned less money than a carpenter, and the bricklayer did ~~appear on TV~~ who earned more money than a college professor.*

         b.   **The gardener appeared on TV who earned more money than a college professor, and the bricklayer did ~~appear on TV who earned more money than a college professor~~, too.*

(165)   a.   *I saw the bricklayer yesterday who earned more money than a college professor, and my wife did ~~see the bricklayer yesterday who earned more money than a college professor~~, too.*

         b.   **I saw the bricklayer yesterday who earned more money than a college professor, and my wife did ~~see the bricklayer yesterday~~ who earned less money than a carpenter.*

Throughout the history of generative grammar there has never been an interface between the semantic and phonological components of the grammar and properties reflected in both components must be encoded in the syntax. Consequently, an operation that occurs at PF remains invisible for the semantic component. Semantically, PF movement corresponds to obligatory "reconstruction" of the moved constituent. A fairly strong argument against syntactic movement can be adduced from examples involving variable pronoun binding, already mentioned in section 2.1.[24]

(166)   a.   *I sent every student$_i$ to a professor last term who could help him$_i$ with his$_i$ thesis.*

         b.   *I told every girl$_i$ a story before bedtime that scared the daylights out of her$_i$.*

         c.   *She refused to send anyone$_i$ the presents yesterday that she had bought for them$_i$.*

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24 To my knowledge, they were first pointed out by Haider (1994), who provides the example in (i).

(i)   *I would not tell everyone$_i$ all the details at once that he$_i$ might be interested in.* (p. 4)

Haider (1994) already noted that adjunction of the relative to the verb phrase would give rise to a weak crossover configuration (cf. also Büring and Hartmann 1997). Haider demonstrates that it is not sufficient to bind the pronoun in its base position with an example of clausal topicalisation. QR of *noone* in (167b), does not result in a licit binding configuration, or as he puts it: "QR on LF does not extend the binding domain" (1994: 6).

(167) a. *She has promised noone$_i$ (sincerely) to support him$_i$.*
       b. ?*[To support him$_i$], she has promised noone$_i$ (sincerely).*
          (Haider 1994: 6)

A theory-neutral definition from Büring (2005) is given in (168), where base position must be understood as the highest A-position (cf. Ruys 2000). Practically, the same point is made by Heim and Kratzer (1998: 262–266), who argue that semantic binding requires syntactic binding: the quantifier must c-command the pronoun at S-Structure (i. e., from an A-position).

(168) The weak crossover restriction
       An NP in a derived position can semantically bind only those pronouns which it c-commands already from its base position. (Büring 2005: 165)

The partial tree diagram below represents a movement analysis with a copy of the relative and QR of the quantifier, although I have argued that adjuncts cannot be extracted from NPs in English. The pronoun in the base position of the relative is bound by the trace/copy of the quantifier in its base position. The pronoun in the vP-adjoined position is bound by the raised quantifier only. That is, we have semantic binding without syntactic binding. If this configuration were created by extraposition, then the example should be degraded. In other words, (169) should be as bad as (170), which does constitute a weak crossover configuration regardless of whether the relative is adjoined to vP, as in (171a), or not separated from the NP it modifies, as in (171b). In both cases, the quantified NP does not c-command the pronoun from its base position. Consequently, examples like (166) provide strong evidence for the fact that the relative clause is where the source NP is in the syntax. In other words, extraposition is delayed to PF.

(169) *She refused to send anyone$_i$ the presents yesterday that she had bought for them$_i$.*
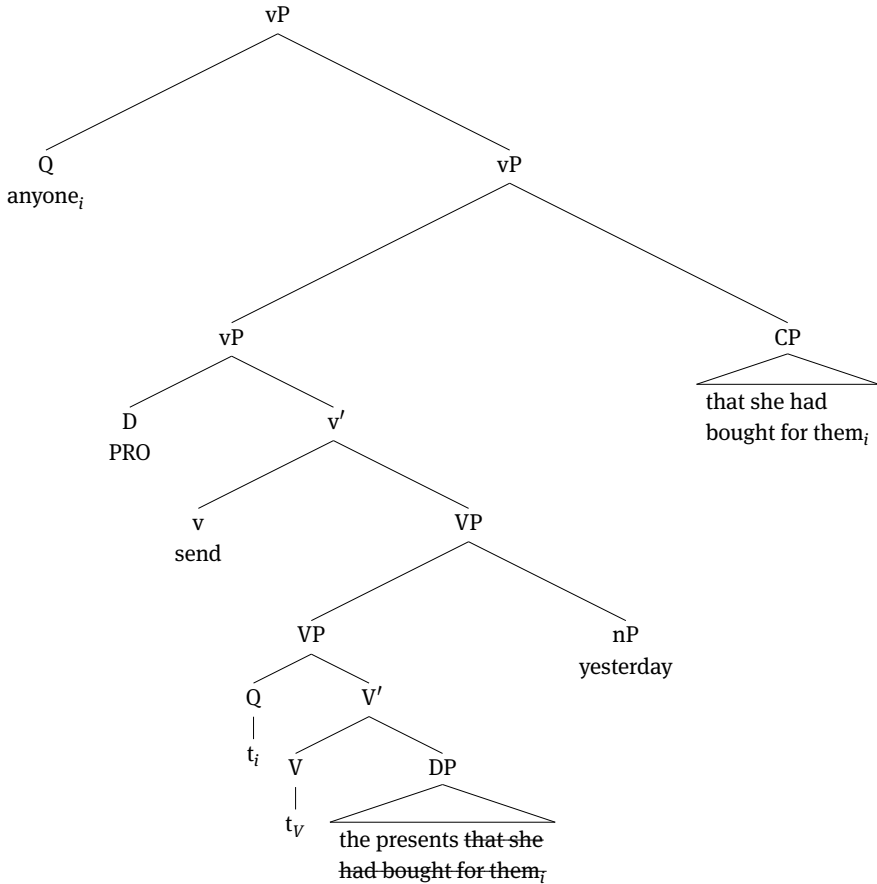
(170)   ??*She refused to send the presents to anyone$_i$ that she had bought for them$_i$.*

(171)   a.   She refused to [$_{vP}$ [$_{vP}$ send the presents to anyone$_i$] that she had bought for them$_i$]

        b.   She refused to [$_{vP}$ send [$_{VP}$ the presents that she had bought for them$_i$ [$_{V'}$ t$_V$ to anyone$_i$]]]

Summing up, in this section I have presented data which shows that extraposition from object cannot involve syntactic movement at all. I have also argued that the extraposed constituent cannot be represented in a vP-adjoined position. The conclusion so far is that the extraposed constituent is where the source NP is in the syntax. Therefore, a PF approach is a promising solution.

2.3 An interface approach to extraposition

2.3.1 Condition C effects

The previous sections established that constituents extraposed from objects cannot be adjoined to vP in overt syntax, either by movement or base adjunction. Yet it is also well-known that extraposition has semantic effects which seriously challenge the conclusion reached so far, namely, that it is a PF operation. One important argument against a PF-movement analysis is the fact that extraposition of relative clauses bleeds Condition C of the Binding Theory. This property has been discussed, for example, by Haider (1994, 1997), Culicover and Rochemont (1990), Rochemont and Culicover (1997), Fox and Nissenbaum (1999) and Sheehan (2010). Examples (172) and (173) show this for extraposition from object. An *in situ* relative clause containing an r-expression is c-commanded by a pronominal indirect object, giving rise to ungrammaticality if they have the same referent. Extraposition of the relative clause obviates a Condition C violation.

(172) a. *I sent her_i many gifts that Mary_i didn't like last year.*
       b. *I sent her_i many gifts last year that Mary_i didn't like.*
           (Culicover and Rochemont 1990: 29)

(173) a. ??/*I gave him_i an argument that supports John's_i theory yesterday.*
       b. *I gave him_i an argument yesterday that supports John's_i theory.*
           (Fox and Nissenbaum 1999: 139)

Semantic effects of extraposition are not expected in a PF movement analysis, rather full reconstruction of the displaced constituent is, as the binding data (166) in the previous section led me to conclude. Extraposition from a higher position is not so damaging for a PF-movement analysis. It is at least compatible with it. The example in (174a) shows that a relative clause extraposed from a wh-phrase does not induce a Condition C effect. Consequently, it is not c-commanded by the subject of the matrix clause and does not reconstruct to the underlying position of the wh-phrase. It is also well-known that a relative clause contained within a wh-phrase does not reconstruct from SpecCP. The example in (174b) illustrates what has come to be known as the Freidin/Lebeaux effect (Freidin 1986; Lebeaux 1988, 1990). Extraposition in (174a) could have occurred from SpecCP after wh-movement. Therefore, in a PF-movement analysis, whatever explains the anti-reconstruction effect of the non-extraposed relative clause, will also explain the anti-reconstruction effect of the extraposed relative.

(174) a. *Which man did he_i say came into the room that John_i didn't like?*

b. *Which man that John$_i$ didn't like did he$_i$ say came into the room?*
(Rochemont and Culicover 1997: 282)

As for extraposition from subject, an r-expression contained in a relative is higher than the position of a clause-mate object, as the example (175) from Reinhart (1976) shows. We have also shown in section 2.2.3 that it cannot be adjoined to the vP. Example (176) provided by a reviewer shows nicely that it is also not higher than the subject. Hence, the relative is where the subject is, not separated from it in the syntax.

(175)   *Nobody would ever call her$_i$ before noon who knows anything about Rosa's$_i$ weird sleeping habits.*
        (Reinhart 1976: 44)

(176)   **A person$_i$ will not set the alarm for the middle of the night who knows about that person's$_i$ sleeping habits.*

Complement clauses, however, tend to reconstruct to their base position under wh-movement, with or without extraposition, as has been pointed out repeatedly in the literature. Cf.:

(177)   **Whose claim that John$_i$ likes Mary did he$_i$ deny?*
        (Lebeaux 1990: 320)

(178)   ??/**I gave him$_i$ an argument yesterday that this sentence supports John's$_i$ theory.*
        (Fox and Nissenbaum 1999: 139)

(179)   a.   **Whose claim that John$_i$ was a spy did he$_i$ refuse to acknowledge?*
        b.   **Whose claim did he$_i$ refuse to acknowledge that John$_i$ was a spy?*
             (Rochemont and Culicover 1997: 298, FN 4)

Before I present my own solution for the problematic cases of extraposition from object, I will examine some proposals that have dealt with this issue.

2.3.2 Haider's solution

The easiest way to deal with the Condition C effects just presented is to ignore them. This is what Haider (1994, 1997) does, who points out that in sentences like (180a) the pronoun can be coindexed with the r-expression in the relative clause, but not in the complement clause—a seemingly paradoxical situation. However,

binding of variable pronouns in an extraposed relative clause is possible (180b) (cf. also section 2.2.3).

(180)   a.   *Someone has told him_i [who John_i had not met before] [that John_*i is in danger]*
        b.   *I would not tell everyone_i all the details at once that he_i might be interested in.*
             (Haider 1994: 3–4)

Haider states that "there must be a non-structural reason which immunizes the relative clause against principle C-violations" (1994: 4). Haider's approach is basically a base-generation one: the extraposed constituents are generated as complements of empty verbal heads in a stacked Larsonian VP-shell structure like the one in (181). Such a structure captures variable pronoun binding, but also predicts Condition C violations.

(181)   Someone [$_{VP}$ told_i [$_{VP}$ him e_i [$_{VP}$ [$_{CP}$ who John had not met before] e_i [$_{CP}$ that John is in danger]]]]

This analysis is certainly not unproblematic. Putting aside the licensing of those empty heads, the most problematic aspect of the analysis is that the relative clause cannot be interpreted as a modifier of the subject, at least not in a standard compositional framework (e. g. Heim and Kratzer 1998). Furthermore, Büring and Hartmann (1997) have pointed out that in Haider's approach variable pronoun binding would also be expected in extraposition from subject or in any configuration in which the quantified NP is lower than the source NP, but precedes the relative clause. Such binding of pronouns is not possible though, as their examples in (182) demonstrate.

(182)   a.   *A man entered every room_i yesterday who lived in it_i.*
        b.   *The porter let a man into every room_i yesterday who lived in it_i.*
        c.   *A man arrived at every station_i who had built it_i.*
             (Büring and Hartmann 1997: 15)

Clearly, ignoring Condition C effects does not solve the problem. For Büring and Hartmann (1997), extraposition is rightward movement in the syntax, adjunction to IP/TP, followed by reconstruction at LF. The ungrammaticality of (182) is due to weak crossover. In a PF-movement analysis, as pursued here, they are not separated from their source, hence reconstruction is not an issue. The weak crossover effect is also predicted. The syntactic structure of (182a) is (183), which exhibits a classical violation of the *Leftness Condition* (Chomsky 1976) after QR of *every room*. Recall also from section 2.2.3 the account of WCO by Heim and Kratzer (1998) and

Büring (2005), which sates that semantic binding requires syntactic binding from an A-position.

(183)   [$_{TP}$ A man who lived in it$_i$ [$_{vP}$ entered every room$_i$ yesterday]]

Also notice that example (180a) above does not pose any problems for a PF-movement analysis of the relative clause since the r-expression in the relative will never occur in a configuration in which the pronoun c-commands it. The syntactic structure of the sentence is (184). The complement clause in this example need not even have been extraposed. Relative clauses are remarkably unremarkable prosodically and information-structurally. They are shifted to the right for reasons to be discussed in chapter 4. If this occurs in the phonology, a prosodically more prominent complement clause may be spelled out *in situ* and the relative ends up at its left edge.[25]

(184)   [$_{TP}$ Someone who John$_i$ had not met before has [$_{vP}$ told [$_{VP}$ him$_i$ t$_V$ [$_{CP}$ that John$_{*i}$ is in danger]]]]

2.3.3 Rochemont and Culicover's solution

As has been mentioned several times before in this chapter, Michael Rochemont and Peter Culicover's work in the early 90's is essentially a base-generation approach to extraposition. Their views are expressed in Culicover and Rochemont (1990), Rochemont and Culicover (1990, 1997) and Rochemont (1992). Constituents extraposed from object are adjoined to VP, whereas constituents extraposed from subject can be adjoined to VP or IP/TP. The two configurations are repeated in (185).

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25 Haider notes that the order is fixed in English (i) as well as in Italian, Swedish and German. He also notes that focus structure may have an effect on that order if the NP, including the relative, is focused, as in (ii). I would like to add that focus on the NP actually results in defocusing of the complement clause, allowing the non-defocused relative to move across it.

(i)   a.   *It struck a grammarian last month [who analysed it] [that this clause is grammatical]*
       b.   **It struck a grammarian last month [that this clause is grammatical] [who analysed it]*.
             (Haider 1994: 3)

(ii)   *She told only those people [that my lecture has been cancelled] [who had asked her]*.
        (Haider 1994: 20, FN 2)

(185) a.
```
          IP
        /    \
      NP      I'
            /    \
           I      VP
                /    \
              VP      OX
             /  \
            V    NP
```
b.
```
               IP
             /    \
           IP       SX
          /  \
        NP    I'
             /  \
            I    VP
                /  \
              VP    SX
```
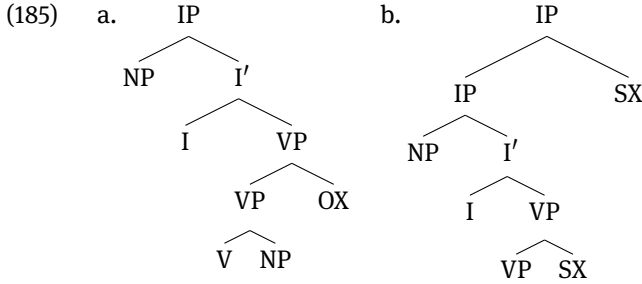
I have already criticised this approach on the following grounds: (i) it is problematic from a compositional semantic approach, (ii) the extraposed constituent is not in the restriction of the determiner, (iii) the evidence for extraposition from subject as adjunction to the verb phrase is not reliable and (iv) it predicts that a constituent extraposed from object can be stranded under ellipsis.

On the positive side, it can capture obviation of Condition C of the Binding Theory if the constituent is extraposed from an object. Another potential positive aspect is that it can capture extraposed relatives with split antecedents, which cannot have originated within any of its antecedents. The following examples were first observed by Perlmutter and Ross (1970: 350) and have since been marched against any analysis of extraposition that involves movement of sorts (Alexiadou et al. 2000; Bianchi 2002; Webelhuth, Sailer, and Walker 2013).

(186) a. *A man entered the room and a woman went out who were quite similar.*
   b. **A man who were quite similar entered the room and a woman went out.*
   c. **A man entered the room and a woman who were quite similar went out.*

However, Demirdache (1991) analyses these examples as non-restrictive relatives. For her, relative pronouns in appositive clauses are resumptive pronouns and the relative clause in (186a) can be paraphrased as a separate clause, as in (187). On the other hand, relative operators in restrictive clauses do not refer and are only moved for semantic reasons, namely, to form a property denoting expression.[26] If this analysis is correct, then an important piece of evidence for base adjunction must be rejected. So we are only left with the Condition C effect, which is properly captured, but which is overpowered by the arguments against such an analysis mentioned above.

(187) *A man$_i$ entered the room and a woman$_j$ went out. They$_{i/j}$ were quite similar.*

---

26 Webelhuth, Sailer, and Walker (2013) also suggest a referential analysis for the relative pronoun in (186), but do not conclude that the clause is appositive.

In a later paper, Rochemont and Culicover (1997) bring their analysis in line with Kayne's antisymmetry program (Kayne 1994), which disallows both rightward movement and rightward adjunction. Their analysis involves merger of the extraposed constituent in a higher specifier, followed by movement of the remnant containing the source of the extraposed constituent. The steps in the derivation of (188) are shown below.

(188)   *I sent her$_i$ many gifts last year that Mary$_i$ didn't like.*

(189)   Merge Rel-CL

```
                    TP
              _____|_____
             D            XP
             |       _____|_____
             I      CP            X′
                  __|__        ___|___
          that Mary_i didn't like  X      VP
                                      _____|_____
                                   sent her_i many gifts last year
```

(190)   Move VP:

```
                    TP
              _____|_____
             D            YP
             |       _____|_____
             I     VP_j           Y′
                 ___|___       ____|____
          sent her_i many     Y        XP
          gifts last year          _____|_____
                                  CP          X′
                                __|__        _|_
                         that Mary_i        X   VP
                         didn't like            |
                                               t_j
```
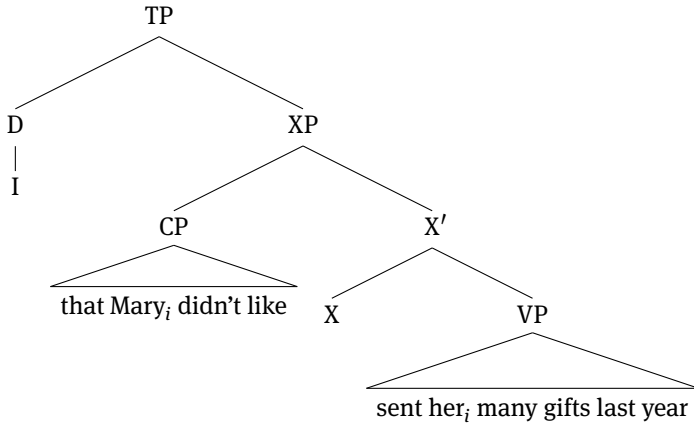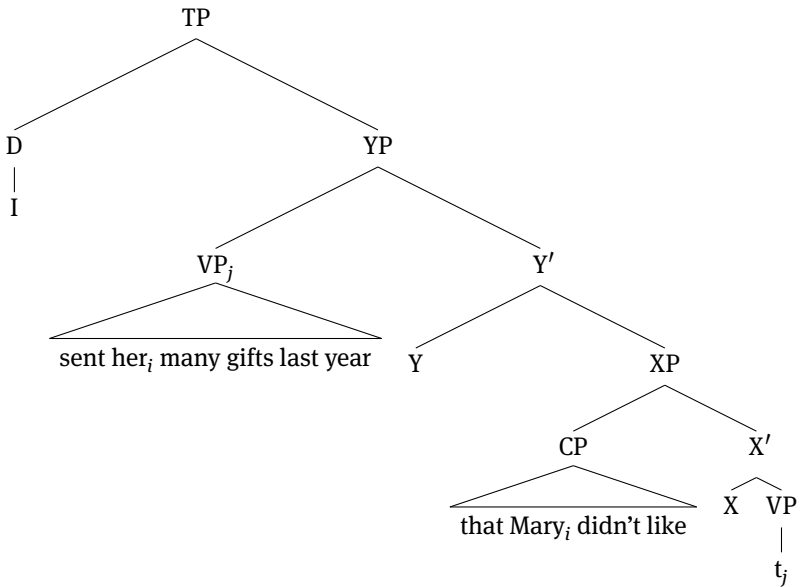
This analysis, like the classic rightward-adjunction analysis, correctly predicts that the indirect object can be co-referential with the r-expression in the relative clause because it does not c-command the latter. In this paper, Rochemont and Culicover do not take a stand on whether the relative clause is moved to the higher specifier or simply merged there, but they do not seem to exclude syntactic movement. A movement analysis is at least necessary for complement clauses, which have to be reconstructed. But simple merger of the relative clause in the higher specifier is obviously problematic because it cannot be interpreted as a modifier of the source NP.[27] Rochemont and Culicover conclude that their analysis remains incomplete without (i) some account of why the extraposed constituent moves, (ii) independent motivation for the structures assumed and (iii) an explanation of what licenses the required movement of the remnant.

A serious problem for Rochemont and Culicover (1997) is their analysis of extraposition from a wh-phrase. In order to account for examples like (191), they argue that the relative clause is merged in (or moved to) a higher specifier above TP followed by remnant movement of TP. The derivation is illustrated in (192).

(191)   *Which man did he$_i$ say came into the room that John$_i$ didn't like?*

(192)   a.   Merge Rel-CL:
             [$_{XP}$ that John didn't like [$_{X'}$ X [$_{TP}$ he said which man came into the room]]]
        b.   Move TP:
             [$_{YP}$ [$_{TP}$ he said which man came into the room]$_i$ [$_{Y'}$ Y [$_{XP}$ that John didn't like [$_{X'}$ X t$_i$]]]]

This analysis is highly problematic. Firstly, there is no independent evidence for the possibility of movement of TP in English. Secondly, it is unclear what happens to the source wh-phrase itself, which is trapped inside a topic island. Last but not least, it is unclear how subject-auxiliary inversion is to be implemented in this analysis. Consequently, this analysis can be rejected as fully unsatisfactory. In the next section, I examine a third account, which has been highly influential to this day.

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27 Not even their version of the Guéron and May's Complement Principle, which essentially says that the relative clause and the source NP must be in a government/m-command relation, is useful here, because the relative and the source NP are contained in different maximal projections.

2.3.4 Fox and Nissenbaum's solution

More recently, Fox and Nissenbaum (1999) and Fox (2002) propose an interesting solution to the anti-reconstruction effect exhibited by relative clauses. The basic idea is that only extraposed complements move overtly. Extraposed adjuncts, as in (193), are merged late after the object has undergone QR to the right. The two steps of the derivation are illustrated in (194). This analysis requires a model of the grammar in which overt and covert operations are not ordered with respect to each other.

(193)   *I gave him$_i$ an argument yesterday hat supports John's$_i$ theory.*

(194)   a.   QR of object:
                I [$_{vP}$ [$_{vP}$ gave him an argument yesterday] [$_{DP}$ ~~an argument~~]]
         b.   Adjunction of relative clause:
                I [$_{vP}$ [$_{vP}$ gave him$_i$ an argument yesterday] [$_{DP}$ ~~an argument~~ that supports John's$_i$ theory]]

Extraposed complements move overtly, as in (195). Therefore, they must reconstruct to the movement site.

(195)   ??/* I [$_{vP}$ [$_{vP}$ gave him$_i$ [$_{DP}$ an argument ~~that this sentence supports John's$_i$ theory~~] yesterday] that this sentence supports John's$_i$ theory]

They also claim that the same Condition C contrast can be observed with extraposed PPs, as in (196). I could not reproduce the judgement of (196a) with my informants, for whom the indicated coreference was not available. Sheehan (2010: 146, FN 38) mentions the same problem. It should be noted, however, that Condition C is not the only factor that regulates coreference possibilities. Discourse factors also play an important role.[28]

(196)   a.   *I gave him$_i$ a painting yesterday from John's$_j$ collection.*
         b. ??*I gave him$_i$ a picture yesterday of John's$_i$ mother.*

---

28 Failure to control for discourse factors may have misled Thompson (2001: 309–310) to consider the (b)-examples in (i) and (ii) Condition C violations. I will return to this issue in considerable detail in section 2.4.1.

(i)   a.   *A picture of Mary$_i$ was sent to her$_i$.*
        b.   **A picture was sent to her$_i$ of Mary$_i$.*

(ii)   a.   *A picture that Rembrandt$_i$ painted was sent to him$_i$.*
        b.   **A picture was sent to him$_i$ that Rembrandt$_i$ painted.*

For Fox and Nissenbaum, rightward movement parallels the possibility of leftward movement. Only complements can move leftward (cf. also section 2.2.2.2):

(197)   a.   *Of whom did you see [a painting t]?*
        b.*??*From where/*??By whom did you see [a painting t]?*

This analysis follows a trend in the analysis of adjuncts, which allows late, counter-cyclic syntactic merger (Lebeaux 1990; Chomsky 1993; Safir 1999; Stepanov 2001, 2007; Fitzpatrick and Groat 2005; Takahashi and Hulsey 2009). What is new is the possibility of adjunction to an NP that has undergone QR. This analysis has also been applied by Bhatt and Pancheva (2004) to extraposition in comparatives, a construction that poses similar problems for Condition C of the Binding Theory.

The analysis, however, is not unproblematic. One problem for Fox and Nissenbaum are data concerning binding of variable pronouns. If relative clauses are merged late in examples like (198), then a pronoun contained in the relative clause will not be c-commanded by the indirect object. As discussed in section 2.2.3 above, the syntactic configuration in (198b) is one that predicts a weak crossover effect.

(198)   a.   *She refused to send anyone$_i$ the presents yesterday that she had bought for them$_i$*
        b.   She refused to [$_{vP}$ [$_{vP}$ send anyone$_i$ the presents yesterday] [$_{QP}$ ~~the presents~~ that she had bought for them$_i$]]

A second problem is posed by examples like (199), which show that it is possible to extrapose both a complement and an adjunct from object or subject. In these cases, Fox and Nissenbaum face a conflicting requirement of overt movement of the complement and abstract movement of the QP to the position in which the relative clause is merged.

(199)   a.   *The CBI produced a report last year [on this subject] [which/that I thought excellent].*
        b.   *A book has been written [on this subject] [which/that is fascinating].*

A step by step derivation for (199a) would involve (i) movement of the PP complement, (ii) followed by abstract movement of the quantified NP, (iii) followed by overt merger of the relative. However, if the complement is a clause, the reverse order is observed, i. e., the relative precedes the complement. This was noted by Stucky (1987: 392), who prefers a reduced relative in (200).[29]

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29 Cf. also Haider's observation in section 2.3.2 on the order of relatives with respect to clausal complements of verbs.

(200)   *I have not yet demonstrated the claim either to my satisfaction or to anyone else's [(that has been) made by several researchers], [that free word order phenomena require an inherently computationally intractable treatment].*

The different orders of extraposed constituents in (199) and (200) cannot be due to different syntactic operations. The order is clearly a matter of weight or prosodic prominence. The PPs in (199) are defocused and cannot form a phonological phrase on their own (cf. chapter 5). Therefore, they precede the relative which does form one. In (200), the relative can be mapped to a phonological phrase, but the more complex complement clause is mapped to an intonational phrase, which consists of at least two phonological phrases. Therefore, the lighter relative precedes the phonologically more complex complement clause.

There are other problems with this analysis. Baltin (2006) notes a problem for an extension of this analysis to extraposition from wh-phrases like (201). The derivation of this example would require right-adjunction of the wh-phrase to TP followed by merger of the relative clause. In a final step, the wh-phrase must move to SpecCP stranding the relative clause. As Baltin notes, such movement is unattested. This leads us to yet another problem noted by Chomsky (2004), namely, why should QR be to the right? What could possibly exclude leftward QR followed by late merger of the relative clause, with the result in (202)?

(201)   *Which man did he$_i$ say came into the room that John$_i$ didn't like?*

(202)   a.   **That supports John's theory I gave him an argument yesterday.*
         b.   [~~an argument~~ that supports John's theory] I gave him an argument yesterday.

If QR adjoins the quantified NP to the left edge of vP, then the following sentence would also be expected to be grammatical:

(203)   a.   *I [~~an argument~~ that supports John's theory] gave him an argument yesterday.*
         b.   **I that supports John's theory gave him an argument yesterday.*

One question, however, still has to be addressed here. Are complements moved in the syntax, or can movement be delayed to PF as well? In section 2.2.3, I noted that extraposition under pseudo-gapping is ungrammatical, and complements of nouns behave like adjuncts in this construction. I established there that pseudo-gapping requires syntactic movement of the remnant. The relevant example is repeated in (204), which is grammatical without gapping.

(204) *John hasn't given a book about John Lennon to Mary, but he has ~~given a book to Mary~~ about the scandal-ridden actress Marilyn Monroe.

For those who have doubts about the complement status of the *about*-PP, the following examples might help convince them.

(205)   a. *Mary hasn't dated any student of Physics lately, but she has ~~dated students lately~~ of Chemistry and Neurobiology.
        b. *He hasn't lost his love for music, but he has ~~lost his love~~ for travelling abroad.

The arguments for syntactic movement of complements that Fox and Nissenbaum present have not convinced me, though. Firstly, obligatory reconstruction in (195) is also compatible with a PF movement analysis because in the syntax the complement would be *in situ*. Needless to say, a PF-movement analysis cannot account for the fact that relative clauses bleed Condition C.

Secondly, Fox and Nissenbaum claim that complement extraction exhibits a definiteness/specificity effect. Their examples are given in (206) and (207).

(206)   a. *I saw the best picture yesterday from the museum.*
        b. ??*I saw the best picture yesterday of the museum.*
        c. *I saw a very good picture yesterday of the museum.*

(207)   a. *I heard the same rumor yesterday that you were spreading.*
        b. ??*I heard the same rumor yesterday that you were quitting.*
        c. *I heard a similar rumor yesterday that you were quitting.*

I could not reproduce the grammaticality judgement of (206b) with my informants, who found it grammatical.[30] And in (207b), the word *same* is disturbing. Without *same*, the sentence is grammatical. Indeed, the literature abounds with examples of complement extractions from definite DP like those in (208). A quick Google search also returned hundreds of examples like this one. So there is no clear definiteness effect for extraposition of complement clauses from objects (cf. also section 2.4.2).[31]

---

30 Comparative superlatives are probably not definite/specific as leftward extraction is also possible. Cf. the pair in (i) from Matushansky (2005: 166).

(i)   a. *(Of those present) Who did you take the picture of?
       b.   (Of those present) Who did you take the best picture of?

31 Johnson (1985), however, notes the following contrast between complement and relative clause extraposition from DPs containing a possessive pronoun. Like Fox and Nissenbaum he

(208)   *The ambassador made the claim yesterday that world population has al-*
         ready outstripped the food supply.
         (Perlmutter and Soames 1979: 307)

Further arguments in favour of syntactic movement of complements presented
by Fox and Nissenbaum are the possibility of extraction across the board, as in
(209), and the licensing of parasitic gaps, as in (210). Across the board extrapo-
sition of adjuncts is claimed to be ungrammatical in both cases. Note, however,
that both examples can be analysed as Right Node Raising, for which there is no
agreement in the literature today on whether overt movement is involved or not.
The examples in (209) combine Right Node Raising with extraposition in the sec-
ond conjunct, which according to Sabbagh (2007) is obligatory in such cases.

(209)   a.   *I wanted to [present an argument _] and [discuss evidence _] very*
              badly that what John told me is right.
         b.   **I wanted to [present an argument _] and [discuss evidence _] very*
              badly that John told me about.

---

argues that clausal complements move in the syntax, while relatives do not. For PPs he argues
that they move in the syntax, regardless of whether they are complements or adjuncts.

(i)   a.   **I spread your rumor yesterday that Mary is in town.*
         b.   **I read your proof last night that Godel's Incompleteness Theorem is incomplete.*
              (p. 106)

(ii)   a.   *I met your friend yesterday who knows everything about everything.*
         b.   *I brought my book along that tells everything about everything.* (p. 107)

For reasons that are not fully clear to me, he does not consider the definite article as inducing
a specificity effect on extractions. The examples in (iii) are cited as grammatical, while those in
(iv) are all supposed to be ungrammatical. If specificity is the reason leftward extractions are
bad, then what we see here is something else, something that I don't understand at the moment
of writing. In any case, the definiteness/specificity restriction on extraposition from subjects is
more stringent. Some more recent discussion can be found in Maynell (2008) and experimental
work on this issue has been undertaken by Walker (2013).

(iii)   a.   *I saw the woman at the party from Niue.*
         b.   *I put the story on the table about my mum.*
         c.   *I gave the story to my mum about Niue.* (p. 100)

(iv)   a.   **I remember John's friend yesterday from Chicago.*
         b.   **I ate every dish on Tuesday from Cantor's.*
         c.   **I bought this radio yesterday from Taiwan.* (p. 102)

(210) a. *I read a book _ before reading an article _ about John.*
       b. **I read a book _ before reading an article _ from John's library.*

In sum, Fox and Nissenbaum present an interesting, but not unproblematic analysis of extraposition of adjuncts. They also fail to provide convincing arguments for syntactic movement of complements. In the remainder of this chapter I concentrate on relative clauses and present a different analysis, which is partly influenced by Guéron and May (1984). I think the new analysis can capture the semantic effects associated with relative clause extraposition, while at the same time doing justice to the conclusion reached so far that overt syntactic movement is not involved in this construction.

2.3.5 The proposal

This section outlines the basic proposal for extraposition from NP. The analysis to be outlined still relies on traces instead of copies. Copy theory reintroduces some of the problems this section solves. Therefore, further refinements are necessary in subsequent sections.

We have seen in previous sections that data relating to Condition C of the Binding Theory point to an analysis of extraposed relative clauses from objects in a position that c-commands material in vP, whereas data relating to variable pronouns shows that the relative clause is not separated from the source NP. The conflicting data can be reconciled if we assume the following ingredients for the analysis:

A: a standard phase-based derivational model (cf. Chomsky 2001 and section 1.2.2)
B: LF movement as post-Spell-Out movement (cf. Nissenbaum 2000, Chomsky 2004 and section 1.2.2)
C: extraposition at PF (Chomsky 1986, 1995, 2008)

In chapter 1 I outlined and motivated my assumptions about the theoretical model and concluded that only strong phases (*vP and CP) are syntactically relevant for the phonology. Only these correspond in a predictably systematic way to phonological phrases. Assuming, following Chomsky (2001), that transfer to PF applies to strong phases and that strong phases are spelled out in full on the next higher phase once all uninterpretable features are valued (i. e., *vP is spelled out once T or C is merged), the derivation of (211) proceeds as shown in (212). Spelled-out material at the successive derivational stages is bold-faced.

(211)   *I sent her many gifts last year that Mary didn't like.*

(212)   a.   Merge
             [_{vP} I sent_i [_{VP} [_{VP} her [_{V'} t_i many gifts that Mary didn't like]] last year]]

        b.   Spell-Out
             [_{CP} **that Mary didn't like**]

        c.   Merge
             [_{CP} C [_{TP} I_j [_{T'} T [_{vP} t_j sent_i [_{VP} [_{VP} her [_{V'} t_i many gifts that Mary didn't like]] last year]]]]]

        d.   Spell-Out + Linearisation
             [_{vP} **sent her many gifts** that Mary didn't like **last year**]

        e.   Extraposition at PF
             [_{vP} sent her many gifts last year that Mary didn't like]

        f.   Covert movement
             [_{CP} C [_{TP} I_j [_{T'} T [_{vP} [_{QP} many gifts that Mary didn't like]_k [_{vP} t_j sent her t_k last year]]]]]

The first step involves construction of the *vP phase (212a). When *v is merged it attracts *send* and the relative clause is spelled out (212b). Next T and C are merged and the subject moves to SpecTP (212c). Once the external argument has been raised and its case feature valued, the *vP phase, which contains the adverbial, is spelled out (212d). Note that the adverbial can be linearised to the right of the relative clause although the latter has been spelled out first. The position of the adverbial is the result of linearisation to the right edge of its VP sister (cf. section 1.2.4 for the formal statement of the relevant constraints). If Spell-Out were just right to left concatenation of spelled-out strings of terminals, cyclic transfer to PF would yield extraposition directly and canonical word order would be underivable. This is so because the relative is transferred to PF before the remainder of *vP is.

The relative clause is extraposed at PF (212e). The reasons why the clauses are displaced are discussed at length in chapter 4. In essence, extraposition of the relative optimises the prosodic structure of the clause by allowing the *vP and the relative to form separate phonological phrases. If the relative does not extrapose, the deaccented deictic adjunct would have to be phrased together with the relative to which it bears no syntactic and semantic relationship. In examples like this one, the prosodic structure for the canonical word order requires formation of a recursive phonological phrase, as in (213a), which the language tolerates, but does not prefer. Extraposition in (213b) gives rise to a more optimal prosodic structure that does not violate constraints on phonological recursion.

(213)   a.   *(I sent her many gifts)*_{PPh} *((that Mary didn't like)*_{PPh} *last year)*_{PPh}
        b.   *(I sent her many gifts last year)*_{PPh} *(that Mary didn't like)*_{PPh}

In the syntax, the relative clause is not separated from the source quantified NP. It can therefore be raised after Spell-Out of *vP (212f) as part of the quantified expression. QR of quantified objects is necessary in order to resolve a type mismatch and it is sufficient to adjoin them to vP, as argued by Heim and Kratzer (1998) and Fox (2003).[32] The relevant LF structure is represented separately in (214).

(214)

```
                              vP
                  ┌────────────┴────────────┐
                QP_k                        vP
          ┌───────┴───────┐           ┌──────┴──────┐
    many gifts that Mary didn't like  D            v'
                                       I       ┌────┴────┐
                                               v         VP
                                             send_i   ┌───┴───┐
                                                      VP      nP
                                                   ┌───┴──┐  last year
                                                   D     V'
                                                  her  ┌──┴──┐
                                                       V    QP
                                                       │    │
                                                       t_i  t_k
```
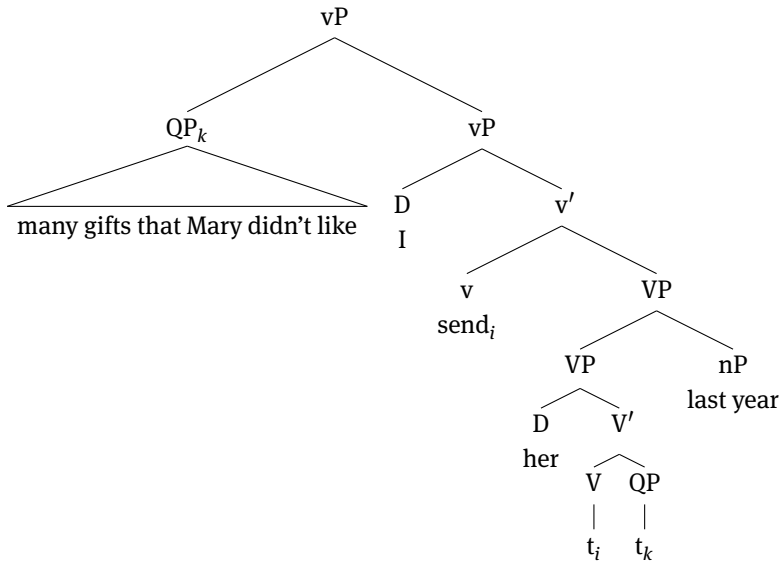
This analysis bears certain similarities to the one proposed by Guéron and May (1984). The main difference is that movement of the relative clause occurs at PF, while in their analysis it occurs in the syntax. It shares with them, and also with Fox and Nissenbaum (1999), the LF movement step. In my analysis, however, the whole relative clause is QRed together with the source NP. The advantage over Guéron and May (1984) is that it does not resort to overt syntactic movement, which, as we have seen in earlier sections, is not well motivated for adjuncts. The advantage over Fox and Nissenbaum (1999) is that a standard model of the grammar can be maintained in which overt operations precede covert ones.

The analysis just proposed captures bleeding of Condition C if this condition holds at LF, as argued by Fox (1999, 2003) as well as Heycock (1995) and Sportiche

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32 Obviation of Condition C is also possible if the source NP is definite, as in (i). Since it is widely believed that definite NPs do not undergo QR, I will discuss this issue separately in section 2.4.2.

(i)   *I sent her$_i$ the documents yesterday that Mary$_i$ had requested.*

(2006). After QR in (212f)/(214), the indirect object *her* no longer c-commands the r-expression *Mary*, at least on the assumption that QR leaves traces/variables, which are of the right semantic type (i. e., of type <e>). Copy theory reintroduces the Condition C effect and will be dealt with in section 2.4.

This analysis can also easily deal with binding of variable pronouns. The example in (215) has the LF in (216).

(215)   *She refused to send anyone$_i$ the presents yesterday that she had bought for them$_i$*

(216)
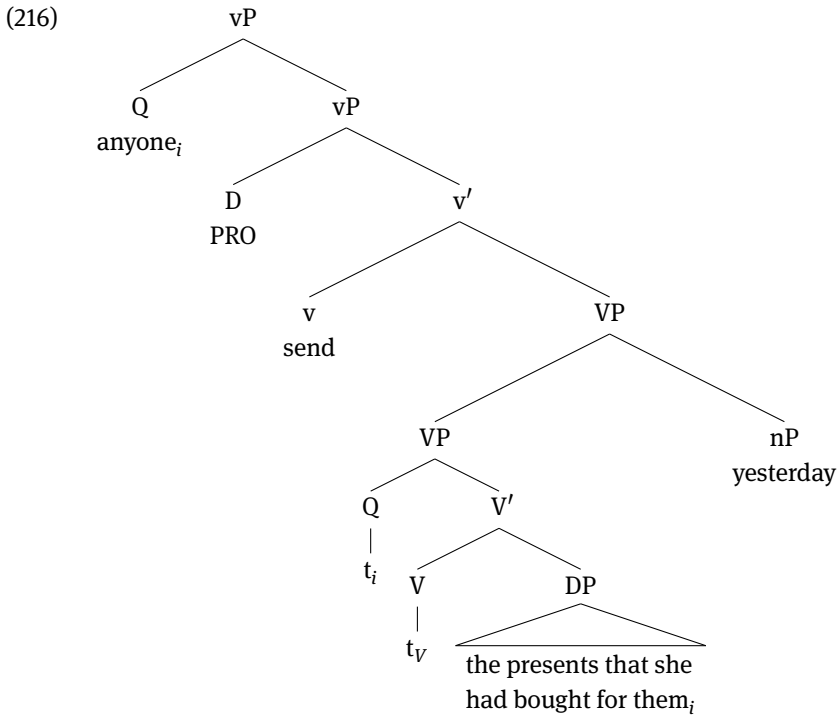
The syntactic configuration does not induce any weak crossover: the quantified NP c-commands the pronoun from an A-position and at LF. If, on the other hand, the quantified NP is raised from a position in which it is c-commanded by the NP containing the relative clause (with or without extraposition) we do have a weak crossover configuration. The example in (217) has the LF in (218).

(217)   ??*She refused to send the presents to anyone$_i$ that she had bought for them$_i$*.

(218)   She refused to [$_{vP}$ anyone$_i$ [$_{vP}$ PRO send [$_{VP}$ [$_{DP}$ the presents that she had bought for them$_i$] [$_{V'}$ t$_V$ to t$_i$]]]]

In the next subsection I will provide foundations for the proposed LF movement analysis. The facts to be discussed are not new, but will have to be captured by the proposed analysis.[33]

2.3.6 The LF position of extraposed constituents

Since Williams (1974) it is known that there is a correlation between extraposition and the scope of its source, an observation that has been formalised in different ways in Guéron and May (1984), Rochemont and Culicover (1990, 1997) and Fox and Nissenbaum (1999). Concretely, the position of the extraposed clause is as high as the LF position of its source and is constrained as follows, according to Guéron and May:

(219)   Boundedness of extraposition:
         Extraposition is clause-bounded if QR of the source is clause-bounded

The generalisation embodied in this statement can be illustrated with the examples in (220) and (221), where (a) exemplifies extraposition of relative clauses and (b) extraposition of result clauses. The co-indexed pronoun is either a subject or an object of a higher clause. Only extraposition of the result clause bleeds Condition C of the Binding Theory in these examples.

(220)   a.   *She$_i$ told many people about the concert who Mary$_i$ made nervous.

---

33 Horst Lohnstein has pointed out to me a potential problem this approach faces if both objects are quantified. In examples like (ia), repeated from section 2.2.3, one would have to ensure that the direct object does not take scope over the indirect object, because binding of the variable pronoun would no longer be possible if the direct object including the relative QR-ed over the indirect object. Now, it is well-known that the scope of the two quantified objects in the English double object construction is frozen, reflecting the surface order of the quantifiers (cf. Aoun and Li 1989; Kitagawa 1994; Stroik 1996). The problem does, however, show up in (ib), which allows inverse scope and binding of the variable pronoun. Note, though, that the analysis formulated in this section relies on traces. In section 2.4, I will reconsider this analysis in the light of copy theory (Chomsky 1993), which requires a copy of the relative in the base position of the existential quantifier. The pronouns can therefore be bound by the universal quantifier, even under inverse scope. Copy theory also reintroduces the Condition C problem that this section seeks to capture.

(i)   a.   I told every girl$_i$ a story before bedtime that scared the daylights out of her$_i$.
       b.   I sent every student$_i$ to a professor last term who could help him$_i$ with his$_i$ thesis.

b. *She$_i$ told so many people about the concert that Mary$_i$ made Bill nervous.*
(Guéron and May 1984: 10)

(221) a. **I told her$_i$ that many people attended last year's concert who made Mary$_i$ nervous.*
b. *I told her$_i$ that so many people attended last year's concert that I made Mary$_i$ nervous.*
(Guéron and May 1984: 2)

Let me consider them in turn, starting with relative clause extraposition. If QR occurs in order to resolve a type mismatch, then it is clause-bounded and so is extraposition from NP. This is so because the extraposed constituent is not separated from the source NP at LF. They are only discontinuous at PF. In recent approaches to the syntax of quantifiers like Heim and Kratzer (1998) and Fox (2003), subjects do not have to be raised at LF because there is no type mismatch to resolve. Only objects move, adjoining to vP. Applying my analysis to examples like (220a), the subject c-commands the LF position of the raised object and also the r-expression contained within it, as shown in (222). A Condition C violation is therefore predicted. In (221a), QR need not occur and the indirect object in the matrix clause c-commands the r-expression in the embedded clause, violating Condition C. In result clauses, on the other hand, QR is possible out of the containing clause and the "extraposed" clause is located in the higher clause, too.

(222) [$_{TP}$ She$_i$ [$_{DP}$ many people who Mary$_i$ made nervous]$_1$ [$_{vP}$ told t$_1$ about the concert]]

One prominent analysis going back to Bowers (1975) holds that result and also comparative clauses are selected by degree particles like *so*, *too*, *more*, *enough*. The following two sentences show that *so* selects a finite clause introduced by *that*, while *too* selects an infinitival clause introduced by *for*. Since selection is a head-head relation, *so* and *too* must have been merged underlyingly with the result clauses. The result clause is therefore extraposed from within the quantified NP.

(223) a. *So many books have been published recently that I haven't been able to read them all.*
b. *Too many books have been published recently for me to be able to read them all.*
(Guéron and May 1984: 1)

Extraposed result clauses exhibit the same paradoxical behaviour as extraposed relatives do: they bleed Condition C of the Binding Theory, yet a superficially structurally higher quantifier can bind a variable within the result clause. Example (224) provides evidence for a copy of the result clause in the matrix clause (cf. also White 2005 for additional examples and discussion), whereas (225) provides evidence for a copy of the result clause in the embedded clause.

(224)   *She told him$_i$ that so few people would attend the concert that John$_i$ would never want to go on stage again.*

(225)   *She told every artist$_i$ that so few people would attend the concert that he$_i$ would never want to go on stage again.*

A base generation account of the result clause in the main clause, as envisaged for example by White (2005), can therefore be excluded. A movement account of the result clause alone, as proposed by Guéron and May (1984), is also problematic if *so* and its CP complement are merged as the specifier of the quantified NP, as in (226). Subextraction from specifiers/left branches is problematic in other areas, too (cf. the discussion in section 2.2.2.2). Extraction of the whole specifier seems to me the least problematic analysis.[34]
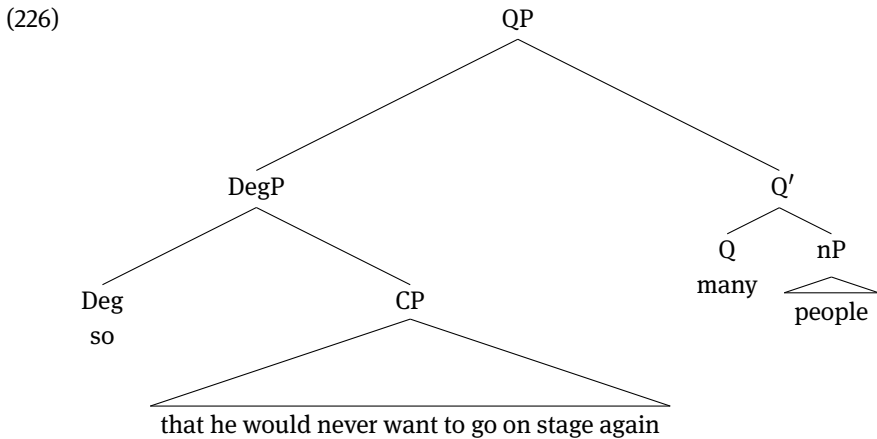
(226)

The analysis of *so* as a specifier of the QP receives support from the fact that it does not strictly select the QP as its complement. The following examples show that *so* can modify a range of different categories as long as their denotation is gradable. The gradable expression in (226) is the quantificational adjective *many*.[35]

(227) a. He is [$_{AP}$ so [famous]] that he has to leave town after a short time.
       b. He is [$_{PP}$ so [under scrutiny]] that he cannot be elected.
       c. He [$_{VP}$ so [likes venison]] that he eats it all the time.
           (White 2005: 521)

(228) He arrived [$_{ADV}$ so [soon] that we couldn't get our bags packed in time.

Now consider the following ambiguous sentence, discussed by Guéron and May (1984) and Rochemont and Culicover (1990, 1997). On one interpretation, it means that Mary believes that there is a causal relation between Harry's craziness and his irrational behaviour. On the other, it means that Harry acted irrationally because Mary believes that he is crazy.

(229) *Mary believes that Harry is so crazy that he acted irrationally.*

The ambiguity is due to the fact that *so* has scope over the embedded clause or scope over the matrix clause. Extending the analysis developed for relative clause extraposition in the previous section to result clause extraposition, the result clause is spelled out exactly where *so* is pronounced, namely in the specifier position of AP. The structure that is spelled out and linearised is the one in (230). After Spell-Out the CP must shift to the right, for reasons that still have to be explored.[36]

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35 Cf. Neeleman, van de Koot, and Doetjes (2004) for this and a number of other tests that distinguish degree expressions that are heads from those that are modifiers. Specifically, they argue that *too*, *very*, *as* and *that* (as in *that impatient*) are heads of DegP, while *more*, *less*, *enough*, *a little*, *a great deal* are modifiers. They do not discuss *so*, nor do they discuss the status of the result/comparative clauses. Clearly, the analysis in the text that the degree particle selects a clause as its complement cannot be extended to *too* if the latter strictly also selects adjectives as its complements. An interesting solution in terms of DegP recursion for this case is discussed by White (1997), to which the reader is referred.

36 The fact that the result clause is obligatorily extraposed may be related to the fact that constituents in specifier positions within DP/QP and presumably also AP may not have complements. And if they do have complements, for example adjectives like the one in (i), the complement of the adjective or more generally the whole AP may not occur prenominally. Whether extraposition is involved here, depends on the syntactic analysis of the adjective (i. e., if it is base generated in pre- or postverbal position, cf. Alexiadou, Haegeman, and Stavrou 2007 for discussion). Preverbal adverbs exhibit similar properties.

(230)

```
                              aP
                    ┌─────────┴─────────┐
                  DegP                  a′
              ┌────┴────┐            ┌───┴───┐
            Deg        CP            a       N
            so    ┌────┴────┐       -y     craze
              that he acted irrationally
```
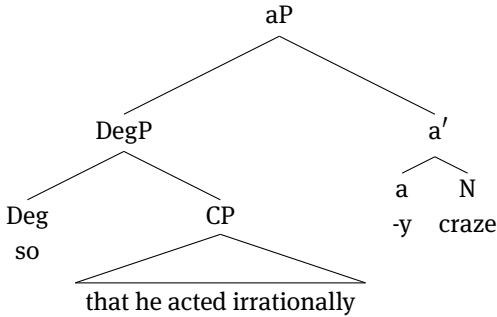
The scope of the degree particle *so* is due to QR, adjoining either to the embedded clause or to the main clause. Since the degree particle is not separated from the result clause in the syntax, the sentence in (229) has the following LFs corresponding to the two interpretations of the sentence.

(231) *Mary believes that Harry is so crazy that he acted irrationally.*

    a.   [$_{CP}$ Mary believes [$_{CP}$ that [$_{TP}$ [$_{DegP}$ so [$_{CP}$ that he acted irrationally]]$_i$ [$_{TP}$ Harry is [$_{AP}$ t$_i$ crazy]]]]]]

    b.   [$_{TP}$ [$_{DegP}$ so [$_{CP}$ that he acted irrationally]]$_i$ [$_{TP}$ Mary believes that Harry is [$_{AP}$ t$_i$ crazy]]]

A formal semantics for this construction, which relies on these LF structures, can be found in Meier (2001). She argues that it involves the comparison of two degrees: the degree d introduced by the adjective on a scale (Harry is d-crazy) and a minimal degree $d\star$ which is part of a hidden conditional composed of main clause and *that*-clause. Hence, on the narrow scope reading of (231), represented in (232a), Mary believes that Bill's craziness is at least as great as the minimal $d\star$, such that if Bill is $d\star$-crazy he acted irrationally. On the wide scope reading, (231) means (232b): the maximal degree d, such that Mary believes Bill is crazy to degree d is at least as great as the minimal degree $d\star$ such that if Mary believes that Bill is crazy to degree $d\star$ he acted irrationally.[37]

(i)   a.   *⋆a [fat around the waist] man*

        b.   *a fat man [around the waist]*

        c.   *a man [fat around the waist]*

37 Note that result clauses are closely related to comparative constructions (*John is taller than Mary is*), where the degree clause is also interpreted as a complement of *-er* (cf. Heim 2001 and Beck et al. 2004). A variation on this analysis with late merger of the degree clause after QR of *-er* can be found in Bhatt and Pancheva (2004).

(232)   a.   Mary believes that *MAX* {d: Harry is d-crazy} $\geq$
        MIN {$d\star$: if Harry is $d\star$-crazy, he acted irrationally}
   b.   *MAX* {d: Mary believes that Harry is d-crazy} $\geq$
        MIN {$d\star$: if Mary believed that Harry is $d\star$-crazy, he acted irrationally}

For these two interpretations the LFs above must therefore be enriched with a hidden conditional. Meier proposes a syntactic duplication of the main clause, the bold-faced string in (233). The trace/copy of the DegP and the empty category in the duplicated clause are interpreted as degree variables.

(233)   Mary believes [$_{CP}$ that [$_{DegP}$ so [$_{CP}$ that [$_{CP}$ **(if) Harry is [e$_i$ crazy]]** he acted irrationally]]$_i$ [$_{TP}$ Harry is [$_{AP}$ t$_i$ crazy]]]

Even if LFs like (233) obliterate the information that the result clause originates in AP, as evidence from variable binding seems to suggest (cf. the contrast between (224) and (225) above), the analysis presented here can account for bleeding of Condition C without a late adjunction analysis of the result clause in its scope position (cf. White 2005 for such an analysis). Degree particles move at LF together with the result clause, adjoining to the (matrix) TP in examples like (234), repeated from above. Since the result clauses are only separated from the degree particle at PF, the pronouns do not c-command the r-expressions at LF. On the other hand, extraposition of relative clauses is clause-bounded because QR of the source is clause-bounded and quantified objects adjoin to vP in the containing clause.

(234)   a.   *She$_i$ told so many people about the concert that Mary$_i$ made Bill nervous.*
   b.   *I told her$_i$ that so many people attended last year's concert that I made Mary$_i$ nervous.*

Since backward pronominalisation in (234) depends on the possibilities of QR of *so* plus the result clause, it is expected that co-reference may enforce a certain interpretation of result clause extraposition or co-reference can be blocked by certain syntactic configurations. The first case is illustrated in (235), an example from Rochemont and Culicover (1997). They argue that only the wide scope reading of *so* is available with the indicated coreference between referential expressions and pronouns (i. e., Mary's belief is the cause of her leaving him). In order for the result clause to get out of the c-command domain of the subject of the matrix clause, *so* plus its complement must adjoin to the matrix TP at LF, as shown in (236).

(235)   *She$_j$ believed that Harry$_i$ was so crazy that Mary$_j$ left him$_i$.*

(236)   [$_{TP}$ [$_{DegP}$ so [$_{CP}$ that Mary$_j$ left him$_i$]]$_1$ [$_{TP}$ she$_j$ believed that Harry$_i$ was [$_{AP}$ t$_1$ crazy]]]

Rochemont and Culicover further demonstrate the impact of syntactic islands on co-reference possibilities (cf. also White 2005 for further examples). The following ungrammatical examples involve extraction from syntactic islands, namely a complex NP in (237b) and adjunct clauses in (238b) and (239). *So* cannot be moved out of the containing complex NP or adjunct clauses and, on my analysis, the result clauses cannot be moved either, yielding Condition C violations.

(237)   a.   *She$_i$ claimed that so many people left that Mary$_i$ must have been lying.*
        b.   **She$_i$ made [$_{DP}$ the claim that so many people left that Mary$_i$ must have been lying].* (complex NP)

(238)   a.   *She$_i$ tried [$_{CP}$ to do so many pushups that Mary$_i$ hurt herself].* (complement clause)
        b.   **She$_i$ bent [$_{CP}$ to do so many pushups that Mary$_i$ hurt herself].* (purpose clause)

(239)   **She$_i$ hurried out [$_{PP}$ after eating so much food that Mary$_i$ must have been sick].* (temporal adjunct)

I conclude here that my analysis is compatible with the generalisation of Williams and Guéron and May that an extraposed clause is as "high" as the LF position of its source. I have demonstrated this with a short excursion into the domain of result clause extraposition, comparing it with relative clause extraposition. My analysis is similar to the one proposed by Guéron and May (1984), modulo separate syntactic movement of the result or relative clause.

2.4 An analysis employing copy theory

The analysis of relative clause extraposition proposed in section 2.3.5 relies on QR of the complex NP with a trace/variable at the extraction site. However, current approaches to reconstruction rely on the copy theory of movement (Chomsky 1993). In this theory, part of the moved constituent is interpreted at the movement site. If the copy theory were adopted, one would have to explain why the relative clause does not seem to reconstruct. In other words, how can the LF in (240) be avoided, which reintroduces a Condition C violation?

(240)   [$_{vP}$ an argument that supports John$_i$'s theory λx [$_{vP}$ I gave him$_i$ <the argument that supports John$_i$'s theory x>]]

The representation in (240) is adapted from Fox (1999, 2002, 2003). In order to be interpretable, the copy of the quantified NP is converted to a definite description and a variable of type <e,t> is inserted that establishes a variable-binding dependency with the λ-operator introduced by movement of the quantified NP. The conversion of the remerged copy therefore requires the operations variable insertion and determiner replacement in (241). The variable and the predicate, where Pred = *argument that supports John's theory*, are interpreted by predicate modification and serve as the argument of the definite determiner.

(241)   Trace conversion
      a.   Variable Insertion: (Det) Pred $\rightarrow$ (Det) [Pred λy(y=x)]
      b.   Determiner Replacement: (Det) [Pred λy(y=x)] $\rightarrow$ the [Pred λy(y=x)]

In order to solve the problem of how a Condition C violation can be avoided in a representation making use of copies of remerged constituents, it is necessary to establish under which conditions co-reference is actually possible. Condition C is only part of the story.

2.4.1 Conditions on co-reference

A pronoun requires an antecedent either in the same sentence or in the discourse setting. Conditions B and C, essentially negative conditions, ban the occurrence of co-referential expressions in certain syntactic configurations, but they are not the only conditions that can block co-reference. Williams (1997) shows that the possibilities for a pronoun to find, or its anaphoric dependence on, an antecedent in the same complex sentence underly further restrictions that are not regulated by the Binding Theory. Additionally, narrow (contrastive) focus and logophoric pronouns impose further restrictions on co-reference. In the next two subsections I will motivate the conditions listed below, subsection 2.4.1.3 solves the problem introduced by copy theory that was mentioned above and the role of logophoric pronouns will be addressed in subsection 2.4.1.4.

A: Condition C only bans co-reference under strict c-command at LF (Fox 1999, 2003; cf. also Heycock 1995 and Sportiche 2006).

B: the distribution of pronouns is further regulated by the *general pattern of anaphoric dependence* ([GPAD], Williams 1997)

C: narrowly focused r-expressions cannot be antecedents of a pronoun in the same sentence regardless of the position of the r-expression

2.4.1.1 Condition C of the Binding Theory

Let me consider examples involving relative clauses again, this time moved in overt syntax. As the following pair from Lebeaux (1988) in (242) shows, relative clauses are not obligatorily reconstructed after A′-movement, while complements containing an r-expression more regularly feed Condition C.

(242) a. *Which argument that John$_i$ made did he$_i$ believe?*
  b. ??/*Which argument that John$_i$ is a genius did he$_i$ believe?*

As mentioned in earlier sections, this contrast is often accounted for in terms of late merger of adjuncts. Let me make it clear at this point that in section 2.3.4 above I only rejected late merger after covert movement of the DP, an operation which requires a non-standard model of the grammar with selective Spell-Out of either the head or the tail of a chain. There are, however, good reasons not to reject late merger after overt syntactic movement, even if a non-cyclic operation like this one should in principle be disfavoured on theoretical grounds.

It seems that relative clauses can be merged at any stage of the derivation. A Condition C violation is avoided in (242a) if it is merged late (i. e., after the wh-phrase *which argument* has moved to SpecCP).[38] In the case of extraposition a late merger analysis is not possible because the object has not moved in overt syntax (cf. section 2.3.5). So bleeding of Condition C under extraposition will have to receive a different explanation.

Safir (1999) provides additional evidence from secondary crossover phenomena for the plausibility of late merger of adjuncts. Secondary crossover, a term originating from Postal (1993), occurs in configurations in which the quantifier is embedded in another DP. Example (243a) is a case of secondary strong crossover (SCO), (243b) is a case of secondary weak crossover, and (243c) is a control case. The universal quantifier itself is contained in an adjunct. The fact that the last example is not perfect is due to the fact that the universal quantifier has to take scope out of the DP that contains it.

(243) a. **He$_i$ is particularly proud of some book on every poet's$_i$ shelf.*
  b. *?*His$_i$ mother reads at least one book on every poet's$_i$ shelf.*
  c. ?*Some book on every poet's$_i$ shelf means more to him$_i$ than money.*
      (Safir 1999: 602)

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38 But see Chomsky (2004), and also Rubin (2003), for a different account in terms of pair merge. The grammaticality contrast in (242) is also captured by the "logophoric pronoun" constraint to be discussed in section 2.4.1.4. The discussion in that section opens up the possibility for eliminating late merger as a syntactic operation, at least for reconstruction purposes.

If the quantifier that binds the pronoun is moved overtly, for example pied-piped by a wh-phrase, the crossover effect disappears. According to Safir, the following examples, though awkward, are not ruled out.

(244) a. *[Which book on every poet's$_i$ shelf] is he$_i$ particularly proud of t?*
       b. *[Which book on every poet's$_i$ shelf] is his$_i$ mother most proud of t? (The one dedicated to her)*
           (Safir 1999: 602)

The difference in grammaticality between the *in situ* and *ex situ* cases in (243) and (244), respectively, can be captured if the adjunct PPs are merged late in (244). Compare this with the examples in (245), in which the moved wh-phrases contain PP complements and in which crossover effects appear again. Safir therefore concludes that a late merger analysis is necessary to capture the adjunct/complement distinction in this case, too.

(245) a. *[Which reviews of every poet's$_i$ book] does he$_i$ try to forget t?*
       b. ??*[Which analysis of every poet's$_i$ book] is his$_i$ mother most afraid of t? (The Freudian one)*
           (Safir 1999: 601)

Having discussed some additional evidence for late merger of adjuncts after overt movement, let me return to Condition C and consider some evidence that it holds at LF. The fact that condition C applies at LF has been demonstrated convincingly by Fox (1999). Fox's argument runs as follows: if scope reconstruction feeds condition C, then Condition C must see the output of an LF operation and therefore applies at this level.

One case of scope reconstruction that he discusses involves bound variable pronouns. The examples in (246) show that reconstruction of the moved wh-phrase is possible for such binding, and binding is only possible if the quantified NP c-commands the trace of the moved constituent.

(246) a. *Which of his$_i$ students did every professor$_i$ talk to t?*
       b. *Which students of his$_i$ did you think every professor$_i$ talked to t?*
       c. **Which of his$_i$ students t talked to every professor$_i$?*
       d. **Which students of his$_i$ did you think t talked to every professor$_i$?*
           (Fox 1999: 172)

Scope reconstruction, however, is not possible if the resulting configuration feeds Condition C. In other words, Condition C holds at LF and can prevent scope reconstruction. Consider in this respect (247).

(247) a. *Which (of the) paper(s) that he$_i$ gave to Ms. Brown$_j$ did every student$_i$*
hope t' that she$_j$ will read t?
b. **Which (of the) paper(s) that he$_i$ gave to Ms. Brown$_j$ did she$_j$ hope t'*
that every student will revise t?
(Fox 1999: 173)

The wh-phrase in (247a) contains a relative clause which contains a pronoun and
an r-expression. The relative can in principle be merged late. However, in order
for the quantified NP *every student* to bind the pronoun in the relative clause, it
has to be merged earlier, namely at the stage of the derivation in which the wh-
phrase has moved to the position marked with the intermediate trace t' (in the
lower SpecCP). Since this example does not induce any Condition C effect, it can-
not have been merged in the complement position of the verb. On the other hand,
in (247b) the quantified NP is the subject of the complement clause and in order
to get the bound variable reading the relative clause would have to reconstruct
to (i. e. be merged as early as) the object position of *revise*. But this possibility is
blocked by Condition C, since the pronoun *she* would c-command the r-expression
at LF, as the representation with a copy in (248) clearly shows.

(248)   which paper that he$_i$ gave to Ms. Brown$_j$ λx [she$_j$ hoped that every student$_i$
will revise <the paper that he$_i$ gave to Ms. Brown$_j$ x>

Having reviewed some evidence that Condition C holds at LF, I turn to conditions
of a completely different nature that further regulate the co-reference possibili-
ties between a pronoun and an r-expression. Before doing so, let me note that I
don't have an explanation yet of why extraposition can bleed Condition C, since
in my analysis there is a copy at LF that does seem to violate that condition, as
can be seen in (249). But linear order and information structure play an impor-
tant role, too. In the classical Lebeaux cases involving wh-movement (242a), the
r-expression contained in the wh-phrase precedes the pronoun at PF. In extrapo-
sition cases, it follows the pronoun at PF (250).

(249)   LF: [$_{vP}$ an argument that supports John$_i$'s theory λx [$_{vP}$ I gave him$_i$ <the
argument that supports John$_i$'s theory x> yesterday]]

(250)   PF: I gave him an argument yesterday that supports John's theory

2.4.1.2 Williams's general pattern of anaphoric dependence
Williams (1997) argues that there are certain structural configurations in which
anaphoric dependence of a pronoun on an r-expression is blocked. These are il-
lustrated in (251) and obviously fall outside the domain of the Binding Theory.

Williams discusses the possible and impossible co-reference configurations un-
der the heading *general pattern of anaphoric dependence* (GPAD). In examples like
these, the linear order of constituents plays an important role, not c-command,
so I will abstract away from my particular analysis of extraposition. Caps in (251b)
signal main stress, not (necessarily) narrow focus.

(251) a. *He_i arrived late and $John_i$ was very tired.*
       b. *$Anyone can turn it_i$ in to me now [who has written his $TERM PAPER_i$].*

Let me illustrate them in turn. If the antecedent precedes the pronoun (forward
anaphora), there are no restrictions beside those imposed by Condition B. Nei-
ther in (252a), nor in (252b), does the r-expression c-command the pronoun. The
pronoun is anaphorically dependent on the r-expression.

(252) a. *Anyone [who has written his term $paper_i$] can turn it_i in to me now.*
       b. *Anyone can turn his term $paper_i$ in to me now [who has written it_i].*
           (Williams 1997: 587)

If the pronoun precedes the antecedent (backward anaphora), co-reference is pos-
sible just in case the pronoun is contained in a subordinate clause and the matrix
clause contains the antecedent, as in (253a). If the r-expression is contained in a
subordinate clause, as in the extraposed relative in (253b), co-reference is blocked.

(253) a. *Anyone [who has written it_i] can turn his term $paper_i$ in to me now.*
       b. *Anyone can turn it_i in to me now [who has written his $TERM PAPER_i$].*
           (Williams 1997: 587)

Consequently, the patterns in which the pronoun does not c-command the an-
tecedent (i. e., which are not Condition C constellations) and which are ruled out
are the ones in (254).

(254) a. *$[... pro ...]_{matrix}$ $[... anteced ...]_{matrix}$
       b. *$[... pro ...]_{matrix}$ $[... anteced ...]_{subord}$

(254a) applies to coordinate clauses like (251a), which I will not discuss any fur-
ther.[39] Relevant here is (254b). If the r-expression is deaccented, co-reference is
permitted. In this case, the antecedent of the pronoun and of the r-expression

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39 Cf. in particular Bolinger (1977, 1979) for discussion of co-reference in coordinate structures.
See also Bruening (2014) for an analysis in a modified Binding Theory, which rejects c-command
in favour of a new notion of "phase-command."

must occur in the preceding context, as in (255). The r-expression itself is anaphoric (cf. also Kuno 1972, Reinhart 1995 and Frey 2000).

(255)　*I assume you recall that this course requires a term paper.*
　　　　Anyone can turn it$_i$ in to me now [who has WRITTEN his term paper$_i$].
　　　　(Williams 1997: 588)

To complete the picture of the GPAD, (256) shows the patterns of anaphoric dependence that are allowed.

(256)　a.　[... pro ...]$_{subord}$　　[... anteced ...]$_{matrix}$
　　　　b.　[... anteced ...]$_{matrix}$　　[... pro ...]$_{subord}$
　　　　c.　[... anteced ...]$_{subord}$　　[... pro ...]$_{matrix}$

Williams demonstrates that the GPAD applies to other kinds of anaphora, as well, for example ellipsis and destressing anaphora. The following examples illustrate the GPAD with VP ellipsis.

(257)　a.　*Anyone who wants to ϕ can see the doctor.*
　　　　　　[... ϕ ...]$_{subord}$　　[... VP$_{anteced}$ ...]$_{matrix}$
　　　　b.　*Anyone can see the doctor who wants to ϕ.*
　　　　　　[... VP$_{anteced}$ ...]$_{matrix}$　　[... ϕ ...]$_{subord}$
　　　　c.　*Anyone who wants to see the doctor can ϕ.*
　　　　　　[... VP$_{anteced}$ ...]$_{subord}$　　[... ϕ ...]$_{matrix}$
　　　　d.　*Anyone can ϕ who wants to see the doctor.*
　　　　　　*[... ϕ ...]$_{matrix}$　　[... VP$_{anteced}$ ...]$_{subord}$
　　　　　　(Williams 1997: 591)

Returning to cases like (255), there are several ways to signal whether an r-expression in a subordinate clause that linearly follows the matrix containing the pronoun is contextually given or not. As Bolinger (1977, 1979) points out, prosodic detachment can make a difference in examples like (258). Without comma intonation, nuclear stress is clearly assigned to *twins* in (258a), bringing this example in line with (253b). With comma intonation, as in (258b), it is easier to interpret the r-expression as thematic/given information.

(258)　a.　**I introduced them$_i$ when the twins$_i$ came in.*
　　　　b.　*I introduced them$_i$, when the twins$_i$ came in.*
　　　　　　(Bolinger 1977: 30)

Another factor mentioned by Bolinger are what he calls "distractors." That is, if another constituent within the complex sentence attracts main prominence, e. g.

dressed like that in (259), then co-reference improves. Focus on one constituent typically goes hand in hand with defocussing of other constituents in the same sentence.

(259) a. ?*I didn't recognize him when John came in.*
       b. *I didn't recognize him when John came in dressed like that.*
           (Bolinger 1977: 30)

Bolinger provides a wealth of examples and discusses the reasons why definite descriptions or names can be repeated in subordinate clauses. In most cases, the referent is reidentified or retopicalized. Nevertheless, the best examples, according to Bolinger, are those in which the subordinate clause is more loosely constructed with the VP. In other words, they are sentential adjuncts probably adjoined higher than VP. Here are some additional examples from his 1977 paper. Whether Condition C plays a role here, depends on a proper syntactic analysis of each individual adjunct clause.

(260) a. *He would never be believed if John told that story.* (p. 25)
       b. *He didn't seem to mind, when I blamed John for it.* (p. 36)
       c. *He finally gave up, after it was clear to John that there was no hope.*
           (p. 37)
       d. *He will be housed there, although John will be crushed at the thought.*
           (p. 37)

Complement clauses do not allow repetition of the referent in the form of a definite description. These clearly fall under Condition C of the Binding Theory.[40] And non-extraposed relatives from an object show Condition C effects only if the pronoun is the subject of the matrix clause or occurs in a higher clause, but not if the pronoun is the object of the matrix clause. This observation goes back at least to Reinhart (1976), who provides the following examples. In section 2.4.2.2 I will discuss a binding-theoretical solution, which basically relies on QR of the objects in (261).

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40 The following grammatical examples, which Bolinger (1977) presents as complement clauses, all seem to express reason.

(i) a. *I was glad for him that John was able to do it.*
     b. *I pity him that John can't express his feelings.*
     c. *I despised him that John made such a mess of things.*
         (Bolinger 1977: 20)

(261) a. *Zelda sent him$_i$ back all the flowers which Dr. Levin$_i$ had bought for her.*

b. *Society has always granted her$_i$ everything Zelda$_i$ ever wanted.*
(Reinhart 1976: 161)

(262) a. *★After days of search, he$_i$ was finally found in a sleazy hotel room that Dr. Levin$_i$ had rented under a false name.*

b. *★She$_i$ spent her sweetest hours in the bed Zelda$_i$ stole from the Salvation Army.*

c. *★He$_i$ denied that the flowers which Dr. Levin$_i$ sent had been returned.*
(Reinhart 1976: 163)

Before closing this section let me briefly consider the effect of narrow focus on co-reference between a pronoun and an r-expression. We have seen that a pronoun in a matrix clause cannot be co-referential with an r-expression in a following subordinate clause if the latter is part of a larger focus. If the r-expression is contrastively focused, co-reference is excluded as well, even if the r-expression precedes the pronoun.

An early discussion of the effect of contrastive stress on co-referentiality can be found in Akmajian and Jackendoff (1970). Consider their examples in (263). In (263a) the pronoun can either take *George* or *Tom* as its antecedent. However, in (263b) and (263c) the pronoun can only take the defocused r-expression as its antecedent.

(263) a. *That George$_i$ could be Tom$_j$'s thesis advisor never occurred to him$_{i/j}$.*

b. *That GEORGE$_i$ could be Tom$_j$'s thesis advisor never occurred to him$_j$.*

c. *That George$_i$ could be TOM$_j$'s thesis advisor never occurred to him$_i$.*
(Akmajian and Jackendoff 1970: 124)

The same holds for r-expressions in relative clauses that have been pied-piped by wh-movement. This was noted by van Riemsdijk and Williams (1981) and is illustrated in (264). Contrastive focus on *John* in (264b) blocks co-reference between pronoun and r-expression. A similar effect holds in extraposition constructions to be discussed in the next section.

(264) a. *Which picture that MARY gave to John$_i$ did he$_i$ want most desperately?*

b. *★Which picture that Mary gave to JOHN$_i$ did he$_i$ want most desperately?*
(van Riemsdijk and Williams 1981: 203)

2.4.1.3 Extraposition and Condition C

In the previous sections I have established the following conditions on co-reference between a pronoun and an r-expression:

A: Condition C: the pronoun may not c-command the r-expression at LF.
B: Williams's general pattern of anaphoric dependence: excludes any anaphoric dependence of a pronoun on a following r-expression that is not contained in the matrix clause. Any such co-referential r-expression must also be anaphoric.
C: Contrastive focus restriction: a pronoun cannot take as an antecedent, or be co-referential with, a contrastively focused r-expression.

Examining extraposition constructions, we find that co-reference between a pronoun is possible if the r-expression is defocused and deaccented, as in (265a), or if the whole relative clause is deaccented, as in (265b). However, if the nuclear stress is assigned to *John* (265c), co-reference is blocked, like in Van Riemsdijk and Williams' example (264b) above.

(265)   a.   *I gave him$_i$ an argument yesterday that SUPPORTS John's$_i$ theory.*
        b.   *I gave him$_i$ an ARGUMENT yesterday that supports John's$_i$ theory.*
        c.   *I gave him$_i$ an argument yesterday that supports JOHN's$_j$ theory.*

If extraposition from the object NP is the result of PF movement, then the pronoun c-commands the r-expression at LF and (265a/b) would be ruled out by Condition C of the Binding Theory. My solution in section 2.3.5 was to QR the whole indefinite together with the relative clause after PF movement. QR of the indefinite removes the relative clause from the c-command domain of the indirect object, as in (266).

(266)   [$_{CP}$ C [$_{TP}$ I$_j$ [$_{T'}$ T [$_{vP}$ [$_{QP}$ an argument that supports John's theory]$_k$ [$_{vP}$ t$_j$ gave him t$_k$ yesterday]]]]]

This analysis crucially depends on a trace/variable at the extraction site of the complex quantified NP, but, with a copy of the moved NP instead of a trace, a Condition C effect is not obviated. Therefore, a solution is needed which does not resort to late merger of the relative because late merger to covertly moved constituents is not available in my approach.

The problem can be solved by resorting to *vehicle change*, introduced by Fiengo and May (1994) and further defended and refined in work by Safir (cf. Safir 1999, 2004). Vehicle change is essentially replacement of a name/definite description with a pronoun in reconstruction contexts. This makes perfect sense if it is used like a pronoun, looking for an antecedent in the discourse setting. I

will therefore assume that the name/definite description in the copy of the relative clause can be replaced with a pronoun if it is defocused, as in the examples (265a) and (265b) above.

Vehicle change crucially applies only in reconstruction contexts. It was introduced by Fiengo and May (1994) in order to account for pairs of examples like (267), which involve Antecedent Contained Deletion (ACD).

(267)   a.   *Mary introduced John$_i$ to everyone that he$_i$ wanted her to.*
        b.   **Mary introduced John$_i$ to everyone that she wanted him$_i$ to.*

In the classical analysis of ACD, the quantified NP must be raised at LF in order to avoid an infinite regress and the elliptical material is reconstructed after QR, the bold-faced material in (268).[41]

(268)   a.   *everyone that he$_i$ wanted her to **introduce John$_i$ to t** [Mary introduced John$_i$ to t]*
        b.   *everyone that she wanted him$_i$ to **introduce John$_i$ to t** [Mary introduced John$_i$ to t]*

However, these two logical forms both violate Condition C and are predicted to be both ungrammatical. Vehicle change solves the problem if *John* is replaced with a corresponding pronoun at the reconstruction site. After vehicle change, Condition B applies, correctly tagging only (269b) as ungrammatical.

(269)   a.   *everyone that he$_i$ wanted her to **introduce him$_i$ to t** [Mary introduced John$_i$ to t]*
        b.   **everyone that she wanted him$_i$ to **introduce him$_i$ to t** [Mary introduced John$_i$ to t]*

If vehicle change is assumed for extraposition, then the LF representation of (265b) is (270). There is no condition C violation at LF. Only Condition B applies, which is not violated.

(270)   [$_{vP}$ an argument that supports John$_i$'s theory λx [$_{vP}$ I gave him$_i$ <the argument that supports his$_i$'s theory x> yesterday]]

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41 Note that Fiengo and May's LF representations are modeled with traces. This does not affect the point to be made here. See Fox (1999) for an analysis within the framework of copy theory. He argues there that the lower copy is deleted because it is the most economical representation that does not lead to infinite regress. In Fox (2002), he develops a completely different approach which resorts to late merger of the relative clause (i. e., after QR).

Vehicle change gives the correct result for relative clause extraposition, but how can the ungrammaticality of complement clause extraposition like (271) be captured? In section 2.3.4 I argued that the evidence for overt syntactic movement is inconclusive and it should be analysed like relative clause extraposition. So what blocks vehicle change in Fox and Nissenbaum's example (271)? A solution will emerge in the next subsection, where I consider an additional restriction on coreference.

(271) ??/*I gave him$_i$ an argument yesterday that this sentence supports John's$_i$ theory.

2.4.1.4 The logophoric pronoun constraint

Kuno (1987: ch. 3) has argued that discourse perspective plays an important role in co-reference possibilities between pronouns and r-expressions. Consider the sentences in (272). The difference in acceptability does not follow from Williams's general pattern of anaphoric dependence, which predicts both examples to be grammatical: the r-expression is contained in a subordinate clause, whereas the pronoun is contained in the matrix clause.

(272) a. ??*[The statement that Churchill$_i$ was vain] was often made to him$_i$.*
       b. *[The statement that Churchill$_i$ was vain] has often been made about him$_i$.*
           (Kuno 1987: 106)

(273) [... anteced ...]$_{subord}$ [... pro ...]$_{matrix}$

Nor does the difference in acceptability follow from the Binding Theory. If the argument containing the r-expression is reconstructed into its base position, as in (274), it is still not c-commanded by the pronoun. Here I follow Blight (1997, 2004), who shows that passive participles do not move in English because small v is headed by *be*.

(274) [$_{DP}$ The statement that Churchill$_i$ was vain]$_1$ was$_2$ often [$_{vP}$ t$_2$ [$_{VP}$ t$_1$ made to him$_i$]].

In some examples Kuno discusses, Binding Theory does make the correct predictions. In (275a), the *by*-phrase is adjoined to VP, as in (276a), and the pronoun *her* c-commands the copy of the moved object clause because PPs are generally transparent for c-command purposes in English. Co-reference is therefore ruled out by Condition C. In (275b), analysed in (276b), the reconstruction site c-commands the pronoun and there is no Condition C violation.

(275) a. *That Mary$_i$ would win was expected by her$_i$.
       b. That Mary$_i$ would win was expected of her$_i$.
           (Kuno 1987: 116)

(276) a. [$_{CP}$ That Mary$_i$ would win]$_1$ was$_2$ [$_{vP}$ t$_2$ [$_{VP}$ expected t$_1$] by her$_i$].
       b. [$_{CP}$ That Mary$_i$ would win]$_1$ was$_2$ [$_{vP}$ t$_2$ [$_{VP}$ t$_1$ expected of her$_i$]].

However, the contrasts discussed by Kuno are too systematic to attribute them to Binding Theory alone or to declare some examples to be exceptional. In (277), both sentences are passive, yet co-reference is banned in (277a), but not (277b). Cleft sentences are also known to show connectivity effects (Heycock and Kroch 1999; Reeve 2012) even if a trace/reconstruction site is not discernible. In (278), only (a) is excluded.

(277) a. *The claim that John$_i$ was dying of cancer was made by him$_i$.
       b. The claim that John$_i$ was dying of cancer was denied by him$_i$.
           (Kuno 1987: 116)

(278) a. *That John$_i$ was crazy was just one of the things Mary said to him$_i$.
       b. That John$_i$ was crazy was just one of the things Mary said about him$_i$.
           (Kuno 1987: 110)

Kuno argues that discourse perspective is at stake here. Particularly, an r-expression contained in complements communicated by or representing the thoughts/beliefs of a pronominal referent in the main clause cannot be co-referential with that pronoun. Nor can r-expressions contained in a complement that is communicated to the referent of that pronoun.

Kuno calls NPs that encode referents who are either the source or the recipient of a message "logophoric NPs", and a "logophoric pronoun" cannot be co-indexed with an r-expression in the complement of the verb. He argues that this is the consequence of turning direct speech into reported speech. In (279a), the pronoun *you* has to be replaced by *he* in a reported speech act and cannot be replaced by *Churchill*. In (279b), the r-expression may or may not be pronominalised. Hence, the acceptability contrast in (272), repeated in (280).

(279) a. People often made to Churchill/him the statement: "You are vain"
       b. People often made about Churchill/him the statement: "Churchill is vain"

(280) a. ??[The statement that Churchill$_i$ was vain]$_1$ was often made t$_1$ to him$_i$.
       b. [The statement that Churchill$_i$ was vain]$_1$ has often been made t$_1$ about him$_i$.

Kuno presents examples which show that the logophoric pronoun constraint also applies in rightward movement contexts (although he does not identify them as such). In (281), a complement clause is extraposed from an object and, in (282), it is the complement of the verb that is extraposed. The (a)-examples are ruled out by this constraint. For the (b)-examples, Kuno reports variable acceptability judgements, claiming that there are speakers for whom they are fully acceptable. That (281b) is not excluded is actually predicted by my approach to extraposition, in which the extraposed clause only moves at PF. Its syntactic structure is given in (283) and it is not ruled out by Condition C of the Binding Theory. Nor is it ruled out by Williams' general pattern of anaphoric dependence as long as the r-expression is defocused.

(281) a. **People often made the statement to her$_i$ that Mary$_i$ was a lunatic.*
       b. $^\sqrt{}$/?/??*People often made the remark about her$_i$ that Mary$_i$ was a lunatic.*
           (Kuno 1987: 116)

(282) a. **People often said to her$_i$ that Mary$_i$ was a lunatic.*
       b. $^\sqrt{}$/?/??*People often said about her$_i$ that Mary$_i$ was a lunatic.*
           (Kuno 1987: 116)

(283) People often [$_{vP}$ made$_1$ [$_{VP}$ [$_{DP}$ the remark that Mary$_i$ was a lunatic] t$_1$ about her$_i$]]

Now consider Fox and Nissenbaum's example of complement clause extraposition from NP in (284), which has not received an explanation so far. Why does extraposition of the complement not bleed Condition C.

(284) ??/*I gave him$_i$ an argument yesterday that this sentence supports John's$_i$ theory.*

Kuno's approach to coreference captures its unacceptability. It is ruled out by the logophoric pronoun constraint. The referent of the indirect object is the recipient of the message and the descriptive content of the complement clause, which contains the r-expression, is the communicated message. Unlike (281), the object is indefinite and has to be raised at LF. Following Safir (1999), I assume that vehicle change in the reconstruction site is blocked by the logophoric pronoun constraint (see also below). The LF of (284) is the representation in (285), in which the indirect object *him* c-commands the r-expression in the copy of the moved quantified NP. Coreference is therefore excluded by Condition C at LF.[42]

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42 The solution provided here is also applicable to the analysis in Fox and Nissenbaum (1999), in which the complement clause moves overtly and leaves a copy at the extraction site. Vehicle

(285)   [$_{vP}$ an argument that this sentence supports John's$_i$ theory λx [$_{vP}$ I gave
         him$_i$ <the argument that this sentence supports **John's$_i$** theory x> yester-
         day]]

Both Safir (1999) and Büring (2005) have pointed out that the logophoric pronoun
constraint has far-reaching consequences for theories of reconstruction, strongly
narrowing down the structural core of the argument/adjunct distinction in recon-
struction processes. Firstly, Büring points out that the descriptive content of rela-
tive clauses is often not part of the communicated message, for example in (286).

(286)   *Which claim that offended Nixon$_i$ did he$_i$ repeat?*
         (Büring 2005: 259)

Viewed from this perspective, the Freidin/Lebeaux asymmetry in some core cases
depends on whether the logophoric pronoun restriction applies or not. Exam-
ple (287a) is grammatical because the content of the relative clause is not part
of John's belief, while the pied-piped complement in (287b) is (although it is a
strange question to ask in the first place).[43]

(287)   a.   *Which argument that John$_i$ made did he$_i$ believe?*
         b.   ??/**Which argument that John$_i$ is a genius did he$_i$ believe?*

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change, if possible, applies in reconstruction contexts. In this case it is blocked. In my analysis,
there is a copy of the whole quantified NP which includes the complement clause.

43 Recall from section 2.4.1 that Fox (1999) argues that scope reconstruction can be blocked by
Condition C, as in (ia). Note that vehicle change cannot apply in this example because the de-
scriptive content of the relative clause is part of Ms. Brown's hope. Hence, the pronoun *she* is lo-
gophoric and blocks vehicle change. In the case of (ib), Fox argues that the relative can be merged
in the course of the derivation in the position of the intermediate trace t'. There is, however, an
alternative analysis, in which the relative is merged with the wh-phrase from the very beginning.
Since the referent of *she* is not the source of the hope, the relative can reconstruct to the lowest
trace position. Vehicle change will replace *Ms. Brown* with a pronoun and the sentence observes
Condition B under reconstruction, in a way that (ii) does.

(i)   a.   **Which (of the) paper(s) that he$_i$ gave to Ms. Brown$_j$ did she$_j$ hope t' that every student
             will revise t?*
        b.   *Which (of the) paper(s) that he$_i$ gave to Ms. Brown$_j$ did every student$_i$ hope t' that she$_j$
             will read t?*
             (Fox 1999: 173)

(ii)   *Every student$_i$ hoped that she$_j$ will read the paper that he$_i$ gave to her$_j$.*

Late merger is in principle a counter-cyclic operation, which should be avoided if possible. It in-
volves adjunction of the relative to NP after the QP/DP has already been constructed (and moved).

Secondly, the logophoric pronoun constraint could be part of a more general theory of reconstruction if only it can be properly formalised. In some cases reconstruction of the r-expression is necessary, in others it is not. In (288), the copy of the moved complement clause contains the r-expression.

(288)   *$That Bill_i had cancer, he_i revealed for the first time.$
            (Kuno 1987: 104)

In the following examples, collected from various sources, there is no Condition C effect. The co-indexed pronoun is not logophoric, in the sense that it is not the source or recipient of the message expressed by the complement clause. What cannot be overlooked is that many (though not all) grammatical examples cited in the literature involve factive verbs.

(289) $That John_i had seen the movie, he_i never admitted.$
            (Culicover 1997: 333)

(290) $The fact that John_i has been arrested, he_i generally fails to mention.$
            (Safir 1999: 589)

(291)   a. $The rumour that John_i stole the money, he_i has always denied.$
            b. $Whether John_i will come tonight or not, he_i refuses to say.$
                    (Guéron 1984: 150)

As Safir (1999: 609) puts it in the context of a discussion of wh-movement: "There is no Principle C effect for adjuncts (or pied-piped possessives), and there is *sometimes* a Principle C effect for pied-piped complements, depending on other factors."

For Safir a Condition C effect occurs if vehicle change is blocked and one of those factors that can block it is the logophoric pronoun constraint. Unfortunately, Safir does not work out any additional factors, neither in his article (Safir 1999) nor in his book (Safir 2004). Another factor that arguably blocks vehicle change is a focused r-expression.[44] Such an r-expression obviates coreference in all contexts, not only in those which involve movement. I will not pursue this issue any further as the development of a general theory of reconstruction lies well beyond the scope of this study. Nevertheless, I conclude here that the account developed so far can explain bleeding of Condition C in relative clauses by resorting to QR of the containing quantified NP and vehicle change at the reconstruction site. An explanation could also be found for the lack of a similar effect in extraposition

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[44] Cf. also Guéron (1984) and Biskup (2009) on the role of focus structure on reconstruction.

of complement clauses. In the next section I turn to some possible objections to my analysis.

2.4.2 Sorting out potential problems

I can think of two major objections that could be raised against the analysis developed so far. Firstly, obviation of Condition C is possible in examples like (292), in which the relative clause is extraposed from a definite DP. Why should QR target definite descriptions?

(292)   *I sent her$_i$ the documents yesterday that Mary$_i$ had requested.*

A second objection to this approach is why QR cannot save examples like (293), in which the relative clause is not extraposed. I will discuss them in turn.

(293)   ??/*I gave him$_i$ an argument that supports John's$_i$ theory yesterday.*

2.4.2.1 Extraposition from definite DPs

Extraposition from definite DPs is often reported to be ungrammatical. This is known as the *name constraint* (Guéron 1980). For example, Guéron and May (1984) present the example in (294b) and claim that it is ruled out because the DP in extraposition constructions must undergo QR and definite DPs cannot do so. In fact, their analysis of extraposition involves two steps: extraction of the relative clause in overt syntax followed by QR of the source quantified NP.

(294)   a.   *I read a book during the vacation which was written by Chomsky.*
         b.   **I read that book during the vacation which was written by Chomsky.*
               (Guéron and May 1984: 6)

Whatever the reason for the ungrammaticality of (294b), if indeed it is ungrammatical,[45] extraposition from a definite object is often unproblematic and numerous examples can be found in the literature. I have already discussed this issue in section 2.3.4. Two more examples are cited below. In (295), the relative clause moves across a deaccented adverbial. In (296), it is heavy enough to move across a more complex adverbial.

(295)   a.   *Mary praised the pot roast yesterday that John made.*

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45 Baltin (2006: 243) discusses the same example and remarks that it is not ungrammatical.

> b. *I was shocked by the garish dress yesterday that she took from her mother.*
> (Hulsey and Sauerland 2006: 114)

(296)   *She rapidly spotted the book right on my desk that I had been desperately searching for all morning.*
(Quirk et al. 1985: 1398)

But in my analysis QR of the DP containing the relative is required for the avoidance of a Condition C violation, for example in (292), repeated in (297). In fact, the possibility of definite descriptions to undergo QR is assumed without discussion by Fox (1999), Fox and Nissenbaum (1999) and others who follow their lead (e. g. Hulsey and Sauerland 2006).[46] Furthermore, Heim and Kratzer (1998: 210) explicitly allow constituents of type <e> to undergo QR because there is no problem with interpretability. I will therefore assume that QR of definite descriptions is possible if it is required for certain interpretations, as in the example under discussion. Vehicle change will take care that *Mary* in (297) is replaced with a pronoun in the copy of the raised constituent, as discussed in section 2.4.1.3.

(297)   *I sent her$_i$ the documents yesterday that Mary$_i$ had requested.*

Empirical evidence for QR of definite descriptions comes from ACD constructions, if the standard analysis of these constructions is assumed (May 1985; Larson and May 1990; Kennedy 1997). While the literature is mainly concerned with examples involving quantified NPs, ACD is also possible in definite DPs. In order to avoid an infinite regress, both the quantified NP and the definite description in (298) must be QR-ed (cf. in particular Harley 2002 and Isac 2006 for discussion of this issue). Consequently, QR of definite descriptions is not a problem for my analysis.

(298)   a. *I read every book that John did.*
        b. *I read the book that John did.*

2.4.2.2 Obviation of Condition C violations without extraposition
Now if QR can obviate Condition C violations, why can't it do so in examples without extraposition like (299a)?

(299)   a. **I sent her$_i$ many gifts that Mary$_i$ didn't like last year.*

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46 For Fox and Nissenbaum QR is mandatory when an adjunct is extraposed, because any adjunct extraposition is actually late insertion after QR of the object.

      b.   *I sent her$_i$ many gifts last year that Mary$_i$ didn't like.*
         (Rochemont and Culicover 1997: 282)

I think the reason is that the default interpretation of such a sentence is one in which the whole indefinite is focused and presents new information.[47] First of all, it is ruled out by Williams' general pattern of anaphoric dependence, which is sensitive to linear order and prohibits co-reference of a pronoun with an r-expression in a subordinate clause to the right if the r-expression is part of a focus (cf. section 2.4.1.2). Furthermore, if vehicle change can only replace an r-expression with a pronoun if the former is defocused—in other words, when it is used like a pronoun—then *Mary* cannot be replaced with a pronoun in the copy left by QR and we still have a Condition C violation. Note that the two restrictions apply jointly. The general pattern of anaphoric dependence cannot be subsumed under, or derived from vehicle change, because the latter only applies to "copy re-construction," while Williams' general pattern of anaphoric dependence applies to co-reference of a pronoun and an r-expression in any subordinate clause that linearly follows the matrix clause.

    Condition C cannot be eliminated from an account of coreference in extraposition constructions because higher pronouns consistently induce ungrammaticality under co-indexation, like the examples from Guéron and May (1984) in (300) or the examples without extraposition from Reinhart (1976) in (301). It is only object pronouns which may or may not be co-referential with an r-expression in the relative.

(300)   a. **She$_i$ told many people about the concert who Mary$_i$ made nervous.*
         (p. 10)
       b. **I told her$_i$ that many people attended last year's concert who made Mary$_i$ nervous.* (p. 2)

(301)   a. **After days of search, he$_i$ was finally found in a sleazy hotel room that Dr. Levin$_i$ had rented under a false name.*
       b. **She$_i$ spent her sweetest hours in the bed Zelda$_i$ stole from the Salvation Army.*
       c. **He$_i$ denied that the flowers which Dr. Levin$_i$ sent had been returned.*
         (Reinhart 1976: 163)

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47 An additional contributing factor may be the light adverbial at the right edge, which is typically deaccented and forces the nuclear stress on some constituent within the relative. Thanks to Carsten Breul for helping me clarify the effect of focus structure on the interpretation of such examples.

The fact that higher pronouns consistently induce a Condition C violation follows from the approach developed here because QR targets the edge of the vP, the quantified NP ending up in a position lower than subjects but higher than objects. Example (300a) has the LF in (302). Vehicle change can replace the r-expression in the copy of the quantified NP with a pronoun, but the surface position of the subject c-commands *Mary* in the raised quantified NP, in violation of Condition C.

(302)   [$_{CP}$ [$_{TP}$ she T [$_{vP}$ many people who made Mary nervous λx [$_{vP}$ <she> told <the people who she made nervous x> about the concert]]]]

Obviation of Condition C with object pronouns is, in fact, possible without extraposition. In (303), the DP containing the relative is definite. It is also possible with quantified NPs, as noted by Reinhart (1976) and Kennedy (1997). These data seem to have escaped the debate in the literature about Condition C effects in extraposition constructions. The question is what kind of conditions they have to meet in order to be acceptable.

(303)   *I got him$_i$ the painting that John$_i$ had picked out.*

(304)   a.   *Zelda sent him$_i$ back all the flowers which Dr. Levin$_i$ had bought for her.*
         b.   *Society has always granted her$_i$ everything Zelda$_i$ ever wanted.*
               (Reinhart 1976: 161)

Consider the following examples from Kennedy (1997). Example (305a) is an ACD construction and QR is necessary in order to avoid an infinite regress. QR removes the r-expression from within the c-command domain of the pronoun and, as expected, the r-expression can be co-indexed with the pronoun. In (305b), co-reference between the pronoun and the r-expression is also possible, but this example does not pose any infinite regress problem. As Kennedy points out, only QR can explain the bleeding of Condition C in both examples.

(305)   a.   *Polly introduced him$_i$ to everyone Erik$_i$ wanted her to.*
         b.   *Polly introduced him$_i$ to everyone Erik$_i$ wanted to meet.*
               (Kennedy 1997: 689, FN2)

Note, however, that there is a clear difference between examples like (305b) and (299a). In (305b), the vP in the infinitival clause seems recoverable from the matrix clause and may therefore be considered defocused. This aspect has been addressed by Fox (1995). Fox also points out the similarity with ACD constructions in examples like (306) and (307), showing that the conditions for bleeding Condition C are practically the same.

(306)   a.   *I introduced him$_i$ to everyone that John$_i$ wanted me to.*
   b.   *I introduced him$_i$ to everyone that John$_i$ wanted me to introduce him$_i$ to.*
   c.   *I introduced him$_i$ to everyone that John$_i$ wanted to meet.*
        (Fox 1995: 117)

(307)   a.   *I provided him$_i$ with everything that John$_i$ wanted me to.*
   b.   *I provided him$_i$ with everything that John$_i$ wanted me to provide him$_i$ with.*
   c.   *I provided him$_i$ with everything that John$_i$ needed.*
        (Fox 1995: 117)

He argues that the vP that is elided in the (a) examples is necessarily deaccented in the corresponding (b) examples and also in the (c) examples. The only difference between them is that ACD is subject to the parallelism constraint holding of ellipsis more generally (lexical identity being required), while deaccenting involves recoverability of the vP.[48] Fox further notes that not only does the elided/deaccented vP in the infinitival clause require an antecedent in the main clause, but the r-expression may not bear focal stress either.

   The analysis Fox (1995) develops for ACD has the following ingredients: (i) ellipsis is PF deletion licensed by LF Parallelism (i. e., the deleted element and its antecedent have a parallel structure and interpretation), (ii) Parallelism is achieved by QR and replacement of the copy with a variable. In this approach, it is not ACD resolution that forces the replacement of the copy with a variable, but Parallelism. Hence, (308a) has the LF (308b) and the deleted vP has a parallel structure to its antecedent (see in particular Fox 1999).

(308)   a.   *I provided him$_i$ with everything that John$_i$ wanted me to.*
   b.   [$_{QP}$ everything that John$_i$ wanted me to ⟨provide him$_i$ with x⟩] λx [$_{vP}$ I provided him$_i$ with x]

On the assumption that ellipsis is only an extreme case of deaccenting (Tancredi 1992), Fox suggests that the same analysis applies to the deaccenting cases. In

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48 Concerning the (c)-examples, Fox does not clarify how the relation between the deaccented material and the antecedent comes about, but I think there are two distinct processes involved. In (306c), the matrix vP entails the vP in the infinitival clause, as shown in (i). In (307c), I think it can only be inferred from mention of *provide x with y* that *x needs y*. Cf. Birner and Ward (1998) for the role of inference in a number of constructions that are sensitive to information structure.

(i)   *introduce x to y $\Rightarrow$ x meets y*

(309), QR raises the quantified NP, PF deaccenting is licensed by Parallelism and Parallelism requires the replacement of the lower copy with a variable. Since the whole lower copy is replaced with a variable, there is no Condition C violation at LF.

(309)   a.   *I provided him$_i$ with everything that John$_i$ wanted me to provide him$_i$ with.*

          b.   [$_{QP}$ everything that John$_i$ wanted me to provide him$_i$ with x] λx [$_{vP}$ I provided him$_i$ with x]

Fox's solution for the obviation of Condition C effects crucially relies on deletion of the lower copy of the raised quantified NP and its replacement with a variable. For ACD, there is no other option because infinite regress has to be avoided. For the deaccenting cases there is one. The alternative solution would be to maintain the lower copy, but resort to vehicle change. We have noted above that the r-expression must be defocused and the antecedent must be sought in the preceding context. In other words, the r-expression represents an old discourse referent that could in principle be replaced with a pronoun at LF.

    Now consider (310), this time with a definite DP. Someone groaning about *John* could in principle utter this sentence. That there are several rumours around is a precondition here, but that there is a particular rumor around that John wanted to hear is very unlikely. The sentence asserts that I told John the rumour that conforms to his expectations. So it seems that the topicality of *John* is important here, not the giveness of the vP or the topicality of the larger containing DP [*the rumour that John wanted to hear*].[49]

(310)   *I told him$_i$ the rumour that John$_i$ wanted to hear.*

This sentence is entirely parallel to the examples Fox (1995) discusses, only that the DP is definite. The vP in the embedded clause (*x hear y*) can be assumed to be entailed by the matrix vP (*tell x y*). If QR of definite descriptions is assumed, the Condition C problem can be solved, either by replacement of the lower copy with a variable, (i. e., Fox's ACD-like solution), or by maintaining the whole copy and application of vehicle change. The question is whether there is evidence that allows for a decision between these two alternative analyses.

    I think there is. Bolinger (1977: 21) cites the following contrasts. While the (a) examples are ungrammatical under the indicated co-indexation, the (b) and (c) examples are claimed to be fine.

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[49] In fact, this sentence cannot answer a question like *Which rumour did you tell John yesterday?*, where different rumours are under discussion (Jennifer Austin, p. c.).

(311)   a. **I bought him$_i$ the house that John$_i$ wanted.*
        b. *I bought him$_i$ the house that John$_i$ always wanted.*
        c. *I bought him$_i$ the house that John$_i$ seemed to want.*

(312)   a. **I got her$_i$ the mink that Mary$_i$ admired.*
        b. *I got her$_i$ the mink that Mary$_i$ had picked out.*
        c. *I got her$_i$ the mink that Mary$_i$ kept begging me for.*

In none of these examples is the vP in the relative clause recoverable from the matrix vP: it is neither entailed by it, nor can it be inferred from it. The analogy with ACD cannot be resorted to, nor can any sort of parallelism be evoked. While in (311a) and (312a) the relative clause is part of the assertion of the sentence, the grammatical sentences at least allow for an inference that the content of the relative clause, which includes the referent of the r-expression, is part of the common ground or shared knowledge. As such it is not necessarily defocused.

I conducted a production test with one informant, who shares Bolinger's judgements, to determine what is deaccented in such examples. The accentual pattern can give us a clue to what is defocused.[50] I wanted to figure out what the informant treated as defocused. The examples and recorded accentual patterns, including segmentation into phonological phrases, are given in (313).

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50 Sportiche (2006: 83) notes that in French Condition C violations can be obviated in examples like (i) if the direct object is backgrounded.

(i)   *Je lui$_i$ ai donné la photo que le vieux peintre$_i$ m'a demandée.*
         I gave him the picture that the old painter asked for.

The parallel English example in (ii) is also not excluded, though I doubt that the whole object including the relative is completely defocused. Example (iii), pointed out to me by Carsten Breul, is from the Corpus of Contemporary American English, and the whole relative is clearly not defocused.

(ii)   *I bought him$_i$ the painting that the old man$_i$ had asked for again and again.*

(iii)   *After a short discussion in which Mrs. Moorehouse verifies that Louise has indeed received the proper certification to work in Michigan—Louise takes this as a sign that the interview is going well. Mrs. Moorehouse lobs her a question that Louise is certain she can smash back for a winner.*

Obviation of Condition C is also possible in German. I find the example in (iv) reasonably fine if nuclear stress is assigned to *immer* 'always.'

(iv)   *Ich gab ihm$_i$ das Buch, das Hans$_i$ schon IMMER lesen wollte.*
         I   gave him the book that Hans always   read wanted
         'I gave him the book that Hans had always wanted to read.'

(313)   a.   *I introduced him$_i$ to everyone that John$_i$ wanted to meet.*
           (I íntrodced him to éveryone) (that John wánted to méet)

       b.   *I told him$_i$ the rumor that John$_i$ wanted to hear.*
           (I tóld him the rúmour) (that John wánted to héar)

       c.   *I bought him$_i$ the house that John$_i$ always wanted.*
           (I bought him the hóuse) (that John álways wánted)

       d.   *I got him$_i$ the painting that John$_i$ had picked out.*
           (I got him the páinting) (that John had pícked óut)

The informant did not even deaccent the verbs in those cases in which they can be assumed to be recoverable from the matrix vP (i. e. *meet* and *hear* in (313a) and (313b)), though I believe that in these two cases they can in principle be deaccented. Nevertheless, the r-expression *John* was associated either with an L* or an L*+H accent in all examples. These accents do not occur on focused constituents in English, but typically mark defocused ones. So *John* is the only constituent that she treated as necessarily defocused. If it is defocused, it must be activated in the discourse. From the fact that she did not deaccent the material contained in the vPs of the relative clauses, it cannot be concluded that they are not part of the common ground/shared knowledge. Any such element can be focused if it is new to the discourse. A property ascribed to *John*, say that he had picked out the painting, may be part of the common ground, but it may be new to the discourse, hence focused. In the terminology employed by Birner and Ward (1998), the r-expression is discourse-old (i. e. given), while the property ascribed to him is hearer-old (i. e. shared knowledge), but discourse-new (i. e. focused).

    While further investigation of sentences of this kind is necessary, I conclude here that they are not analogous to the ACD examples mentioned by Kennedy (1997) and discussed by Fox (1995). Obviation of Condition C does not require the vP in the relative to find an antecedent in the matrix clause. Hence, an ACD-like analysis is not necessary. In order to avoid a Condition C violation, the DPs only

---

But, as Katharina Hartmann has pointed out to me, the contrast between quantified and definite descriptions does show up if the relative is extraposed, as in (v) and (vi).

(v)   *Ich habe ihr$_i$ viele Geschenke geschickt, die   Maria$_i$ nicht gefallen haben.*
      I   have her many   presents sent,   which Maria not liked   has
      'I sent her many presents which Mary didn't like.'

(vi) ??*Ich habe ihr$_i$ das Geschenk geschickt, das   Maria$_i$ nicht gefallen hat.*
      I   have her the present   sent,   which Maria not liked   has
      'I sent her the present which Mary didn't like.'

have to be QR-ed, whether definite or not. After QR of the DP, vehicle change replaces the r-expression with a pronoun in the lower copy, as in (314).

(314)   the painting that John$_i$ had picked out λx [$_{vP}$ I got him$_i$ <the painting that he$_i$ had picked out x>]

2.5 Conclusion

In the first part of this chapter I examined a number of syntactic properties of extraposition constructions, mainly reviewing the evidence for a movement analysis. This was necessary because there is compelling evidence for two copies of the extraposed constituent in the syntactic representation of the construction. First I examined possible triggers for syntactic movement, concluding that a range of extraposition constructions cannot be accounted for in terms of movement to a structural focus or even topic position. Since lack of triggers cannot be equated with lack of movement, I re-examined the locality of rightward movement, mainly looking at the role of Subjacency and putative Subject Island effects. It turned out that neither the Subjacency Condition nor the Subject Island Condition properly constrain extraposition. Additional evidence actually led me to conclude that overt syntactic movement is not involved at all in this construction, which supports Chomsky's suggestions since *Barriers* (1986, 1995, 2008) that extraposition is post-syntactic, on operation that occurs in the phonological component.

A post-syntactic analysis, however, runs into problems with the fact that extraposition has binding-theoretic consequences. After a review of several influential analyses in the literature that have dealt with Condition C effects in relative clause extraposition, I presented a new interface solution. The analysis has two essential components: extraposition occurs at PF, but since the NP is not separated from the relative clause in the syntax, they can be moved together covertly. This captures obviation of Condition C effects and can account for data involving variable pronoun binding, the basic evidence for the two copies of extraposed constituents in the syntax.

In the last part of this chapter, the analysis is recast in terms of the copy theory of movement, which actually reintroduces the Condition C problem. This led me to consider more closely the conditions on co-reference between a pronoun and a following r-expression, Condition C being only one of them. I concluded that a pronoun can only be co-referential with an r-expression in a relative clause if the r-expression is defocused. The solution for the Condition C problem was to resort to vehicle change, which allows replacement of the r-expression with a pronoun in the copy of the QRed NP. Potential problems with this analysis were

also addressed. I have argued in particular that QR of the NP does not depend on extraposition, but has to be assumed for surface NPs *in situ* as well.

While this chapter has discussed the syntax of extraposition constructions and has argued for movement at LF and PF, the next chapters will have to find solutions for the question of what phonological properties of English sentences trigger PF movement.

3 The syntax-phonology correspondence

3.1 Preliminary remarks

This chapter discusses the interaction between syntax and phonology, particularly those aspects which are traditionally considered to be central topics of research at the syntax-phonology interface. These include the correspondence between syntactic structure and prosodic structure (i. e., phonological phrasing), the relation between syntactic structure and phrasal stress as well as the effect of information structural features like [focus] on both phonological phrasing and accentual prominence.

Traditionally it is assumed that phonology has direct access to the structures generated by the syntactic component of the grammar and can therefore construct phonological phrases by inspecting those structures. To put it differently, phonology is assumed to share with syntax a "surface" syntactic representation or phrase marker (cf. Truckenbrodt 1999; Selkirk 2006). However, current minimalist syntax does not allow such a direct correspondence because hierarchical organisation of phrase structure and linear precedence relations are dissociated (Chomsky 1995). Linearisation occurs only when syntactic objects are transferred to PF. This literally means that the input to phonology are just strings of words, transferred as chunks or phases to PF (Chomsky 2001, 2004, 2008). From the point of view of phonology, an important piece of information is therefore missing in such a model, namely the hierarchical organisation of phrase structure. Yet there is considerable evidence that phonology can see both the hierarchical structure as well as the linear order of words, as will become apparent in the ensuing discussion.

The strictly derivational approach to syntactic computations, which aims at eliminating levels of representation, and the current optimality-theoretic approach to phonological phenomena, which heavily relies on levels of representations, are clearly at odds. It is therefore not surprising that linguists from the syntactic camp would prefer a derivational approach to phonological phenomena, for example, by allowing phonology to process syntactic chunks or phases directly and to map them to phonological categories. Rather than giving up Minimalist Syntax or the well-founded optimality-theoretic approach to phonology, in section 1.2.3 I proposed that the hierarchical syntactic structures be preserved after Spell-Out as PF representations. These representations do not constitute a new

level of grammatical representation, but they should be sufficiently "syntactic" for the phonology to work with. They are comparable to the LF representations that feed the semantic component and therefore form the interface accessed by phonological interface constraints.

PF representations are constructed during Spell-Out, representing both the linear order and the hierarchical structure of syntactic objects. Furthermore, null constituents and their phrasal projections, as well as traces/copies and their projections, are not needed at PF and will therefore be pruned from the syntactic structure. The *Lexical Category Condition* (Truckenbrodt 1999), which will be discussed in section 3.2.2.1, requires just this. For example, if the syntactic structure of a triadic construction, abstracting away from linear order, is as in (315a), then its PF representation is presumably the structure in (315b), from which all empty categories and their projections have been deleted.[1] From a syntactic point of view, (315b) is a strange tree, but from the point of view of the syntax-phonology correspondence it is a desirable representation, encoding exactly those syntactic aspects that the phonology also sees, namely the distinction between lexical and functional categories (D vs. N) and the distinction between heads and maximal projections (v vs. vP). Nevertheless, in keeping with current practice in phonological description I will continue using regular syntactic trees like (315a), but will resort to PF representations whenever this becomes necessary or desirable.

This chapter is organised as follows: section 3.2 deals with phonological phrasing, phrasal stress and focus prominence. Section 3.3 revises the so-called *end-based theory* of phonological phrasing and introduces certain extensions which become necessary once a phase-based model of syntax is adopted. The concluding section discusses some potential objections to my approach and compares the OT approach of phonological phrasing to a strictly derivational one.

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1 In order to save space, in the syntactic representation, (ia) is an abbreviation of (ib) because N moves to n (cf. section 2.1).

(i)   a.   NP   b.   nP
               | /\
               N   n   N
                             /\ |
                           N_i n t_i

(315)   *The farmer has poured wine into bottles*

a.

```
                        TP
                 ┌──────┴──────┐
               DP_i            T′
             ┌──┴──┐      ┌─────┴─────┐
            D     NP      T          PerfP
            │      │    has_k    ┌────┴────┐
           the     N           Perf       vP
                   │            │      ┌───┴───┐
                 farmer         t_k    DP      v′
                                       │    ┌──┴──┐
                                       t_i  v     VP
                                            │  ┌──┴──┐
                                         poured_j DP    V′
                                              ┌──┴──┐ ┌─┴─┐
                                              D   NP  V   PP
                                                   │  │  ┌─┴─┐
                                                   N  t_j P   DP
                                                   │    into ┌┴─┐
                                                  wine      D  NP
                                                             │
                                                             N
                                                             │
                                                          bottles
```

b.
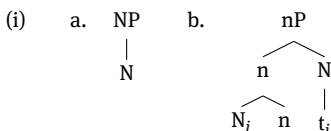
```
                      TP
               ┌──────┴──────┐
              DP             T′
           ┌──┴──┐      ┌─────┴─────┐
          D     NP      T           vP
          │      │     has    ┌──────┼──────┐
         the     N            v     NP      PP
                 │            │      │     ┌─┴─┐
               farmer       poured   N     P   NP
                                     │    into  │
                                    wine        N
                                                │
                                             bottles
```
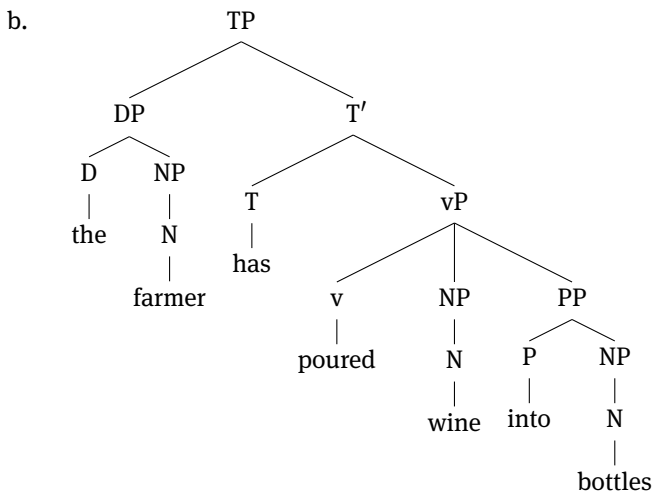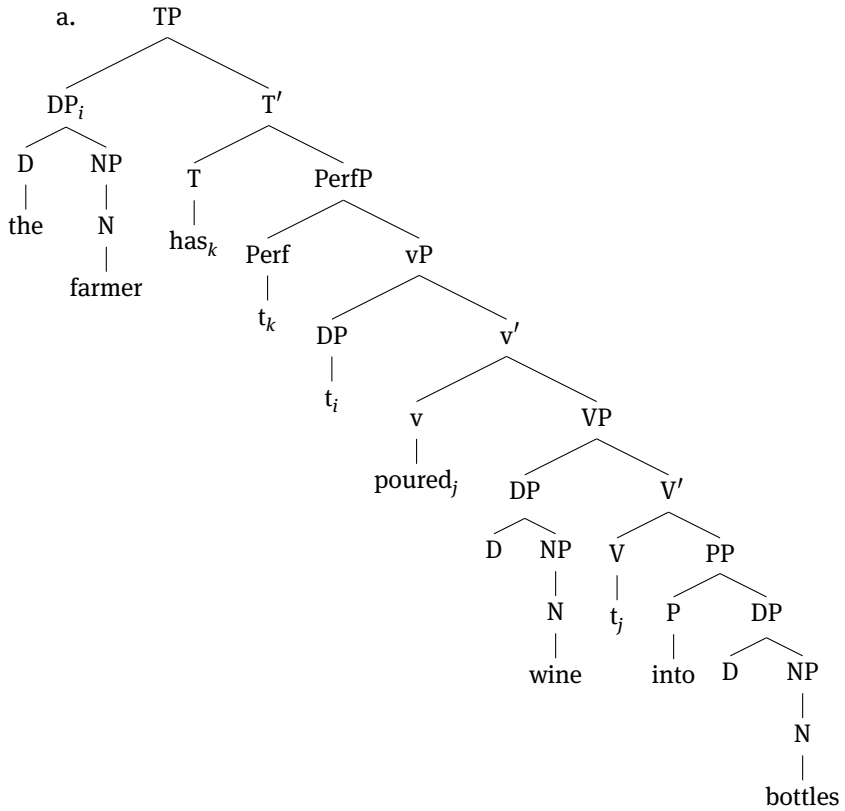
3.2 Prosodic categories and prominence

This section is an overview of the syntax-phonology correspondence as it has emerged from recent work. It presents essential aspects of prosodic phonology that are needed throughout this study, particularly, the Strict Layer Hypothesis and its reformulation as a set of constraints, basic tenets of the end-based theory of prosodic phrasing as well as phrasal stress and focus prominence. For the account of prosodic structure, to be presented in the following subsections, I adopt the standard OT model of the grammar (Prince and Smolensky 2004; Kager 1999).

3.2.1 The prosodic hierarchy

This section is an overview of the prosodic categories which will be employed throughout this study. The categories are listed in (316) and it is a well-established fact that they are hierarchically ordered, such that each category of a given type immediately contains a category at the next lower level. The hierarchical organisation of prosodic structure has motivated the formulation of the Strict Layer Hypothesis (Selkirk 1984; Nespor and Vogel 1986) in (317).

(316)   Prosodic Categories
      a.   Utt (utterance)
      b.   IP (intonational phrase)
      c.   PPh (phonological phrase)
      d.   PWd (prosodic/phonological word)
      e.   Ft (foot)
      f. σ (syllable)
      g. μ (mora)

(317)   Strict Layer Hypothesis
      Prosodic structure is hierarchically organised and any category at a given level of the hierarchy consists exclusively of categories at the next lower level of the hierarchy.

A simple sentence illustrates the prosodic hierarchy in (318).[2]

---

2 Moras are ignored here. English is a rhyme-weight language, i. e., only segments in the rhyme contribute to the weight of a syllable and correspond to moras. Long vowels correspond to two moras.

(318) *John visits Alabama.*

```
                    Utt
                     │
                     IP
              ┌──────┴──────┐
            PPh             PPh
             │        ┌──────┴──────┐
            PWd      PWd           PWd
             │        │        ┌────┴────┐
            Ft        Ft       Ft        Ft
             │        │      ┌─┴─┐     ┌─┴─┐
             σ      σ   σ    σ   σ     σ   σ
             │      │   │    │   │     │   │
            ʤɒn    vɪ  zɪts  æ   lə    bæ  mə
```
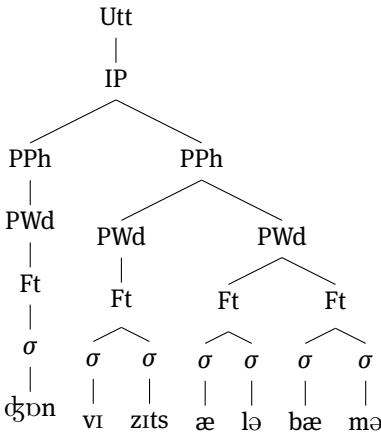
Word stress is a consequence of the rhythmic organisation of words into feet (cf.
Hayes 1995). English feet are moraic trochees (i. e., a foot is minimally bimoraic)
and pitch accents are usually, but not necessarily, associated with the primary
stressed syllable of a prosodic word. The diacritics [́] and [̀] will be used to indi-
cate primary and secondary lexical stress, respectively. The diacritic [́] will also
be used to indicate accents in order to avoid too many caps. In a verb-object se-
quence, only the noun has to be accented. (319a) shows the stress pattern of the
sentence above and (319b) the accentual pattern, here with caps.[3]

(319) a. jóhn vísits àlabáma.
       b. JOHN visits alaBAma.

The different levels of prominence can also be represented in terms of a bracketed
metrical grid, as in Figure 3.1. Each grid mark represents the head prominence of
a prosodic category.

```
(                   *  )   IP
( * ) (             *  )   PPh
( * ) ( *   )(      *  )   PWd
( * ) ( * ·) ( * ·)( * ·)  Ft
 John  visits  Ala  bama
```

Figure 3.1: Metrical grid.

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3 The distinction between stress and accent goes back to Bolinger (1958), who proposed that a
stressed syllable is a syllable that has the potential for being pitch-accented. The distribution of
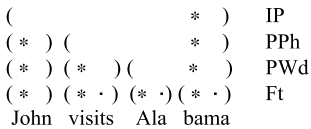pitch accents depends on various factors, which will be discussed in later sections.

Prosodic categories have heads at the immediately lower level. Following Prince and Smolensky (2004) and Selkirk (2006), a prosodic head can be defined as in (320). Feet in English are left-headed, while all other prosodic categories are right-headed.

(320)   Head of a prosodic category
         The head of a prosodic category α is the most prominent category immediately dominated by α.

Phonological words and phrases roughly correspond to morphosyntactic lexical categories and their projections, while intonational phrases in English correspond to root CPs (Downing 1970; Selkirk 2005). As the discussion proceeds, it will become increasingly clearer that prosodic phonology must have access to syntactic structure, or rather PF representations in the framework developed here.

The Strict Layer Hypothesis has been criticised particularly in work by Ladd (1986, 1992, 1996). He provides compelling arguments that recursive structures are found at the level of the phonological phrase and the level of the intonational phrase. The following examples contain three conjoined root clauses that are mapped to separate intonational phrases. Yet the *but*-boundary is stronger, in the sense that it is preceded by a longer pause and is accompanied by a reset of the pitch range. Therefore, Ladd posited two different recursive prosodic structures for the two utterances, which are shown in (322).

(321)   a.   *Warren is a stronger campaigner, and Ryan has more popular policies, but Allen has a lot more money.*
         b.   *Warren is a stronger campaigner, but Ryan has more popular policies, and Allen has a lot more money.*

(322)   a.   Utt   b.   Utt
                  IP   IP   IP   IP
               IP   IP   IP   IP
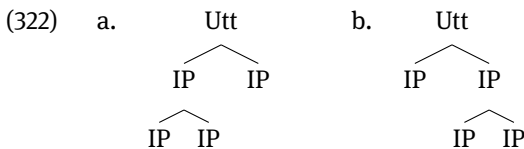
Recursive prosodic structures are now generally accepted and within an OT framework, which employs violable constraints, they have become part and parcel of prosodic analysis (cf. Selkirk 1995b; Féry 2010, 2016; Féry and Truckenbrodt 2005; Ito and Mester 2008, 2009b as well as Kabak and Revithiadou 2009 for recent discussion of recursivity at different prosodic levels). Also accepted is the fact that a certain prosodic category need not dominate only categories at the immediately lower level of the prosodic hierarchy. The prosodic structure of a word like *America* in (323) has two syllables dominated directly by the prosodic word. The final

syllable is extrametrical and remains unparsed at the foot level and the first syllable, which is light, cannot form a foot on its own. However, the prosodic word needs a head, which is the only foot in this word.

(323)
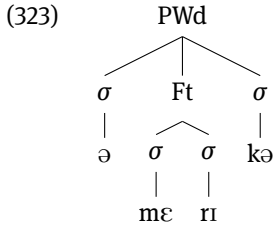
Recursive phonological structures and unfooted syllables clearly violate the Strict Layer Hypothesis and should not be allowed if it were a monolithic constraint. In fact, Selkirk (1995b) has argued that the Strict Layer Hypothesis should be decomposed into a set of constraints on prosodic domination. The constraints are given below, where C^i is some prosodic category.

(324) Layeredness
No C^i dominates a C^j, j > i,
e. g.: "No σ dominates a Ft."

(325) Headedness
Any C^i must dominate a C^{i-1} (except if $C^i = \sigma$),
e. g.: "A PWd must dominate a Ft."

(326) Exh[austivity]
No C^i immediately dominates a constituent C^j, j < i–1,
e. g.: "No PWd immediately dominates a σ."

(327) NonRec[ursivity]
No C^i dominates C^j, j = i,
e. g.: "No Ft dominates a Ft."

Layeredness and Headedness together embody the essence of the Strict Layer Hypothesis and seem to hold universally. NonRec is violated in Ladd's examples, while Exh, which essentially says that levels may not be skipped, is violated by the unfooted syllables in *America*. NonRec and Exh must be considered and ranked for every level of the prosodic hierarchy. Furthermore, Exh will be interpreted slightly differently in this study from what Selkirk actually intended, in order to conform with the more wide-spread application of this constraint in the literature (e. g., Truckenbrodt 1999; McCarthy 2003; Kabak and Revithiadou 2009 and Ito and Mester 2009b), namely as a requirement for exhaustive parsing at every level

of the prosodic hierarchy. Therefore, the definition of Exʜ should be revised as in (328).[4]

(328)   Exʜ[ᴀᴜsᴛɪᴠɪᴛʏ] (revised)
         Terminal elements are parsed at every level of the prosodic hierarchy.

To see the difference, consider again the representation of *America* in (323). Given Selkirk's definition of Exʜ in (326), this constraint would be violated twice at the level of the prosodic word because the prosodic word dominates two prosodic constituents that are not feet. The revised definition, however, requires that syllables be parsed into feet, i. e., exhaustive parsing has not occurred at the level of the foot and would therefore constitute a violation of Exʜ at the level of the foot, for which the notation Exʜ_{Ft} will be employed.[5] At the level of the prosodic word, Exʜ_{PWd} is not violated because all terminal elements are parsed at that level.

3.2.1.1 Intonational cues for prosodic categories

The prosodic categories listed in (316) are the ones I am going to work with. For the description of the intonational contours, I adopt the auto-segmental theory as developed by Pierrehumbert (1980),[6] particularly the version developed for ToBI (Tones and Break Indices, cf. Beckman and Hirschberg 1994 and Beckman and Ayers Elam 1997). In Pierrehumbert's system of intonational description, intonational contours or tunes are described as a sequence of low (L) and high (H) tones, which determine the form of the F_0-contour. An L or H F_0 target associated with a lexically stressed syllable is a pitch accent. A pitch accent marks the lexical item it is associated with as prominent. An L or H tone associated with unstressed syllables is either part of a complex tone or it marks the boundary of an intonational phrasing unit.

The ToBI conventions identify five different types of pitch accents in English: two simple tones and three complex tones. The English pitch accents are listed in (329). The diacritic "⋆" is used to indicate the alignment of a tone with a stressed syllable. The complex accents have one of the tones aligned with the stressed syllable; the unstarred tone of a complex accent is often called a "leading" or

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4 Cf. in particular Ito and Mester (2009b: 139–141) for discussion. They more aptly call this constraint Pᴀʀsᴇ-ɪɴᴛᴏ-X, where X is any prosodic category. I will retain the term "Exhaustivity," however, due to its more wide-spread usage.

5 Note that Exʜ_{Ft} replaces the more familiar constraint Pᴀʀsᴇ-σ, which also requires syllables to be parsed into feet. Cf. McCarthy (2003) for discussion of this issue.

6 Cf. also Beckman and Pierrehumbert (1986) and Pierrehumbert and Hirschberg (1990).

"trailing" tone. The diacritic "!" marks a down-stepped accent which cannot be attributed to the natural declination of an intonational contour.

(329) Pitch accents in English
- a. H⋆ (peak accent)
- b. L⋆ (low accent)
- c. L⋆+H (scooped accent)
- d. L+H⋆ (rising peak accent)
- e. H+!H⋆ (step down onto accented syllable from high pitch)

Two of the intonational phrasing units, namely the phonological phrase and the intonational phrase, are marked by boundary tones. The diacritic "-" indicates a phrase accent which marks the boundary of a phonological phrase. Such boundaries are also signalled by final lengthening. The diacritic "%" is used to indicate an intonational phrase boundary. Such boundaries can also be signalled by pauses, which are not obligatory.

(330) Boundary tones
- a. L- or H- (phrase accent)
- b. L% or H% (final boundary tone)
- c. %H (high initial boundary tone)

Consequently, a tune is a sequence of discrete phonological events, namely pitch accents, phrase accents and boundary tones. Two sample pitch tracks can be viewed in Figure 3.2, the first contains two phonological phrases and the second one phonological phrase. In the second pitch track, the phrase accent actually controls the F_0 between the pitch accent and the end of the intonational phrase.

Phonological phrases and intonational phrases can be read off the intonational contour, but they also define domains for various phonological processes. For example, the phonological phrase is the domain of the Rhythm Rule (Hayes 1988, 1989; Gussenhoven 1991, 2005). This rule shifts the pitch accent in a word from a primary stressed syllable onto a secondary stressed syllable in order to avoid a stress clash.[7] Consider the following examples borrowed from Hayes (1988: 235). In (331), the compound pronounced in isolation corresponds to one phonological phrase and the pitch accent on *Mississippi* is associated with the secondary stressed syllable, thereby avoiding a clash with the pitch accent on *mud*. In (332), both the subject and the verb phrase correspond to a phonological

---

7 Avoidance of a stress clash is not the only reason, cf. section 3.2.2.2.
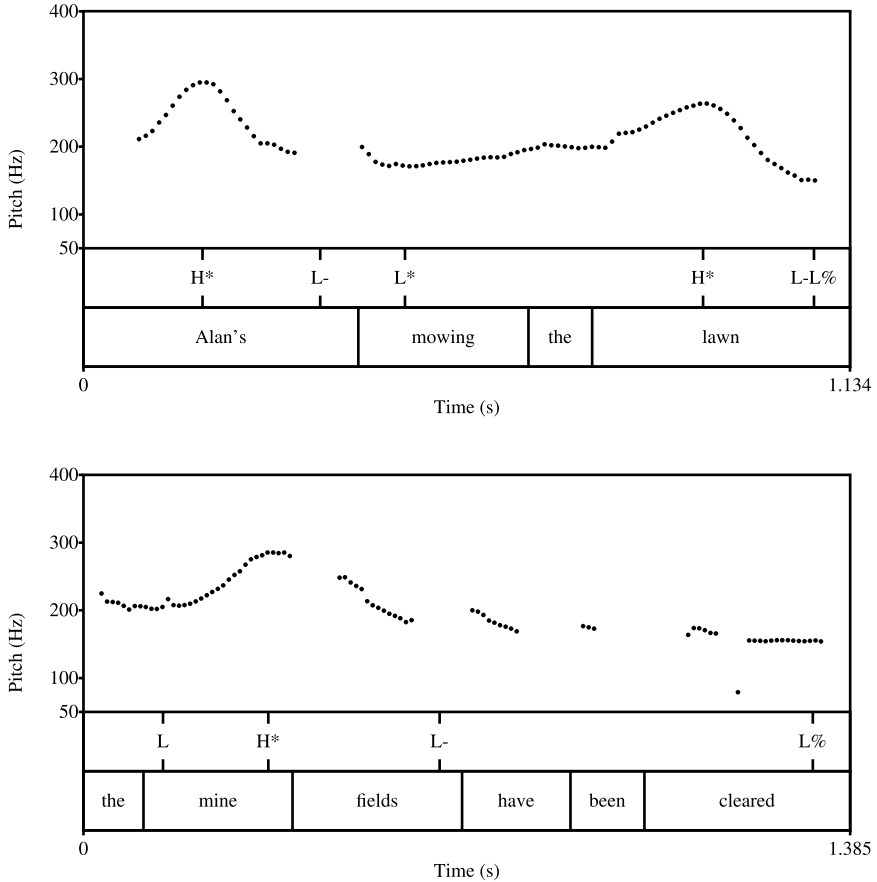
Figure 3.2: Sample pitch tracks.

phrase each. The Rhythm Rule cannot apply although the primary stresses on *Mississippi* and *vetoed* are adjacent.

(331)   *Mìssissíppi vs. Míssissippi múd*

(332)   a.   *The governor of Míssissippi vétoed it.*
         b.   *(The governor of Mississíppi) (vétoed it)*

Before closing this section, it should be noted that other categories between the prosodic word and the intonational phrase have been proposed in the literature. For example, Nespor and Vogel (1986), Hayes (1989) and Vogel (2009) postulate and defend the clitic group as a separate category between prosodic word and

phonological phrase, while Selkirk (2000, 2005) distinguishes minor phonological phrases (MiP) from major phonological phrases (MaP).

The clitic group essentially contains a prosodic word and any proclitics and enclitics. The end-based theory, which will be discussed in section 3.2.2.1, in conjunction with a Strict Layer Hypothesis decomposed into a set of constraints actually allows this category to be eliminated. The phonological phrase here corresponds to Selkirk's major phrase and to the intermediate phrase in Beckman and Pierrehumbert (1986) and Beckman and Ayers Elam (1997), which can be read off the intonational contour. For Selkirk's minor phrase, aka accentual phrase, there is no independent phonological evidence in English. That is, there are no phonological processes which could be argued to apply to such a domain. It seems to be equivalent to the clitic group (cf. also section 3.2.2.2).

3.2.2 Prosodic phrasing

An essential part of my account of extraposition in this study depends on a proper understanding of prosodic phrasing. Therefore, a careful and detailed discussion of the correspondence between morphosyntactic constituents and prosodic categories is necessary. This section is mainly concerned with phonological phrases and their derivation by the so-called end- or edge-based theory, which largely stems from work by Selkirk (Selkirk 1986, 1995b, 2000, 2005), but also Truckenbrodt (1995b, 1999, 2007). Intonational phrases will be discussed in section 3.2.4. The end-based theory will be revised in section 3.3 to take into account the correspondence between syntactic phases and phonological phrases, which was established in section 1.2.3.

3.2.2.1 The end-based theory

Selkirk (1986) proposed that the relation between syntactic structure and prosodic structure be characterised by a set of interface constraints which require that the edge of every constituent of a designated type in the syntactic structure of a sentence be aligned with the edge of a prosodic constituent of a designated type in prosodic structure. Selkirk made her proposal by considering the distribution of vowel length in Chi Mwi:ni (Bantu). In this language, a phonological phrase boundary is signalled by vowel length on the penult syllable of the phonological phrase. Potential vowel lengthening does not occur on a verb if the verb is merged with an object. The same phenomenon can also be observed in noun-adjective sequences and other phrase-like domains. In triadic constructions, a second com-

plement is phrased separately, as can be seen in (333), where the syntactic representation indicates all potential long vowels.

(333)   [$_{VP}$ [$_V$ panzi:ze] [$_{NP}$ cho:mbo] [$_{PP}$ mwa:mba]]
        (panzize cho:mbo)$_{PPh}$ (mwa:mba)$_{PPh}$
        'He ran the vessel on the rock.'

The basic proposal is that prosodic structure is derived directly from syntactic structure by aligning edges of lexical constituents with prosodic words and edges of maximal phrasal constituents with phonological phrases. In Selkirk (1995a), this is recast within the framework of Optimality Theory. The correspondence between lexical constituents and prosodic words is due to the word alignment constraints in (334), which require the right and left edges of a lexical word to be aligned with the right and left edges of a prosodic word (cf. also McCarthy and Prince 1993 and Prince and Smolensky 2004).

(334)   LEX = PWd
        a.   ALIGN-LEX L (Lex, L; PWd, L)
        b.   ALIGN-LEX R (Lex, R; PWd, R)

One consequence of ALIGN-LEX L/R, which do not refer to functional categories at all, is that such words are not parsed into prosodic words. In English and many other languages they are clitics. Selkirk argues that proclitics are dominated by the phonological phrase, while enclitics are integrated into the prosodic word in terms of a recursive structure, as shown in (335). The relaxation of the Strict Layer Hypothesis makes such an analysis possible and a separate clitic group redundant. However, I follow Ito and Mester (2009b) and Göbbel (2013a) and assume that proclitics in English are also integrated in a recursive prosodic word structure, even if they are footed, as shown in (336).[8]

(335)   a.

b.

---

8 Cf. also chapter 5, where cliticisation will be discussed in considerable detail in the context of extraposition of prosodically deficient PPs. Note that most Ps behave prosodically like functional categories, although they are often classified as lexical in generative syntax.

(336)   a.

```
                  PWd
                 / | \
                σ  σ  PWd
                |  |   |
                ɪn ðə  garden
```

   b.

```
              PWd
             /   \
            Ft    PWd
           /  \    |
          σ    σ   debt
          |    |
          ɪn   tə
```
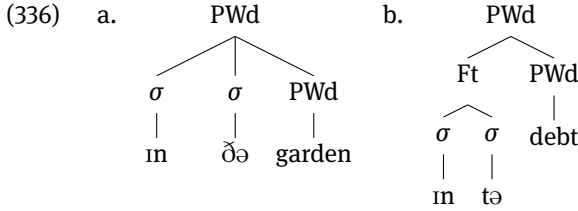
The correspondence between maximal phrasal projections and phonological phrases is due to the alignment constraints in (337). In any language, either the right edge or the left edge of a syntactic phrase is involved in the correspondence, not both edges. Right alignment has been documented for several Bantu languages (Chi Mwi:ni, Chaga, Kimatuumbi), Xiamen Chinese, Romance languages, and also English. Left alignment has been found relevant for Ewe (Kwa), Shanghai Chinese and Japanese. For Selkirk (1986), this was a parametric choice and in a right-edge based language like English, the left edges of the phrasal boundaries are due to exhaustive parsing at the level of the phonological phrase (i. e., enforced by Exh$_{PPh}$, cf. Truckenbrodt 1999).[9] The application of ALIGN-XP to an English example is illustrated in (339), where two NP edges and an NP plus VP edge coincide.

(337)   ALIGN-XP R (XP, R; PPh, R)
   The right edge of any XP in syntactic structure must be aligned with the right edge of a phonological phrase in prosodic structure.

(338)   ALIGN-XP L (XP, L; PPh, L)
   The left edge of any XP in syntactic structure must be aligned with the left edge of a phonological phrase in prosodic structure.

(339)   [$_{TP}$ [$_{NP}$ students of [$_{NP}$ physics]] [$_{T'}$ T [$_{VP}$ make [$_{NP}$ experiments]]]]
   students of physics)$_{PPh}$ make experiments)$_{PPh}$ due to ALIGN-XP
   (students of physics)$_{PPh}$ (make experiments)$_{PPh}$ due to Exh$_{PPh}$

The end-based theory is a particular instantiation of Generalised Alignment explored by McCarthy and Prince (1993). Generalised Alignment unites the diverse

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9 In an optimality-theoretic approach there is no room for parametric choices. Both left-alignment and right-alignment are universal constraints. Truckenbrodt (1999, 2007) argues that they are active if they are ranked above the constraint *PPH, which punishes formation of phonological phrases. They are inactive if they are ranked below *PPH. Truckenbrodt (2007) cites the case of Maori as a language which shows simultaneous alignment of right and left edges of XP, and argues that this can be accounted for by ranking both left and right alignment above *PPH. Left alignment will not play any role in what follows and I will simply use ALIGN-XP for right alignment.

ways constituent edges figure in morphological and phonological processes under a single family of well-formedness constraints, defined in (340). PCat and GCat consist, respectively, of prosodic and grammatical categories provided by linguistic theory.

(340)   Generalised Alignment
         $\text{Align}(\text{Cat}_1, \text{Edge}_1; \text{Cat}_2, \text{Edge}_2) =_{def}$
         $\forall \text{Cat}_1 \exists \text{Cat}_2$ such that Edge_1 of Cat_1 and Edge_2 of Cat_2 coincide.
         Where
         $\text{Cat}_1, \text{Cat}_2 \in \text{PCat} \cup \text{GCat}$
         $\text{Edge}_1, \text{Edge}_2 \in \{\text{Right}, \text{Left}\}$
         (McCarthy and Prince 1993: 80)

The fact that it is alignment of edges of syntactic categories with edges of phonological categories that is at stake here, and not a direct mapping of syntactic constituents onto phonological categories, can be easily demonstrated. The verb and the object in a triadic construction may be contained in one phonological phrase in prosodic structure although they do not form a constituent in the syntax. That they do not form a constituent is obvious from the more articulated syntactic structure in (341).

(341)   (He ran the vessel)$_{PPh}$ (on the rock)$_{PPh}$
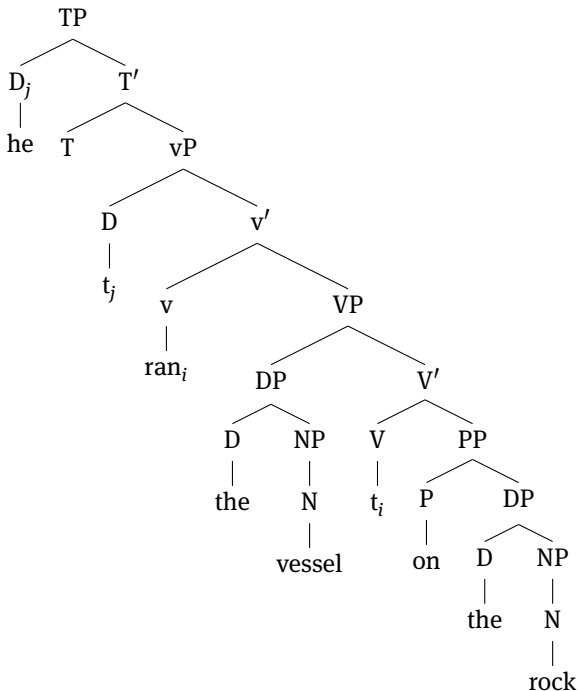
The "demarcative" strategy illustrated above for Chi Mwi:ni is not the only possibility. In Chicheŵa, the verb phrase containing a second complement or adjunct forms one single phonological phrase. It cannot be broken up into several phonological phrases under normal (i. e., focus-neutral) conditions. Phonological phrase boundaries in this language are signalled by the distribution of vowel length, which is found on the penult syllable of the phonological phrase (vowels being generally short), and other tonal events.

(342) $[_{VP} [_V$ anaményá$] [_{NP}$ nyu^{m}bá$] [_{PP}$ ^{n}di [mwalá$]]]$
       (anaményá nyu^{m}bá ^{n}di mwáálá)$_{PPh}$
       'He hit the house with a rock.'

In order to deal with cases like these, Truckenbrodt (1995b, 1999) has argued that the constraint WRAP-XP in (343) is needed, which requires syntactic constituents to be contained within one phonological phrase. The different behaviour of Chi Mwi:ni and Chicheŵa is easily captured in a constraint-based approach: in Chi Mwi:ni ALIGN-XP is ranked higher than WRAP-XP, while in Chicheŵa WRAP-XP outranks ALIGN-XP.

(343) WRAP-XP
       Each XP is contained in a phonological phrase.

One important qualification on the application of ALIGN-LEX, ALIGN-XP and WRAP-XP is that they apply only to lexical categories, but not to functional categories (cf. Selkirk 1986, 1995a; Nespor and Vogel 1986) or traces and their syntactic projections. Truckenbrodt (1999) captures this with the condition in (344).[10]

(344) Lexical Category Condition
       Constraints relating syntactic and prosodic categories apply to lexical syntactic elements and their projections, but not to functional elements and their projections, or to empty syntactic elements and their projections.
       (Truckenbrodt 1999: 226)

Consequently, WRAP-XP requires lexical projections to be phrased separately and it allows functional projections to be broken up. In Chicheŵa, the subject does not form a phonological phrase together with the verb, as can be seen in (345).

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10 Note that the PP adjunct in the Chicheŵa example (342) must be adjoined to VP, not to vP. If it were adjoined to vP, it would satisfy WRAP-XP on the lower vP segment. In other words, it behaves like a complement as far as phonological phrasing is concerned.

(345) $[_{TP} [_{NP}$ kagaálu] $[_{T'}$ T $[_{VP}$ kanáafa]]
          (kagaálu)$_{PPh}$ (kanáafa)$_{PPh}$
          'The (small) dog died.'

Although Chicheŵa opts for a cohesive strategy in prosodic phrasing, the effects of Wrap-XP seem to disappear if a constituent of the verb phrase is narrowly focused. In (346), which matches a context question like *What did he do to the house with a rock?*, phonological phrase boundaries emerge after the verb and the object.

(346) $[_{VP} [_{V/FOC}$ anaményá] $[_{NP}$ nyu^{m}bá] $[_{PP}$ ^{n}di [mwalá]]]
          (anaméenyá)$_{PPh}$ (nyuú^{m}ba)$_{PPh}$ (^{n}di mwáálá)$_{PPh}$
          'He HIT the house with a rock.'

Truckenbrodt (1995b, 1999) argues that a constraint aligning focus with the right edge of a phonological phrase, Align-Foc in (347), is responsible for the phrasing observed in (346). The phonological phrase boundary after the object is due to Align-XP. Align-Foc dominates Wrap-XP in Chicheŵa, and by transitivity, Align-XP. As can be seen in the tableau in Figure 3.3, a lower ranked constraint, Align XP, is active, ruling out a parse (candidate b) in which the object and the PP adjunct are contained within the same phonological phrase.

(347)   Align-Foc (Foc, R; PPh, R)
          Each focused constituent is right-aligned with a phonological phrase boundary.

$[V_{FOC}$ NP P NP]	Align-Foc	Wrap-XP	Align-XP
☞ (V) (NP) (P NP) a.		*	
(V) (NP P NP) b.		*	*!
(V NP P NP) c.	*!		*

Figure 3.3: The effect of focus on phrasing in Chicheŵa.

3.2.2.2 Phonological phrases in English

Selkirk (2000) examines double complement constructions in order to show (i) how the interface constraints can be employed in an account of phonological phrasing in English and (ii) how other phonological well-formedness constraints, particularly size constraints, interact with the interface constraints. I will largely adopt her analysis, but propose a number of modifications which leave the essence of her analysis intact. The modifications are necessary because I reject

the MaP vs. MiP distinction Selkirk's account relies on. They are also necessary because more has to be said about size constraints.

Selkirk observes that in a fluent, but not particularly rapid rendition of a verb phrase with two complements in a VP-focus context, no VP-internal phonological phrase boundary is required, but such a boundary may optionally occur. Hence, both phrasings in (348) are possible in English.[11],[12] A possible context for this sentence is one in which person A reads to person B entries from person C's journal. The sentence is a separate entry in the journal and describes an event of some day.

(348) a. *(She lóaned her róllerblades to Róbin)*
       b. *(She lóaned her róllerblades) (to Róbin)*

For Selkirk the optionality in phrasing is due to ALIGN-XP and WRAP-XP having the same rank in the constraint hierarchy. Since either ALIGN-XP or WRAP-XP is violated, the optionality is predicted. Same-ranking of the two constraints also excludes (349a), a phrasing pattern that is actually not attested crosslinguistically. In this case both constraints are violated. However, it does not exclude (349b), which is mapped to too many phonological phrases. Furthermore, it cannot account for (350), in which the PP is more complex and the optimal phrasing is one in which a phonological phrase boundary occurs after the direct object.

(349) a. *(She lóaned) (her róllerblades to Róbin)*
       b. ??(She lóaned) (her róllerblades) (to Róbin)*

(350) *(She lóaned her róllerblades) (to Róbin's síster)*

Selkirk solves the problem by introducing a constraint that limits the size of a major or phonological phrase to two minor phrases (MiP), the constraint BIN(ARY)MAP in (351). The defining feature of a minor phrase is that it contains an accent. BINMAP is ranked below the interface constraints and it is violated once for any phonological phrase that does not contain two accented words. As can be seen in the first tableau in Figure 3.4, the phrasing options in (349) are correctly excluded. The second tableau contains several candidates for the sentence in (350) and only one candidate is optimal in this example.

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11 Cf. also Selkirk (1984) and Hirst (1993) for earlier discussions of prosodic phrasing in English double complement constructions.

12 Henceforth, phonological phrases (MaP/PPh) will be marked with round unlabelled brackets. All other prosodic categories will be labelled accordingly.

she lóaned her róllerblades to Róbin	Align-XP	Wrap-XP	BinMaP
☞ (she lóaned her róllerblades to Róbin) a.	*		*
☞ (she lóaned her róllerblades) (to Róbin) b.		*	*
(she lóaned) (her róllerblades) (to Róbin) c.		*	**!*
(she lóaned) (her róllerblades to Róbin) d.	*	*	*

she lóaned her róllerblades to Róbin's síster	Align-XP	Wrap-XP	BinMaP
(she lóaned her róllerblades to Róbin's síster) a.	*		*!
☞ (she lóaned her róllerblades) (to Róbin's síster) b.		*	
(she lóaned) (her róllerblades) (to Róbin's síster) c.		*	*!*
(she lóaned) (her róllerblades to Róbin síster) d.	*	*	**

Figure 3.4: Phonological phrasing in triadic constructions.

(351) BINMAP
A major/phonological phrase consists of just two minor/accentual phrases.

(352) WRAP-XP, ALIGN-XP ≫ BINMAP

Note that the number of accented words is crucial in her account of phrasing, but it is not clear how the accentual pattern is computed. In fact, she does not discuss this issue but assumes that they are part of the input to the generator. I have opted against minor phrases due to lack of independent evidence for such a category in English. Furthermore, it is not clear how words with two pitch accents are to be analysed: do they form one or two minor phrases? Words with more than one foot, like *Àlabáma*, *Màssachússetts* and *àbracadábra*, are often associated with two pitch accents if pronounced in isolation. But if they are analysed as two minor phrases, then each dominates only a foot. This would violate HEADEDNESS, which requires prosodic categories to have heads at the immediately lower level of the prosodic hierarchy (cf. section 3.2.1). If the minor phrase were a separate prosodic category, it would have to dominate a prosodic word, not a foot.

Ito and Mester (2009b) have pointed out that positing a minor phrase as an additional prosodic category raises the question of how it would differ from the clitic group. They note that the same result can be obtained if the binarity restriction on phonological phrases is formulated in terms of prosodic words. Example (350) has the prosodic structure in (353) and BINMAP can be replaced with BIN(PPH) in (354).

(353)
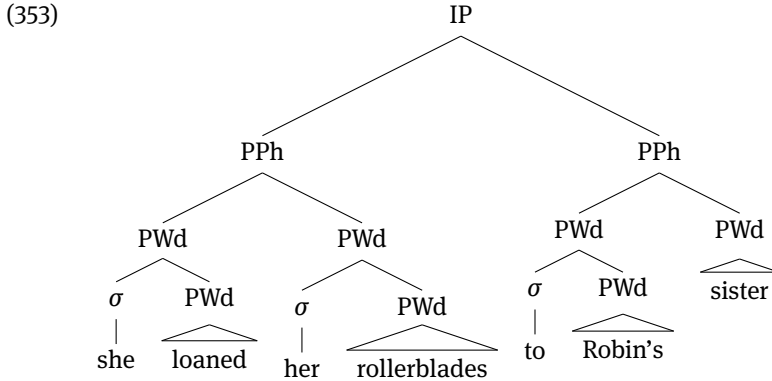
(354)   Bin(PPh): A phonological phrase contains exactly two prosodic words.

Now consider the examples in (355). Example (355a) is problematic for Selkirk's analysis because the phonological phrase boundary after the verb is not predicted. It is not derived by Align-XP because there is no XP edge after the verb.[13] It also violates Wrap-XP. Since Bin(PPh) is ranked lower than the interface constraints, this phrasing is predicted not to be possible. The examples (355b) and (355c), which contain only three prosodic words, are not broken up into two phonological phrases. Obviously, more needs to be said about size constraints.

(355)   *Tell me something about Mary.*

    a.   *(She néver compléted) (her wórk on Míller)*
    b.   *(She's compléted her wórk on Míller)*
    c.   *(She néver compléted her wórk)*

Consider also the following examples, discussed by Gussenhoven (2004: 289–290).[14] The phrasing of (356a) is only predicted if the adjunct is adjoined to nP, the projection to which the N *guests* raises in a more articulate structure of the DP

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13 Note that many adverbs, adjectives and also possessor NPs are exempt from Align-XP in English. Adverbs also do not have complements, which would enforce a phonological phrase boundary, unless they occur in sentence-peripheral positions, while adjectives only allow them if used predicatively. While such a restriction does not hold of possessor NPs in present-day English, it is a well-known fact that they were split up if complex well into the Middle English period (cf. Chaucer's *the clerkes tale of Oxenford*). Whether this behaviour can be attributed to phonological restrictions is a separate research question that will not be pursued here.

14 Gussenhoven assumes that they form two intonational phrases. I have recorded and verified the examples, but neither a pause nor a continuation rise seems required at the right edge of the first intonational unit. At a normal speech rate they form two phonological phrases. An example from my database that has the same phrasing like (356b) is (i). It contains a prenominal adjective, instead of a preverbal adverb.

(cf. section 2.1). In the tree diagram in (357), the lower nP segment can be aligned with a phonological phrase boundary. If the PP is adjoined to NP, as in (358), this phrasing is not predicted because the right edges of the nPs headed by *guests*, *champagne* and *France* all coincide. Furthermore, the phrasing of (356b) is simply ruled out by Bɪɴ(PPʜ), as can be seen in the tableau in Figure 3.5.

(356) a. *(They appreciate guests) (with champagne from France)*
       b. *(We invariably treat guests) (to champagne)*

(357)

(358)
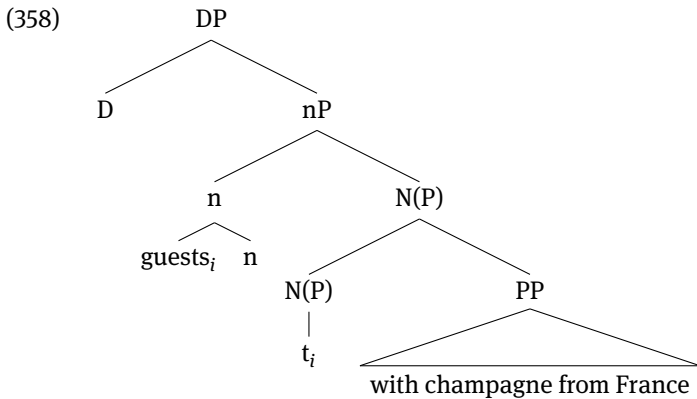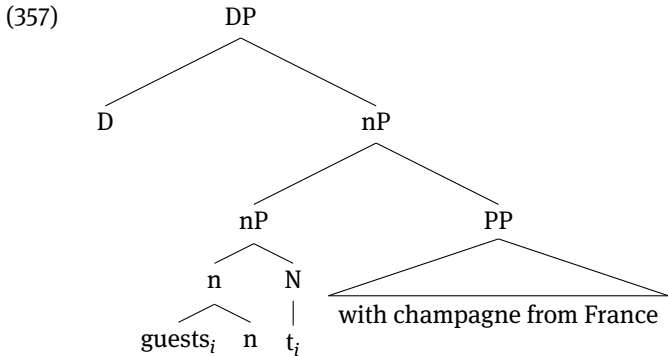
Aʟɪɢɴ-XP is not always responsible for breaking up syntactic phrases into two phonological phrases, but there must be a limit to the words that a phonological phrase can contain. The DPs in (359), discussed by Ladd (1992), are even larger, forming three phonological phrases. In (359a), only the right edge of *rugby* is predicted to be aligned with a phonological phrase boundary. Here the noun *medical effects*, which seems to be a compound, has two complements and moves

(i) a. *After John had finished work, what did he do?*
     b. *(He sóld the old wárdrobe) (to his néighbour)*
         (Göbbel 2003b: 280)

we invariably treat guests to champagne	Align-XP	Wrap-XP	Bin(PPh)
☞ (we invariably treat guests to champagne) a.	*		*
(we invariably treat guests) (to champagne) b.		*	**!
(we invariably treat) (guests to champagne) c.	*	*	

Figure 3.5: Wrong prediction.

within the DP, as in (360). In (359b), it has one complement, but as the more artic-ulate syntactic structure of the gerund below shows,[15] ALIGN-XP can only derive a phonological phrase boundary after *rugby* in this case, too. Only this noun heads an nP that is not at the right edge of the overall structure and to which ALIGN-XP can apply.

(359) a. *(the obvious medical effects) (of playing rugby) (on men over forty)*
       b. *(the obvious medical effects) (of playing rugby) (on artificial turf)*

(360) [$_{DP}$ the [$_{nP}$ obvious [$_{nP}$ medical effects$_i$ [$_{NP}$ [$_{PP}$ of playing rugby] [$_{N'}$ t$_i$ [$_{PP}$ on men over forty]]]]]]

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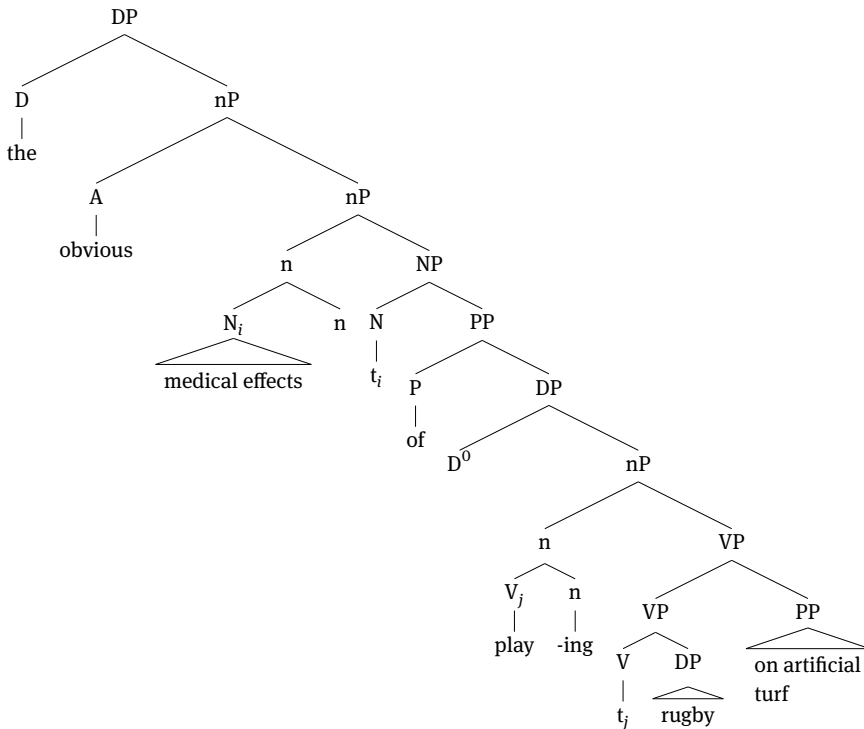
15 For the structure of gerunds see Abney (1987) and the more recent analyses by Moulton (2004) and Alexiadou (2005).

Ladd in fact argues that the phonetic cues point to a recursive prosodic structure for the first two phonological phrases. The level of phrasing of each prosodic category is determined by an L- tone and final lengthening. The cues for the recursive structure are a stronger disjuncture after the second phonological phrase and a higher pitch initiating the third phonological phrase. The recursive structure is shown in (361). Consequently, ALIGN-XP only derives two phonological phrases with a boundary after *rugby*. The first is oversized and has to be broken up in two.

(361)
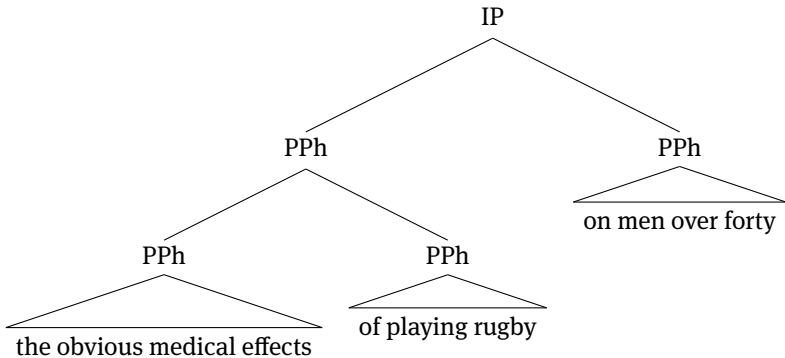
The problem can be solved if the maximal size of a phonological phrase at a normal rate of speech is restricted to three prosodic words, possibly more at faster speech rates. If this constraint is ranked higher than the interface constraints, the correct phrasing is derived for (355a), (356) and (359).

(362)   MAX(PPH): A phonological phrase contains maximally three prosodic words at normal speech rate, possibly more at faster rates.

Either ALIGN-XP or BIN(PPH) decides where a phonological phrase boundary goes within a larger lexical XP. In (363a), the right edge of the nP headed by *guests* calls for a phonological phrase boundary at its right edge. In (363b), a more balanced phrasing of two plus two prosodic words is achieved by the lower ranked BIN(PPH). The tableaux in Figure 3.6 show the evaluation of these two examples: if ALIGN-XP is not violated, the lower ranked BIN(PPH) decides.

(363)   a.   *(We invariably treat guests) (to champagne)*
         b.   *(She never completed) (her work on Miller)*

The reader could object that the formulation of MAX(PPH) in (362) is not a very satisfactory one, at least not from a theoretical point of view. It is well-known that binarity of constituents is a more basic relation and it plays an essential role at other levels of the prosodic hierarchy, particularly at the level of the foot. Feet are bi-

we invariably treat guests to champagne	Max(PPh)	Align-XP	Wrap-XP	Bin(PPh)
(we invariably treat guests to champagne) a.	*!	*		*
☞ (we invariably treat guests) (to champagne) b.			*	**
(we invariably treat) (guests to champagne) c.		*	*	

she never completed her work on Miller	Max(PPh)	Align-XP	Wrap-XP	Bin(PPh)
(she never completed her work on Miller) a.	*!			*
(she never) (completed her work on Miller) b.			*	*!*
☞ (she never completed) (her work on Miller) c.			*	
(she never completed her work) (on Miller) d.			*	*!*

Figure 3.6: Prosodic structure of more complex verb phrases.

nary crosslinguistically, either under a moraic or syllabic analysis (cf. Prince and Smolensky 2004; Hayes 1995; Ewen and van der Hulst 2001). In Spanish, phonological phrases are indeed limited to two prosodic words (cf. Prieto 2006). It is my hope that MAX(PPH) will eventually be derived from more basic rhythmic properties of language, a question that I am not going to pursue any further here.[16]

Nevertheless, it can be shown that it can do a useful job in other contexts as well in which the interface constraints make the wrong predictions. Particularly, it is needed for an account of examples like (364), in which the subject and the verb form one phonological phrase and the complex object another one (cf. Fitzpatrick 2001: 548, who attributes this example to Martin 1970). The phrasing in (b) is properly excluded by this constraint because it contains a phonological phrase with too many words.

(364) a. *(Chickens were eating) (the remaining green vegetables)* √
       b. *(Chickens) (were eating the remaining green vegetables)*

Before closing this section, a further note on the maximal size of phonological phrases is appropriate. Occasionally, one finds in the literature examples with abnormally large phonological phrases, like (365), from Hoskins (1997: 81). I have

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16 Maybe some requirement of symmetry in the rhythmic organisation of language is responsible for breaking up a sequence of four prosodic words into two binary phonological phrases. A principle of symmetry or even distribution of weight has been argued to play a role in prosodic phrasing in Italian (Ghini 1993) and Spanish (Prieto 2006), but it also plays a pervasive role in poetical metrics (Hayes 1988; Golston 1998). Thus, tetrameters, but not trimeters, tend to have a midline caesura, while pentameters are broken up into hemistichs of 2/3 or 3/2 metrical feet (regardless of whether the meter is a durational or stress-based one). It is probably not a coincidence that there is no preference in pentameters for hemistichs of 1/4 or 4/1 feet (cf. Hanson 1996 and Youmans 1996).

recorded several instances myself. Often speed of delivery seems to play a role, but this does not seem to be the only factor. Particularly, large DPs containing a series of adjectives resist segmentation into more than one phonological phrase, apparently in violation of fairly high-ranked MAX(PPH). The DP here contains five prosodic words, with the compound *broken-down* consisting of two prosodic words itself.[17]

(365)   *(John maintains) (old broken-down rusty campers)*

Gussenhoven (2005) has argued that large DPs which contain a series of adjectives and numerals actually form recursive phonological phrases. Each prosodic word is added recursively to the phonological phrase to its right. The main evidence for this analysis is their rhythmic pattern, exemplified in (366). The adjectives and numerals exhibit a stress shift from the primary accented final syllable to the position of the secondary stressed syllable.

(366)   a.   *(fífteen (Jápanese constrúctions))*
          b.   *(twénty-six (véry nice (Jápanese constrúctions)))*

Gussenhoven analyses this process as deletion of the tone usually associated with the primary stressed syllable and association of a tone with the left edge of a phonological phrase. This is possible if the word has a foot at its left edge (i. e., a secondary stress). In other words, a phonological phrase wants to begin with a tone as well as end with one, and if there are several left phonological phrase edges, each edge can be associated with a tone. Gussenhoven states this requirement in terms of the tone-alignment constraints in (367) and (368).[18,19]

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17 More precisely, it has a recursive prosodic word structure:

(i)
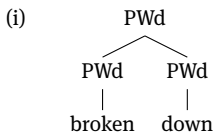
18 The fact that phonological phrases also want to begin with a tone, not only end in one is also discussed by Pierrehumbert (1993). This explains why multi-pedal prosodic words like *Màssachússetts* can have two pitch accents when pronounced in isolation because the word in isolation is also a phonological phrase. A similar view can also be found in Visch (1997, 1999), who discusses stress patterns in complex compounds, as well as in Selkirk (2011), who introduces the constraint Strong Start to capture edge-inital prominence in a number of prosodic categories.

19 Note that, in this analysis, the Rhythm Rule is not just a matter of avoiding stress clashes (i. e., two adjacent prominences) because stress clashes are tolerated in (i), where *ten* and the accented syllable of *Japanese* are adjacent. That is, ALIGN(PPh,T*,L) outranks NOCLASH.

(367) ALIGN(PPh,T⋆,L): The left edge of every phonological phrase coincides with a pitch accent.

(368) ALIGN(PPh,T⋆,R): The right edge of every phonological phrase coincides with a pitch accent.

The same situation can be observed within the verb phrase. Successively larger phonological phrases can be formed without violating MAX(PPH) by recursively procliticising words to a phonological phrase. Examples like (369) have an H⋆ L-sequence of tones on *paintings*, which signals the right edge of a phonological phrase. However, the stress pattern which results from application of the Rhythm Rule, which can be clearly seen in Figure 3.7, suggests the recursive analysis of the verb-object sequence in (370). No doubt, example (369b) would violate MAX(PPH) if no recursive structure were formed.
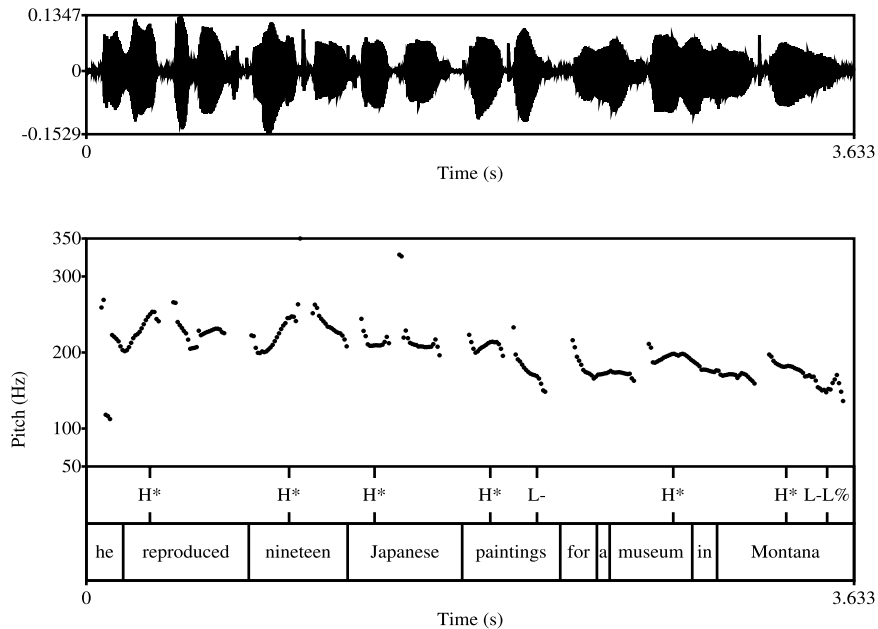
Figure 3.7: Multiple applications of the Rhythm Rule.

(i) a. *(tén (Jápanese constrúctions))*
     b. ??*tén Japanése constrúctions*
     c. ??*tén Japanese constrúctions*
          (Gussenhoven 2005: 186–187)

(369) *What did Jason do in the US last year?*
   a. *(He réproduced Jápanese páintings) (for a muséum)*
   b. *(He réproduced níneteen Jápanese páintings) (for a muséum in Montána)*

(370) a. *(he réproduced (Jápanese páintings))*
   b. *(he réproduced (níneteen (Jápanese páintings)))*

The same holds for the examples in (371), which, given the application of the Rhythm Rule, should be analysed as in (372). Interestingly, the verb can also be grouped together with a one-word subject, as in (364a) or (365), where the first phonological phrase is binary branching. If there is no lexical subject, it procliticises to a complex object, as in the last examples discussed here.

(371) *What did the wizard do?*
   a. *(He tránsformed níneteen rípe óranges) (into Dúndee mármalade)*
   b. *(He tránsformed góod-looking mén) (into slímy tóads)*

(372) a. *(he tránsformed (níneteen (rípe óranges))) (into Dúndee mármalade)*
   b. *(he tránsformed (góod-looking mén)) (into slímy tóads)*

3.2.2.3 Optionality

We have seen that a major difference in phonological phrasing between Chi Mwi:ni and Chicheŵa can be captured in terms of the different rankings of ALIGN-XP and WRAP-XP with respect to each other. Since English allows both options, Selkirk (2000) assumes that the two constraints are same-ranked. Standard OT, however, requires a total ranking order on the constraint set. Since optionality is manifested in many phonological processes, not only within a language or dialect of a language, but even in the same individual speaker, e. g., optional schwa-deletion, optional stress patterns in multi-pedal words, optional application of the Rhythm Rule, optional phrasing, etc., a way has to be found around this restriction imposed by standard OT. Some of the options are *multiple grammars* (Kroch 1989; Kiparsky 1994; Pintzuk 1996), *partially ordered grammars* (Anttila 1997; Anttila and Cho 1998) and *stochastic OT* (Hayes 2000; Boersma and Hayes 2001).[20]

I subscribe here to Anttila's partially ordered grammars, which formalises and gives substance to an already popular approach to variation and optionality, namely in terms of free ranking of constraints (cf. Ito and Mester 1997; Kager

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20 Cf. Anttila (2007) for a concise but excellent overview.

1999: 404–407; Truckenbrodt 2005). When two constraints are freely ranked, the evaluation procedure branches at that point. In one branch, WRAP-XP is ranked higher than ALIGN-XP (373), whereas, in the other branch, ALIGN-XP is ranked higher than WRAP-XP (374).

(373)   *(She lóaned her róllerblades to Róbin)*   WRAP-XP ≫ ALIGN-XP

(374)   *(She lóaned her róllerblades) (to Róbin)*   ALIGN-XP ≫ WRAP-XP

The evaluation of Selkirk's "rollerblade" examples can be inspected in the tableaux in Figure 3.8. As Ito and Mester (1997: 432) succinctly put it, "free ranking derives two winners in a two-competition (two-tableau) scenario."

she loaned her rollerblades to Robin	Max(PPh)	Wrap-XP	Align-XP	Bin(PPh)
☞ (she loaned her rollerblades to Robin) a.			*	*
(she loaned her rollerblades) (to Robin) b.		*!		*
(she loaned) (her rollerblades) (to Robin) c.		*!		***
(she loaned) (her rollerblades to Robin) d.		*!	*	*

she loaned her rollerblades to Robin	Max(PPh)	Align-XP	Wrap-XP	Bin(PPh)
(she loaned her rollerblades to Robin) a.		*!		*
☞ (she loaned her rollerblades) (to Robin) b.			*	*
(she loaned) (her rollerblades) (to Robin) c.			*	**!*
(she loaned) (her rollerblades to Robin) d.		*!	*	*

Figure 3.8: Free ranking.

In Anttila's work, free ranking is not really an option allowed by the grammar, but follows from a modification of the standard definition of an OT grammar. A standard OT grammar imposes a total order on the constraint set. For example, if a grammar contains the constraints A, B and C, then the ranking can be defined as a set of ordered pairs:

(375)   A ≫ B, B ≫ C, A ≫ C

The binary ranking relation in the constraint set is *irreflexive*, *asymmetric*, *transitive* and *connected*. Free ranking could be derived by saying that the ranking relation is not asymmetric or it is not connected. If the relation is asymmetric, A ≫ B and B ≫ A are not allowed. If the relation is connected then every constraint is ranked with respect to every other constraint. Anttila actually proposes that the ranking relation is not connected. So by removing one of the rankings from (375), he derives a partially ordered grammar (376), in which C is no longer ranked with

respect to B. This partially ordered grammar translates as two total rankings or two tableaux, as in (377). In one tableau B dominates C and in the other C dominates B.

(376)   Grammar: A ≫ B, A ≫ C

(377)   Total rankings (tableaux)

    a.   A ≫ B, B ≫ C, A ≫ C
    b.   A ≫ B, C ≫ B, A ≫ C

Such partially ordered grammars are the basis for Anttila's approach to variation more generally and also allow him to make accurate statistical predictions. Note that this approach to variability is not restricted to two constraints and also allows a single constraint to range over a set of fixed constraints. Nevertheless, I will continue to speak informally about free ranking of two constraints, but this ranking reflects a partially ordered grammar. Hence, the two tableaux in Figure 3.8 translate the partially ordered grammar in (378).[21]

(378)   Max(PPh) ≫ Wrap-XP
        Max(PPh) ≫ Align-XP
        Wrap-XP ≫ Bin(PPh)
        Align-XP ≫ Bin(PPh)

3.2.3 Phrasal stress and focus prominence

Accentuation and phonological phrasing often go hand in hand, particularly, when a phonological phrase contains one accent, as in (379a). Once a second argument is added, as in the triadic construction (379b), both arguments must be accented. In this case, a phonological phrase does not necessarily coincide with one "accentual domain." Consequently, a rule of accent assignment in neutral contexts is needed as well as an account of those cases in which narrow focus alters the normal stress pattern (cf. Chomsky 1972). These will be discussed in turn.

(379)   a.   *(Melínda) (made a púdding)*
      b.   *(Melínda) (made Jáne a púdding)*

3.2.3.1 Phrasal stress
This section outlines an approach to phrase and sentence stress that will be assumed throughout this study. The approach here is mainly based on work

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21 Partially ordered grammars will be more fully exploited in section 4.4.

by Hubert Truckenbrodt, which I consider the most promising at the moment. An alternative approach, which I have relied on in earlier work, namely, that sentence accentuation is determined by the argument structure of a predicate (cf. Selkirk 1984, 1995a; Gussenhoven 1984, 1992; Rochemont 1986; van Hoof 1993; Drubig 1994, 2003; Winkler 1996; Breul 2004) will not be discussed here.[22] Argument structure is not accessible to the phonological component, but the syntactic structure in the spelled-out PF representation is. Hence, a theory of sentential accentuation should be formulated in terms of syntactic constituency or be phase-based. I have already argued in section 1.2.3 that phase-based approaches (Kahnemuyipour 2004; Adger 2007; Kratzer and Selkirk 2007) equate a phase or Spell-Out Domain with one accentual domain, which is already a problem for an account of (379b), in which the vP phase contains two accented words. Accentual domains can be smaller than phases or Spell-Out Domains.

Not unlike word stress, which is determined structurally at the foot level, phrasal stress is also structurally determined prosodic prominence. In intonation languages like English, phrasal stress is realised as a pitch accent and sentence (379b) has three phrasal stresses.[23]

Earlier theories of phrasal stress assignment either posited too many stress levels (Chomsky and Halle 1968) or ignored non-final accents in a phrase or sentence (Cinque 1993; Zubizarreta 1998). However, the accents on the arguments in (379b) can be equally prominent. The last accent, which is commonly referred to as the *nuclear stress*, is only perceived as the most prominent one, which does not necessarily match the phonetic reality.

In this study, I essentially follow Truckenbrodt (2006, 2007) and assume that phrasal stress is phonological phrase level prosodic prominence determined by the interface constraint STRESS-XP in (380).

(380) STRESS-XP
       Each XP must contain a beat of stress at the level of the phonological phrase.

---

22 A review of the argument-structural approach, also known as the theory of "focus projection," can be found in Göbbel (2003b: ch. 3).

23 Selkirk (1983) argues that the effect of phrasal stress is also detectable on defocused constituents, for example, on *support* in (i). The cue here is not a pitch accent, but presumably duration and intensity.

(i)   a.   *Who won their support?*
       b.   *The mayor of CHICAGO won their support.*

Like the other interface constraints, Stress-XP is subject to the Lexical Category Condition. It does not apply to functional projections or projections of empty categories. Consider in this respect (381) and its structural representation (382). Phrasal stress is marked with small caps and nuclear stress with big caps, a convention that I will employ whenever necessary. Phrasal stress is phonological phrase level metrical prominence, while nuclear stress is intonational phrase level metrical prominence. Within the subject, the NP containing *Romania* and the dominating NP *President of Romania* are subject to Stress-XP, but not the PP headed by *of* or the DPs headed by *the* or a null D. Stress-XP, applying to the most deeply embedded NP within the subject, assigns a beat of stress to *Romania*. The NP projected by *President* also requires a beat of stress, but Stress-XP is already satisfied for this projection because it contains the prominent word *Romania*.

(381)   *The President of ROMANIA broke the LAW.*

(382)

```
                              TP
                   ┌──────────┴──────────┐
                  DP_i                    T′
              ┌────┴────┐            ┌────┴────┐
              D        NP            T        vP
              │     ┌───┴───┐             ┌────┴────┐
             the    N       PP           DP        v′
                    │    ┌───┴───┐        │      ┌──┴──┐
              President  P       DP       t_i    v     VP
                         │    ┌──┴──┐         ┌──┴──┐ ┌─┴──┐
                         of   D    NP      broke_j v  V   DP
                                    │                 │ ┌─┴─┐
                                    N                t_j D  NP
                                    │                   │   │
                                 Romania              the   N
                                                           │
                                                          law
```
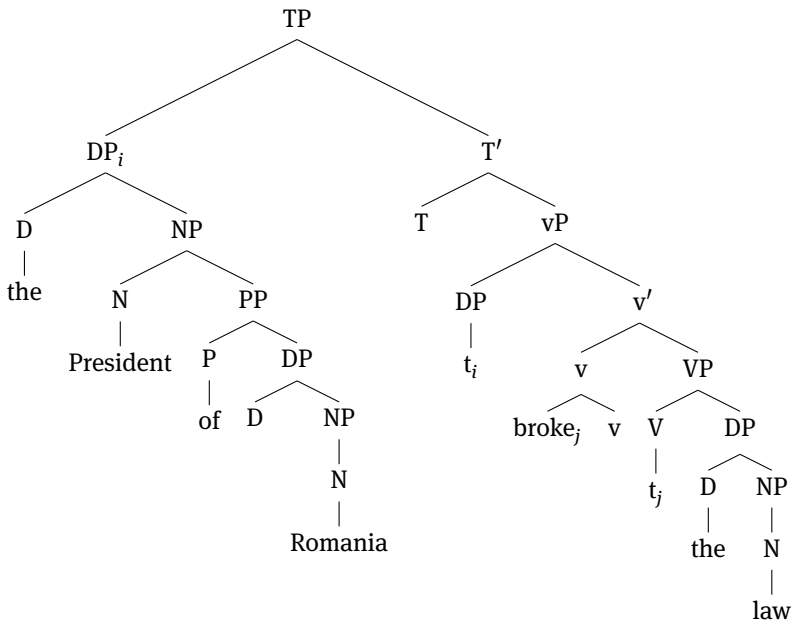
Stress assignment within the extended verbal projection works in a similar fashion. Stress-XP determines a beat of stress at the level of the NP projected by *law*. The VP is headed by an empty category and does not count for the application of the interface constraints. So the next level is vP. Stress-XP is already satisfied for this node because it contains a noun which has phrasal stress, namely *law*. Therefore, no phrasal stress is assigned to the verb and this sentence contains two constituents with phonological phrase level prominence. Since the in-

```
(                                    * )  IP
(                        * ) (        * )  PPh
(      *      ) (      *   ) ( * ) (    * )  PWd
 the president  of Romania  broke  the law
```
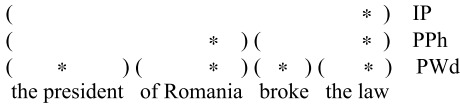
Figure 3.9: Metrical grid for (381).

tonational phrase also requires prominence, the last one is strengthened to intonational phrase level metrical prominence. The stress pattern of this sentence is represented in terms of a metrical grid in Figure 3.9.

In triadic constructions like (383), STRESS-XP requires a beat of stress for every NP but the verb is not assigned phrasal stress because the vP contains two stressed nouns. Consequently, STRESS-XP is an interface constraint which only sees the output of the syntactic component. No independent reference to argument structure is needed in this approach. What is however needed for the application of STRESS-XP is access to the syntactic structure.

(383)   The FARMER has poured WINE into BOTTLES.

While Truckenbrodt argues that STRESS-XP applies directly to syntactic structures, I have argued that the phonology only sees the spelled-out PF representation, a representation in which copies/traces are deleted. The definition of STRESS-XP can actually apply directly to the PF representation in (384), from which all empty categories and their projections have been removed.

(384)

```
                          TP
               ┌──────────┴──────────┐
              DP                     T′
           ┌───┴───┐          ┌──────┴──────┐
          D       NP          T            vP
          |        |          |       ┌─────┴─────┐
         the       N         has      v    NP    PP
                   |                   |    |   ┌──┴──┐
                 farmer              poured N   P    NP
                                            |   |     |
                                          wine into   N
                                                      |
                                                   bottles
```
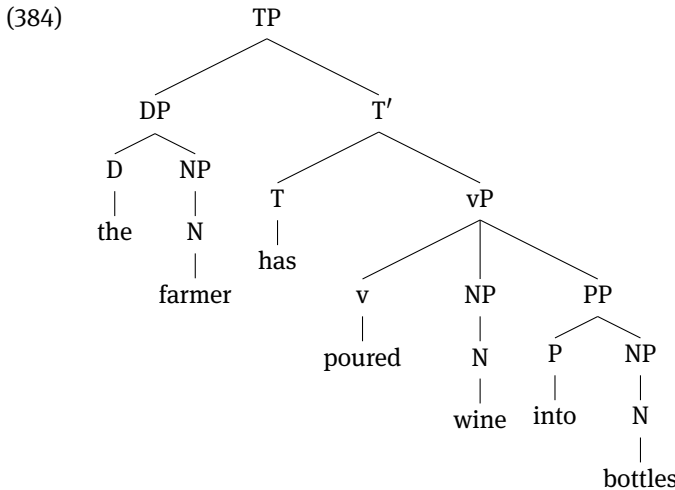
Let us turn to adjuncts, first in German, then in English. As can be seen in (385), V-adjunct sequences in German have two beats of stress, whereas V-object se-

quences only one. This difference can be attributed to the different syntactic representation of arguments and adjuncts. Truckenbrodt (2006, 2007) relies on a more traditional structure of the verb phrase in which the adverbial is adjoined to VP, as in (386). Stress-XP applies to the lower VP segment and to the NP contained in the PP, determining stress on the verb and the noun.

(385) a. *Er soll in GHANA UNTERRICHTEN.*
      b. *Er soll LINGUISTIK unterrichten.*

(386)

```
                      VP
                  ___/  \___
                 /          \
               PP            VP
              /  \            |
             P    NP          V
             |     |          |
            in     N      unterrichten
                   |
                 Ghana
```
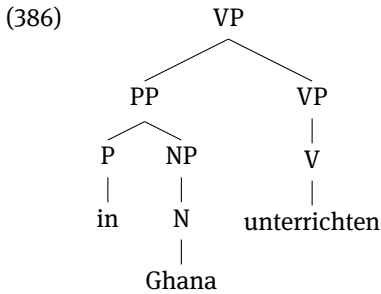
Truckenbrodt assumes that English works like German, but this is far from clear. Accents on the verb are disallowed in German V-final structures if the verb has an argument. However, accents on the verb are common in English, regardless of whether the following constituent is an argument or an adjunct. Furthermore, a phonological phrase boundary is not natural after the verb if it is followed by an argument, but such a boundary is also not necessary after the verb if it is followed by an adjunct. The examples in (387) show that the verb is optionally accented in a verb-object sequence. The examples in (388) show the optionality of phrasing in verb-adjunct sequences.[24]

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24 I am not aware of any systematic investigation of the phrasing options of V + PP-adjunct sequences. Only the different accentual patterns of V+OBJ vs. V+ADV sequences have a long history of research within the framework of the argument-structural approach to focus projection. As to phrasing, Hoskins (1997: 94) suggests that one phonological phrase corresponds to VP focus, as in (i), and two phonological phrases are more likely in a multiple focus construction, as in (ii). Rochemont (2013), discussing the same example, suggests that two phonological phrases are the rule even in a neutral rendition, but does not discuss how phonological phrases should be identified. I will therefore rely on the my own data. The examples in the main text were elicited with the context question mentioned there and phrase boundaries are signalled by phrase accents.

(i) a. *What was Joe doing?*
    b. *(He was smóking in the tént)*

(ii) a. *What was Joe doing where?*
    b. *(He was smóking) (in the tént)*

(387)   *What's that terrible noise?*
    a.   (Alan's) (mowing the LAWN)
    b.   (Alan's) (mówing the LAWN)

(388)   *What's that terrible noise?*
    a.   (Alan's) (MOWING) (in the GARDEN)
    b.   (Alan's) (mówing in the GARDEN)

The pitch tracks in Figure 3.10 show that the accentual patterns can indeed be very similar. The reduced accent on the verb is not due to phrasal stress, but very likely due to a tone-alignment constraint. The left edge, like the right-edge of a phonological phrase, wants to be aligned with a tone, as argued by Pierrehumbert (1993),
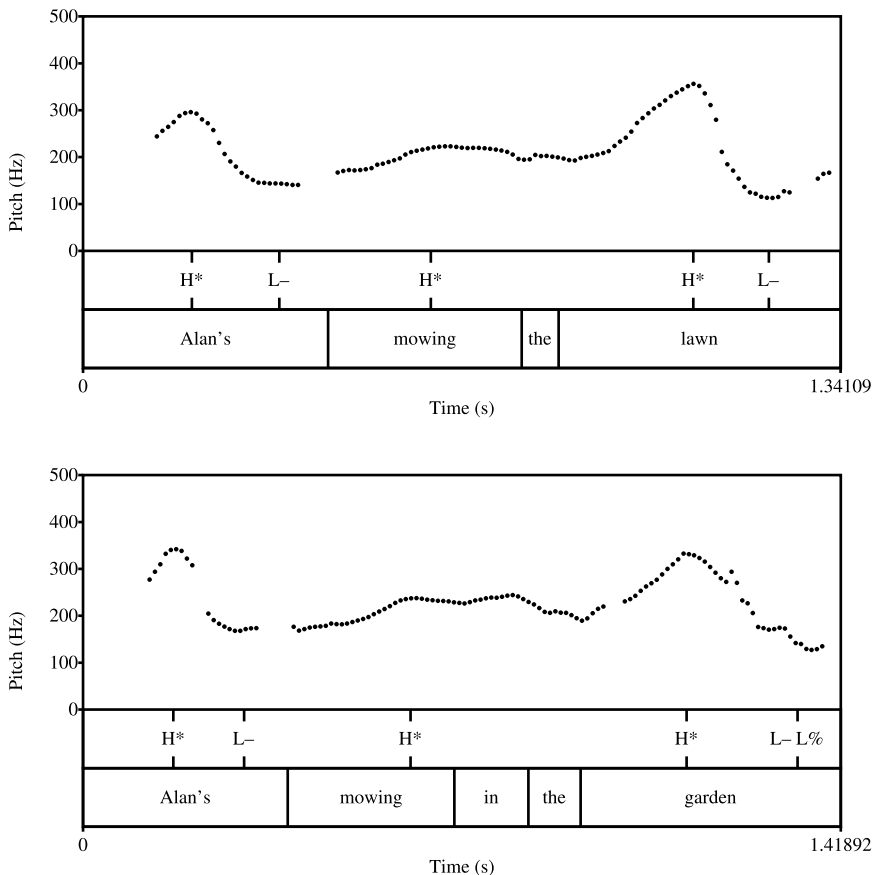
Figure 3.10: Verb-object and verb-adverbial sequences.

Visch (1997, 1999) and Gussenhoven (2005). I have already addressed this issue in section 3.2.2.2 and Gussenhoven's tone-alignment constraints are repeated in (389) and (390).

(389)   ALIGN(PPh,T⋆,L): The left edge of every phonological phrase coincides with a pitch accent.

(390)   ALIGN(PPh,T⋆,R): The right edge of every phonological phrase coincides with a pitch accent.

The rendition of adverbials as separate phonological phrases or as wrapped with the verb, which correlates with different accentual patterns (i. e. one or two phrasal stresses), is highly reminiscent of the conflicting results constituency tests and other tests for hierarchical structure yield for the syntactic representation of adverbials (cf. Pesetsky 1995 and Phillips 2003). In any case, such PP adverbials can be properly contained within the extended verbal projection. Example (391) shows that the object c-commands the PP since negative polarity items often require a c-commanding negative constituent in order to be licensed.[25] Example (392), due to Baltin (2007: 28), shows that the object can bind an anaphor contained in the adjunct. Coordination of two object plus PP adjunct sequences is unproblematic, as in (393). Here the verb is extracted across the board from two conjoined constituents (cf. Larson 1988). Finally, extraction from certain PP adverbials is possible in both questions and pseudo-passives (394). All this evidence converges on the availability of a low adjunction site.

(391)   *The constable saw no children in any pubs.*

(392)   *I visited the students$_i$ on each other$_i$'s birthdays.*

(393)   *I read [a book on Monday] and [two articles on Tuesday].*

(394)   a.   *Which bed did he sleep in?*
        b.   *Which knife did he cut the bread with?*
        c.   *That bed has been slept in.*
        d.   *This knife has been cut with.*

A more articulated structure of the verb phrase which captures the data just reviewed is the one in (395). The object undergoes short object movement (Johnson 1991; Bowers 2002; Göbbel 2003b; Baltin 2007) and c-commands the adverbial in its surface position. In this structure, transitive v⋆ is identified as a Voice head,

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25 This test is not the most reliable one, as discussed in section 2.2.2.2.

which introduces the external argument (Kratzer 1994). The intermediate vP has been identified as an AspP (Baker 1997) or as a Tr(ansitivity)P (Bowers 2002).

(395)

```
                              TP
                        ┌─────┴─────┐
                       D_i          T'
                        │      ┌─────┴─────┐
                        I      T         VoiceP
                                     ┌────┴────┐
                                     D        Voice'
                                     │      ┌──┴──────────┐
                                     t_i   Voice          vP
                                           │         ┌─────┴─────┐
                                        visited_j   DP_k         v'
                                                     │        ┌──┴───┐
                                                the children  v      VP
                                                              │   ┌──┴───┐
                                                              t_j VP     PP
                                                               ┌──┴──┐
                                                               V   DP  on each other's
                                                               │    │  birthdays
                                                               t_j  t_k
```
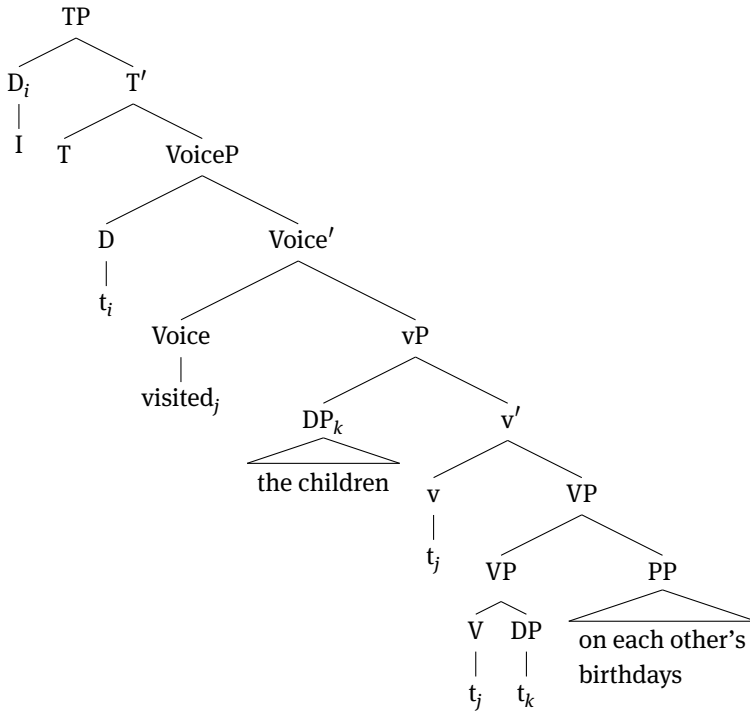
Having established that VP adverbials can be c-commanded by the verb and the object, the stress pattern of (388b) is actually predicted by Truckenbrodt's approach to phrasal stress assignment. The phrasing also follows from this structure. The different syntactic structures between English and German V-final sentences should suffice for an account of the differences in accentuation. And the difference can be attributed to the presence vs. absence of short verb movement. The verb in English moves to Voice and STRESS-XP predicts that a verb-adjunct sequence can have phrasal stress on the adjunct only if the adjunct is adjoined to VP, as in (396). STRESS-XP applies to the NP containing *garden* and to VoiceP. Since VoiceP already contains a constituent that is assigned phrasal stress, STRESS-XP is satisfied and the verb does not require phrasal stress as well.

If the PP is adjoined to VoiceP, as in (397), STRESS-XP applies to the lower VoiceP segment, assigning phrasal stress to the verb.[26] STRESS-XP also requires

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26 Cf. also Lechner (2003) for arguments that two adjunction sites are available for VP adjuncts.

the adjunct adjoined to VoiceP to have its own phrasal prominence. Furthermore, ALIGN-XP is responsible for a phonological phrase boundary after the verb, hence the stress pattern and phrasing of (388a) can also be captured.

(396)

```
                    TP
           ┌─────────┴─────────┐
         DP_i                  T′
       ┌──┴──┐          ┌───────┴───────┐
      D    N(P)        T              ProgP
            │          │          ┌─────┴─────┐
           Alan       is_k      Prog        VoiceP
                                 │      ┌──────┴──────┐
                                t_k    DP          Voice′
                                        │       ┌────┴────┐
                                       t_i    Voice      V(P)
                                               │      ┌────┴────┐
                                           mowing_j  V(P)       PP
                                                      │      ┌───┴───┐
                                                     t_j    in the garden
```

(397)

```
                    TP
           ┌─────────┴─────────┐
         DP_i                  T′
       ┌──┴──┐          ┌───────┴───────┐
      D    N(P)        T              ProgP
            │          │          ┌─────┴─────┐
           Alan       is_k      Prog        VoiceP
                                 │      ┌──────┴──────┐
                                t_k  VoiceP          PP
                                   ┌───┴───┐      ┌───┴───┐
                                  DP     Voice′  in the garden
                                   │    ┌───┴───┐
                                  t_i  Voice    V
                                        │       │
                                    mowing_j   t_j
```
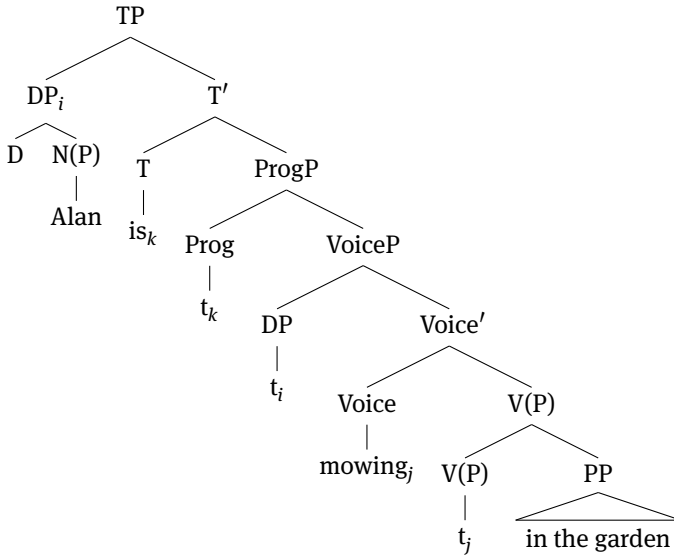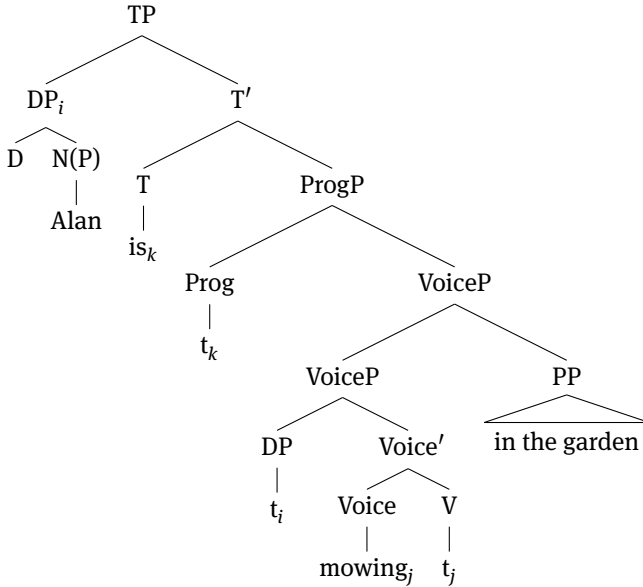
It is now predicted that even in German the argument/adjunct distinction in accentual patterns can be neutralised if the head moves. This happens in noun phrases, which are head initial. There is no perceivable accentual difference between (398) and (399).

(398) *Studenten der* LINGUISTIK *(singen ein Weihnachtslied)*
       students of Linguistics (sing   a   Christmas carol)

(399) *Studenten aus* STUTTGART *(singen ein Weihnachtslied)*
       students from Stuttgart   (sing   a   Christmas carol)

The noun in (400) and (401) moves to n and STRESS-XP correctly determines phrasal stress on the argument or adjunct. The noun is not assigned phrasal stress because the maximal projection nP already contains an accented constituent. The PP in (401) is adjoined to the "maximal" projection of the lexical noun.

(400)

```
                    DP
              ┌──────┴──────┐
              D             nP
                      ┌──────┴──────┐
                      n             NP
                  ┌───┴───┐    ┌─────┴─────┐
            Studenten_i   n    N          DP
                              │      ┌─────┴─────┐
                             t_i   der Linguistik
```
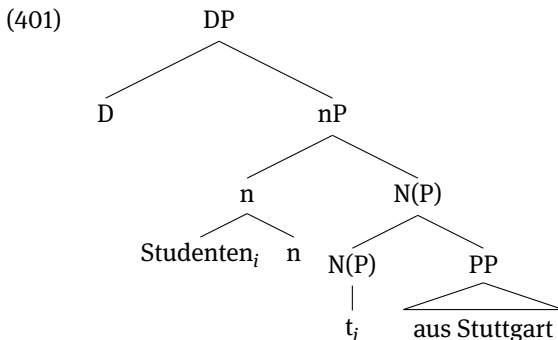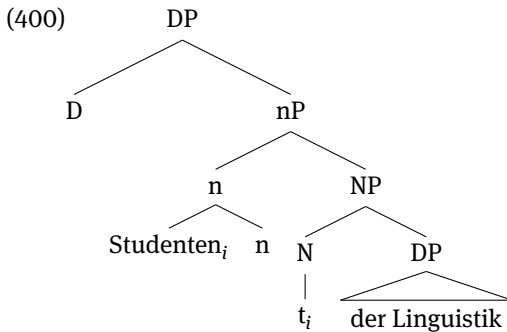
(401)

```
                    DP
              ┌──────┴──────┐
              D             nP
                      ┌──────┴──────┐
                      n            N(P)
                  ┌───┴───┐   ┌─────┴─────┐
            Studenten_i   n  N(P)         PP
                              │      ┌─────┴─────┐
                             t_i     aus Stuttgart
```

In a more recent paper, Truckenbrodt (2012) explores the potential of head-movement in an account of certain V-final accentual patterns in German. I will not review those cases here, but it is clear that the more articulated syntactic structures have to be taken into account for phrasal stress assignment and prosodic

phrasing. I will argue in chapter 4 that extraposition of PPs across other PP adjuncts occurs when the latter can be phrased together with the verb and this is only possible if they have a low adjunction site.

Before closing this section a word on Gussenhoven's tone-alignment constraints seems appropriate. Unlike Align(PPh,T*,L), the constraint Align(PPh,T*,R) need not be stated independently because it can be subsumed under another constraint that is operative across languages. Prosodic constituents typically require their heads to occur at their right or left edges. English is left-headed at the foot level, but the hierarchical higher prosodic constituents are right-headed. This fact has been formalised in terms of head-alignment constraints, defined below. Align H-PWd is due to McCarthy and Prince (1993), whereas Align H-PPh and Align H-IP are due to Truckenbrodt (1995b) and Samek-Lodovici (2005). Gussenhoven's Align(PPh,T*,R) is the same as Align H-PPh.

(402)   Align H-PWd (PWd, R; Head-PWd, R)
   Align the right edge of every prosodic word with the right edge of its head.

(403)   Align H-PPh (PPh, R; Head-PPh, R)
   Align the right edge of every phonological phrase with the right edge of its head.

(404)   Align H-IP (IP, R; Head-IP, R)
   Align the right edge of every intonational phrase with the right edge of its head.

Align H-PWd is responsible for the occurrence of the most prominent foot at the right edge of a word (e. g., *(Àla)(báma)* vs. **(Ála)(bàma)*).[27] The constraint Align H-PPh receives a violation mark for every prosodic word that separates the head word from the right edge of the phonological phrase. Align H-IP receives a violation mark for every phonological phrase that separates the head phrase from the right edge.

Consider the three metrical grids for the sentence *John visits Alabama* in Figure 3.11. The first grid satisfies Stress-XP, Align H-PPh and Align H-IP. The second grid violates Stress-XP because the nP headed by *Alabama* has no phrasal stress, only the vP has phonological phrase level metrical prominence on the verb. It also violates Align H-PPh because the head of the right-hand phonological phrase is separated from its right edge by one prosodic word. The third grid vio-

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27 For further discussion of head-alignment in words see Prince and Smolensky (2004), Pater (2000) and McCarthy (2003).

a.   (∗) IP   S<small>TRESS</small>-XP ✓

```
a.    (               * )  IP      STRESS-XP ✓
      ( * ) (         * )  PPh     ALIGN H-PPH ✓
      ( * ) ( * ) (   * )  PWd     ALIGN H-IP ✓
      John  visits  Alabama

b.    (     *         )    IP      STRESS-XP *
      ( * ) ( *       )    PPh     ALIGN H-PPH *
      ( * ) ( * ) (   * )  PWd     ALIGN H-IP ✓
      John  visits  Alabama

c.    ( *             )    IP      STRESS-XP ✓
      ( * ) (         * )  PPh     ALIGN H-PPH ✓
      ( * ) ( * ) (   * )  PWd     ALIGN H-IP *
      John  visits  Alabama
```

Figure 3.11: Alternative grid candidates.

lates A<small>LIGN</small> H-IP because the head of the intonational phrase, the lefthand phonological phrase containing *John*, is separated from the right edge of the intonational phrase by a less prominent phonological phrase. Only the first grid is well-formed in a neutral context.

Note that reference to focus is not necessary in order to account for the prosodic well-formedness of neutral sentences (cf. Féry and Samek-Lodovici 2006 and Selkirk 2007). Also note that Gussenhoven's A<small>LIGN</small>(PPh,T*,L) cannot be replaced. The same way a word prefers a foot at its left edge (405a), so does a phonological phrase prefer an accented word at the same edge. In (405b), the pitch accents on *never* and *work* are due to A<small>LIGN</small>(PPh,T*,L). The accent on *completed* is required by A<small>LIGN</small> H-PP<small>H</small>. In this example only *Miller* is assigned phrasal stress, which vacuously satisfies A<small>LIGN</small> H-PP<small>H</small>.

(405)   a.   (àbra)ca(dábra) vs. *a(bràca)(dábra)
           b.   (She néver compléted) (her wórk on M<small>ILLER</small>)

Example (405b) raises the question of whether S<small>TRESS</small>-XP can be eliminated in favour of A<small>LIGN</small> H-PP<small>H</small>. Maybe it could for English, but accentuation in German VPs like (406)/(407) clearly shows that A<small>LIGN</small> H-PP<small>H</small> can be violated, although S<small>TRESS</small>-XP is not.[28] Consequently, S<small>TRESS</small>-XP cannot be replaced with A<small>LIGN</small> H-PP<small>H</small>. Superficially similar English examples like (408) actually violate both constraints. The vP in this case does not contain phrasal stress.

(406)   *ein neues Buch lesen*
        a   new   book read

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28 But see Selkirk (2011: 462–463) for a different view.

(407)   [$_{VP}$ [$_{DP}$ ein [$_{nP}$ neues Buch]] lesen]
         (ein neues BUCH lesen)   ALIGN H-PPH*

(408)   [$_{TP}$ [$_{DP}$ a [$_{nP}$ bomb]] [$_{T'}$ T [$_{vP}$ exploded]]]
         (a BOMB exploded)   ALIGN H-PPH*, STRESS-XP*

3.2.3.2 Focus prominence and background accentuation

Phrasal stress as discussed in the previous section is associated with a tone or pitch accent. In (409), the accents on *Alan* and *lawn* are due to phrasal stress and the accent on *mowing* is due to a tone alignment constraint. From the point of view of information structure, this sentence is unstructured (i. e., it does not contain a focus).[29]

(409)   a.   *What's that terrible noise?*
         b.   (ALAN's) (mówing the LAWN)

If a constituent within the same sentence is focused, as in question-answer pairs (410) or contrastive contexts (411), it is the most prominent constituent of the intonational phrase. The contextually given material in post-nuclear position is completely deaccented.

(410)   a.   *Who's mowing the lawn?*
         b.   *ALAN's mowing the lawn.*

(411)   *ALAN's mowing the lawn, not JOHN.*

Following a tradition going back to Jackendoff (1972), I assume that narrow focus is marked with an F-feature in the syntax. It has to be encoded in the syntax because it has an effect on the interpretation of propositions (Rooth 1992; Beck 2007; Krifka 2007) and in many languages it is also moved to a structural focus position. Focused constituents contain the nuclear stress, which, according to Truckenbrodt (2006), is determined by STRESS-XP at the level of the phonological phrase and strengthened to intonational phrase level metrical prominence. I will assume the constraint STRESS-FOC in (412) (cf. also Selkirk 2005 and Féry and Samek-Lodovici 2006). In example (413), the whole subject DP is the focus and the position of accentual prominence on *Mesopotamia* is determined by STRESS-XP.

(412)   STRESS-FOC
         An F-marked constituent contains intonational phrase level metrical prominence.

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29 In theories of focus projection (Selkirk 1984, 1995a), however, they are considered cases of sentence focus.

(413)   a.   *Who invented the wheel?*
          b.   *[_F The inhabitants of MESOPOTAMIA] invented the wheel.*

Accentuation of contextually given material is typically avoided. This has been interpreted as a prohibition against phrasal stress (Truckenbrodt 2006) or as a requirement for given constituents to be prosodically nonprominent (Féry and Samek-Lodovici 2006). Both of these two formulations do not take into account an important asymmetry in accentuation of prenuclear and postnuclear given material. Therefore, I formulate it in terms of accentuation, as in (414), and supplement it with an additional constraint below.

(414)   D(ESTRESS)-GIVEN:
          A given constituent is not accented.

Postnuclear given material is always deaccented, but not necessarily prenuclear given material. In fact, prenuclear accentuation of given material is fairly frequent and systematic in English (cf. Beckman 1996; Göbbel 2003b, 2005) and it is also well documented for German (Uhmann 1991). Two examples with prenuclear accenting are (415) and (416).

(415)   *Where's the hoover?*
          a.   *The hoover's [_F in the dining-room]*
          b.   *(The hóover's in the DINING-room)*

(416)   *Who does Mary read the letters from her lover to?*
          a.   *She reads the letters [_F to Melinda].*
          b.   *(She réads the letters to MELINDA)*

In order to capture the asymmetry between prenuclear and postnuclear accentuation, a second constraint is needed which prohibits postnuclear accenting altogether in English, German, Dutch and, among the Romance languages, Romanian. I propose the constraint POSTNUCLEAR DEACCENTING, abbreviated as POSTNUC-D, in (418). POSTNUC-D must be ranked higher than D-GIVEN. If D-GIVEN is ranked lower than ALIGN(PPh,T⋆,L), then we have an account of why *hoover* and *read* in the examples above can be accented.[30,31]

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30 Note that D-GIVEN is an interface constraint, while POSTNUC-D is a purely phonological constraint (cf. Féry 2010 for an interesting explanation of postnuclear deaccenting).

31 It is noteworthy that not even second occurrences of foci are accented in postnuclear position (cf. Beaver et al. 2007 and Féry and Ishihara 2009). However, Katz and Selkirk (2011) argue that discourse new material following a (contrastive) focus cannot be deaccented although the focus

(417)   PostNuclear Deaccenting
        No pitch accents are realised in the postnuclear stretch.

Not only is accentuation possible in the prenuclear stretch, given material can also be phrased separately. Given material that forms a phonological phrase is fairly common in heavy NP shift constructions like (418), in which only the heavy NP is focused. In cases like these, at least one pitch accent is not suppressed. Pitch accents can surface initially in the phonological phrase due to Align(PPh,T⋆,L), as in (418). They can even surface on constituents which are assigned regular phrasal stress, as in (419), borrowed from Rochemont (2010). The accent on *mother* is presumably due to Align H-PPh, which under certain circumstances seems to override the requirements of D-Given.

(418)   a.   *What did Jason sell at Sotheby's yesterday?*
        b.   *(He sóld at Sotheby's)(a páinting he'd acquíred in NORWAY)*

(419)   a.   *What did John buy for his mother?*
        b.   *(He bought for his MOTHER) (an all expenses paid trip to MEXICO)*

Further questions about accentuation arise if one considers even more complex defocused and/or focused constituents. In (420), practically all lexical words are associated with a pitch accent. The lefthand phonological phrase contains only defocused material and the righthand phonological phrase contains the focus. Pitch accents at the right and left edges of a phonological phrase are due to alignment constraints, but the other accents are not accounted so far. Take *view*, which is neither at the edge of a phonological phrase, nor is it assigned phrasal stress

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contains intonational phrase level metrical prominence. An example they discuss is (i), in which *even* associates with *Minnie* and *a Mariners game* is new to the discourse.

(i)   *Bill chooses the most awful companions. He was dating that horrible lawyer last year, and then there was Kate, who we all hated. He even took [F MINNIE] to [a MARINERS game]. And she's insufferable.*

A solution is offered by Büring and Truckenbrodt (2011), who propose two constraints that prohibit accentuation of only given material, one of them ranked higher for the postnuclear stretch. However, this will not solve the problem posed by thetic sentences like (ii), in which new material can be (optionally) deaccented. It is examples like these that provide independent support for PostNuc-D (cf. also sections 4.3.3.3 and 4.3.3.4).

(ii)   a.   *Why did you run?*
        b.   *A POLICEMAN suddenly appeared around the corner.*
             (Bolinger 1961: 84)

(which goes to *mountains*). What is avoided here is spacing pitch accents too far apart. The same holds for *acquire* in the lefthand phonological phrase.

(420)   a.   *What has Herbert been trying to acquire since last month?*
         b.   *(He's been trýing to acquíre since lást mónth) (a mánor with a víew of the MOUNTAINS)*

Consider also the examples in (421a) and (421b), as well as the German example (422) discussed by Truckenbrodt (2006). They all contain a complex phonological phrase with phrasal stress on the rightmost noun determined by STRESS-XP. The left-edge constituent gets its prominence from ALIGN(PPh,T*,L), but the accents on *good*, *mangroves* and *Freundes* have not been accounted for so far. Note that Truckenbrodt's STRESS-XP only accounts for the phrasal stresses. The accents on *Schwester* and *Freundes* are not mentioned by him, but they are systematically realised (cf. also Büring and Truckenbrodt 2011).

(421)   a.   (the destrúction of the góod name of her FATHER)
         b.   (He wórked on mángroves in PANAMA) (with MELINDA)

(422)   *(Der PETER) (hat der Schwéster des   Fréundes von MARIA) (eine ROSE*
         the Peter   has the sister   of-the friend of Maria a   rose
         geschenkt)
         given
         'Peter has given a rose to the sister of Maria's friend.'

It seems that they are due to eurythmy, a preference for stresses to occur at regular intervals. Firstly, there is a preference for alternating stress patterns. Consider in this respect the examples in (423) from Hayes (1995), analysed here in terms of recursive phonological phrase structures (essentially following Visch 1997 and Gussenhoven 2005). In (423a), the numeral *three* is accented because it occurs at the left edge of a phonological phrase. The pitch accent on *three* is also separated from the one on *Peter* by an unaccented syllable. In (423b), an accent on *three* is avoided because the accent on *John* would be adjacent. In other words, an alternating accentual pattern is preferred. This can be formalised in terms of the constraint NOCLASH in (424), proposed in this form by Gussenhoven (2005).

(423)   a.   *(Péter's (thrée red shírts))*
         b.   *(Jóhn's (three (chúnks of banána)))*

(424)   NOCLASH: Pitch accents are not adjacent.

Secondly, Hayes (1984) argues that there is also a preference for prominences to be spaced close to four syllables apart. I am going to adapt Hayes' *Quadrisyllabic*

Rule as the QUADRISYLLABIC CONSTRAINT (abbrev. as QSC) in (425).[32] It requires that more than three unaccented syllables between two pitch accents be avoided.

(425)　QUADRISYLLABIC CONSTRAINT: Pitch accents within a phonological phrase are spaced close to four syllables apart.

A constraint like this one may be responsible for phonological phrase medial accents on *good*, *mangroves* and *Freundes* in the examples (421) and (422) above. It should be noted, however, that phrasal rhythm is still not well understood today and a more detailed investigation is outside the range of this study. Nevertheless, a constraint like QSC will be needed in chapter 5 in order to account for certain cases of extraposition.

What about the ranking of the constraints introduced so far? Clearly, D-GIVEN does not suppress phrase-initial nor rhythmic accents, as can be seen in (420). It should therefore be ranked lower than ALIGN(PPh,T*,L) and QSC. The ranking of a subset of the constraints that can be established at this point is given in (426). The hierarchy and ranking of the constraints will be further refined in chapters 4 and 5.

(426)　STRESS-FOC, POSTNUC-D ≫ ALIGN(PPh,T*,L), QSC ≫ D-GIVEN, STRESS-XP

Note that, for this approach to work, givenness must be marked in the syntax by way of a G[ivenness]-feature. If it is not marked, the phonology can't see it. It is fairly standard since Jackendoff (1972) that focus is encoded in the syntax, whereas the question of whether givenness should be marked in the syntax is still controversial. I will nevertheless assume that it is (cf. Schwarzschild 1999; Kohlhof 2002; Sauerland 2005; Krifka 2007; Selkirk 2007; López 2010; Rochemont 2013). On the one hand, it is required for an account of what Ladd (1983) called

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32 Hayes' *Quadrisyllabic Rule* was proposed as a principle of grid scansion, possibly extending to other rhythmic manifestations that are not strictly linguistic (e. g. music). It reads as in (i). Hayes argues that it can inhibit the application of the Rhythm Rule in examples like (iia), as opposed to (iib), because a pentasyllabic interval is no improvement over a trisyllabic one if four syllables is the target distance.

(i)　　A grid is eurhythmic when it contains a row whose marks are spaced close to four syllables apart. (p. 46)

(ii)　　a.　*Minneàpolis Míke → ?Mìnneapolis Míke*
　　　　b.　*Mississìppi Mábel → Mìssissìppi Mábel*

"default accent," that is, the avoidance of phrasal stress on given constituents contained within a focus. One of Ladd's example is (427), in which an enthusiastic young student and a jaded older one talk about a charismatic professor. In (427b) the focus and associate of *even* is the verb phrase and the alternatives are other activities that scholars are expected to engage in, like writing papers, giving lectures, etc. Another example is (428), in which the PP complement of the noun is given, but the whole verb phrase is focused.

(427)   a.   *Prof. Smith is so incredibly knowledgable and literate – he gave an incredible analysis of Ulysses in class today.*
         b.   *Are you kidding? He doesn't even [_F READ books] anymore.*
           (Ladd 1983: 165)

(428)   a.   *Does Mary know anything about tsunamis?*
         b.   *She even [_F wrote a BOOK about tsunamis].*

Ladd's basic insight is that a focus can contain defocussed material. STRESS-FOC, defined in (412) above, requires accenting within the focused constituent and the constraints D-GIVEN and POSTNUC-D will conjointly prevent accentuation of the given complements *books* and *about tsunamis*. This means that they must be marked with a G-feature. Intonational phrase level prominence, therefore, defaults on *read* in (427) and on *book* in (428). There is no need for marking all words in the focused constitent except the given ones with an F-feature like in older theories of focus projection (Selkirk 1984, 1995a). It is sufficient to mark just *v* with a focus feature, when it is selected from the lexicon. This feature will then be projected to the phrasal level (vP) and STRESS-FOC will ensure that the nuclear stress is contained in it. Note that G-marking in the syntax does not mean that it is also interpreted syntactically in English (i. e., in terms of a movement operation). The flexible intonation of this language does not make such operations necessary, but G-marked constituents can be scrambled in languages with a less flexible intonation, either rightwards (Catalan, cf. Vallduví 1992) or leftwards (Spanish, cf. Zubizarreta 1998).

    There is also morphological evidence for givenness-marking, for example in Sundanese (Western Malayo-Polynesian). According to Müller-Gotama (1996), this language has three particles which (optionally) mark information-structural categories: *mah* marks focus, *teh* marks givenness and *tae* marks a reintroduced topic (previously given constituent). The example in (429) contains one constituent that is marked for givenness and one constituent which is focus-marked.[33]

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33 Müller-Gotama claims that *mah* marks focus or new information, but from his examples and discussion I infer that it also marks contrastive topics and frames. All three categories have ac-

(429)   *[Anu dalapan welas unit] teh   kandel teuing [upami*
        REL eight   teen unit GIVEN thick too   so-that
        disabukukeun]   mah.
        PASS-one-book-TRANS FOC
        'The eighteen chapters were too thick to be made into one book.'
        (Müller-Gotama 1996: 121)

An important question for this study that hasn't been answered yet is how deaccented material is integrated into the prosodic structure. A widespread assumption is that focus triggers restructuring of phonological domains. This analysis is actually built into the ToBI annotation conventions (Beckman and Hirschberg 1994; Beckman and Ayers Elam 1997). If a sentence with a transitive verb is normally mapped to two phonological phrases, the defocused material is collapsed with the phonological phrase containing the focused constituent, as in (430a). A different position is defended by Winkler and Göbbel (2008) and Féry (2010, 2016), namely, that the defocused material does not undergo restructuring, but forms a phonological phrase which does not contain any pitch accents at all. In fact, Féry argues that the pitch accent associated with phrasal stress is suppressed due to radical downscaling of the pitch register. A third possibility is a recursive phonological phrase, as in (430c).

(430)   *Who's mowing the lawn?*
        a.   [(ALAN's mowing the lawn)]$_{IP}$
        b.   [(ALAN's) (mowing the lawn)]$_{IP}$
        c.   [((ALAN's) mowing the lawn)]$_{IP}$

The representation (430a) violates ALIGN H-PPh twice because the head of the phonological phrase is separated from its right edge by two prosodic words. The representation (430b) violates ALIGN H-IP because the most prominent phonological phrase is separated from the right edge of the intonational phrase by a deaccented phonological phrase. Finally, (430c) violates ALIGN H-PPh twice and also NonRec$_{PPh}$. The choice will have to be deferred until the ranking of the head-alignment constraints has been established in section 4.3.3.

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tually been discussed in connection with focus since their formal account requires reference to alternatives (cf. Krifka 2007).

3.2.4 Intonational phrases

This section addresses the formation of intonational phrases. The discussion will concentrate on those aspects that play a role in later chapters. Recall that intonational phrases are signalled by L% or H% final boundary tones and sometimes an initial %H. The possibility of inserting a pause naturally and the possibility of a continuation rise (H%) are reliable indicators of intonational phrase boundaries. Several factors may contribute to the parsing of an utterance into separate intonational phrases: syntactic structure, narrow (contrastive) focus and various stylistic factors, such as speech rate. As far as the influence of syntax is concerned, it is well established that root clauses are regularly mapped to intonational phrases (Downing 1970; Nespor and Vogel 1986; Selkirk 2005). The examples in (431) and (432), originally discussed by Downing (1970), involve coordination of two root clauses and two clausal complements, respectively.

(431) $[_{CP}$ *Billy thought his father was a merchant] and* $[_{CP}$ *his father was a secret agent]*

(432) $[_{CP}$ *Billy thought* $[_{\&P}$ $[_{CP}$ *his father was a merchant]* $[_{\&'}$ *and* $[_{CP}$ *his mother was a secret agent]]]]*

If two root clauses are coordinated, each sentence forms an intonational phrase on its own, as in (433). Coordination of two complement clauses does not have this effect and the whole root clause can be mapped to one intonational phrase, as in (434).

(433)   *[Billy thought his father was a merchant]*$_{IP}$ *[and his father was a secret agent]*$_{IP}$

(434)   *[Billy thought his father was a merchant and his mother was a secret agent]*$_{IP}$

Even longer sequences can be mapped to one intonational phrase, as the following examples from my database show. In these examples, each intonational phrase contains four phonological phrases and, syntactically, each sentence contains an embedded clause.

(435)   *[(The President has been requesting) (that he should find a solution) (to the United States' growing mortgage crisis) (ever since last week)]*$_{IP}$

(436)   *[(I have wanted John to read) (Stephen Hawking's theory) (about the origin of the universe) (ever since he joined the course)]*$_{IP}$

Other constructions that have an effect on intonational phrasing are parentheticals, which are traditionally said to be set off by "comma intonation" and which

have received considerable attention in phonological and perception studies (e. g., Nespor and Vogel 1986 and Price et al. 1991a, 1991b). Selkirk (2005) argues that parentheticals like those in (437) all have an intonational phrase boundary at their right edge, but not at their left edge. At the left edge there is only a major/phonological phrase boundary.

(437) a. *The Romans, who arrived early, found a land of wooded hills.*
       b. *My uncle Pliny, the Latin teacher, has been working on his Greek.*
       c. *Ames was, as the press reported, a successful spy.*
       d. *I think alpacas, though they are smaller than llamas, can have longer hair.*

Hence, an appositive relative has the prosodic structure in (438a), which differs from a restrictive relative. The latter can be phrased together with the head noun, as in (438b).

(438) a. [(The Romans) (who arrived early)]$_{IP}$ [(found a land of wooded hills)]$_{IP}$
       b. [(The Romans who arrived early) (found a land of wooded hills)]$_{IP}$

Two pitch tracks of the examples in (439) in Figure 3.12, extracted from audio material accompanying Wells (2006), show the difference between the two types of relatives. The first pitch track contains the appositive relative and there is a phonological phrase boundary at its left edge. Such a break is missing in the second pitch track containing the restrictive relative.[34]

(439) *Who's Nikki?*
       a. *She's my sister, who lives in Canada.*
       b. *She's my sister who lives in Canada.*

Selkirk (2005) establishes a link between root CPs and parentheticals. Each root CP expresses a separate speech act. Appositive relatives may also be considered root CPs,[35] in the sense that they make an assertion independently from the assertion of the main clause. Syntactically, they are adjuncts of the constituent they are associated with. Appositives are adjoined to DP (cf. Demirdache 1991), as in (440), and parentheticals like (437c) are adjoined to vP (cf. Potts 2002).

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34 The prosodic structure of restrictive relatives will be discussed in more detail in sections 3.3.2, 3.3.3 and chapter 4. Under certain conditions, they may also have a phonological phrase boundary at their left edge, particularly if the head noun is phrased together with one or more prosodic words preceding it.
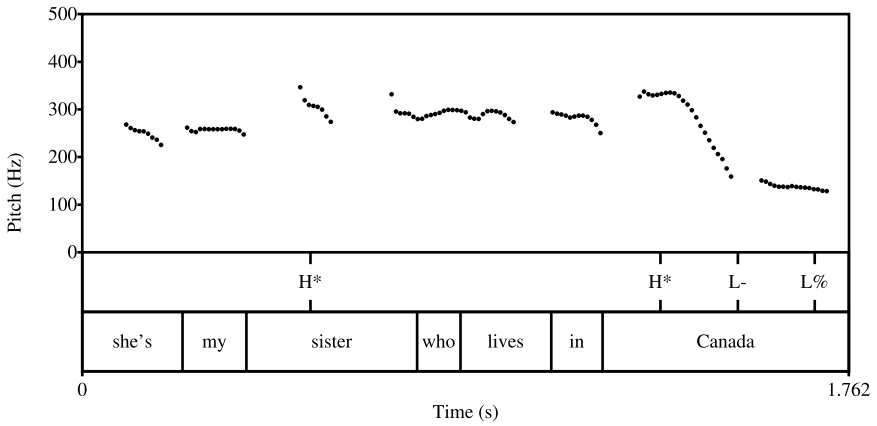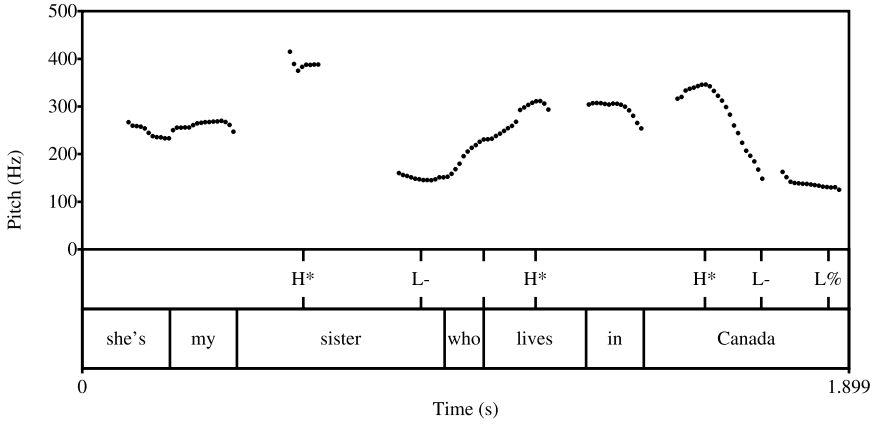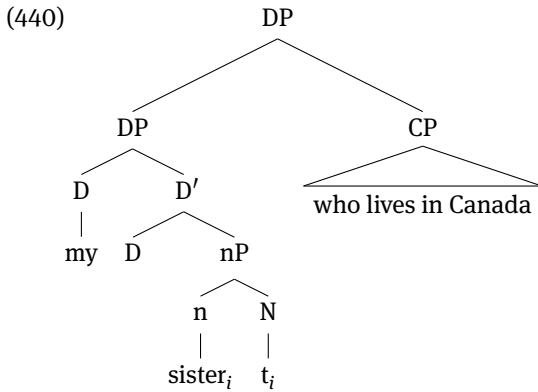**35** Cf. Emonds (1979) and Demirdache (1991: ch. 3).

Figure 3.12: Appositive vs. restrictive relative.

The phonological phrase boundary at the left edge of the appositive is due to ALIGN-XP, that is, alignment of the right edge of nP headed by *sister* with a phonological phrase boundary. The fact that they have an intonational phrase boundary at the right edge is attributed by Selkirk to another alignment constraint which requires root clauses to be aligned with an intonational phrase boundary. Selkirk suggests that root clauses and parentheticals are all dominated by a "Comma Phrase" and proposes that CommaP be aligned with the right edge of an intonational phrase. I have serious doubts about whether the syntactic category of root clauses is a CommaP, so I will use the more neutral formulation of the constraint in (441).[36]

(441) ALIGN ROOT-CP (root-CP, R; IP, R)
Align the right edge of every root CP with the right edge of an intonational phrase.

Another factor which Selkirk identifies as having an influence on intonational phrasing is contrastive constituents. Such constituents can be contrastive foci and contrastive topics. Contrastive foci are found in several constructions, e. g., the remnants in (pseudo)-gapping constructions. In (442), gapping occurs in the comparative clause and a continuation rise is possible on *did*, while *Manny* is contrasted with *Anna*. A continuation rise is an indication of the presence of an intonational phrase boundary. Furthermore, the object *e-mail greetings* is contrasted with *Christmas cards* and set off in a separate intonational phrase.[37]

(442) a. *Who did what more often than who?*
       b. [Anna sent her relatives more Christmas cards than Manny did]$_{IP}$ [e-mail greetings]$_{IP}$

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36 Equating a root-CP with ForceP (Rizzi 1997) won't help either because embedded clauses can also have split-CPs, particularly if they are embedded under bridge verbs. Some linguists classify such clauses as embedded root clauses (e. g., Fischer et al. 2001), which complicates the whole picture drawn here. It should also be mentioned that shorter parentheticals, like the one in (i), can be integrated into the phonological phrase preceding it and that they are only aligned with a phonological phrase boundary at the right edge. In examples I have recorded, the string *I think* was associated with an L* H- sequence of tones. I will not pursue this issue further here.

(i) a. *Orders were given, I think, to blow up the railway bridge.*
     b. [(Orders were given I think) (to blow up the railway bridge)]$_{IP}$

37 This example stems from a set of recordings undertaken for Winkler and Göbbel (2008).

Contrastive topics, as in (443),[38] are also set off consistently in separate intonational phrases. A continuation rise is possible, but not necessary. According to Krifka (2007: 44), contrastive topics "… consist of an aboutness topic that contains a focus, which is doing what focus always does, namely indicating an alternative."

(443) a. *What did you make of the performance?*
        b. [The choir]$_{IP}$ [wasn't too bad]$_{IP,}$ [but the soloists]$_{IP}$ [were a great disappointment]$_{IP}$

In (443b), the temporal disjuncture is significantly greater between the coordinated root clauses than between the contrastive topic-focus pairs. This can be captured by assigning the recursive prosodic structure in (444) to this and similar examples.

(444)

```
              Ut
            /    \
          IP      IP
         /  \    /  \
        IP  IP  IP  IP
```
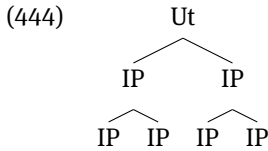
If a focus constituent induces an intonational phrase boundary, then one way to account for it is to follow Truckenbrodt (1999) and assume that focus wants to be aligned with a particular phonological category. In Chicheŵa, it is the right edge of a phonological phrase (cf. section 3.2.2.1). In English, it is the right edge of an intonational phrase, hence the constraint in (445).

(445) ALIGN-FOC (FOC, R; IP, R)
        Each focused constituent is right-aligned with an intonational phrase boundary. (English)

Another account is proposed by Selkirk (2005), who argues that focus phrasing should be derived from focal prominence. Concretely, she proposes that only contrastive focus (which she calls FOCUS) has intonational phrase level metrical prominence, but not focus-neutral sentences. The occurrence of a constituent with intonational phrase level metrical prominence entails the presence of an intonational phrase. Therefore, no independent ALIGN-FOC constraint is needed.

I will nevertheless assume that a constraint like ALIGN-FOC is active, applying to contrastive and non-contrastive foci alike. I will argue in chapter 5 that it is fairly low-ranked and interacts with D-GIVEN in well defined contexts, allowing for an

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38 This example is taken from audio material accompanying Wells (2006).

explanation of why defocused PPs can optionally extrapose. Its relatively low rank in the constraint hierarchy is responsible for the fact that not all foci are aligned with an intonational phrase boundary (for example, *Anna* in (442) is not, although it is contrastively focussed). In other words, ALIGN-FOC can be overridden by other constraints. Eventually, it is an empirical question of whether this constraint is operative in a language. For this reason, I am going to discuss a set of examples to which it can be applied with demonstrable empirical effects.

Consider the following examples in which a non-heavy, non-contrastive NP is moved rightward and in which the width of the focus varies. If focus is narrow, the DP can shift rightward. If focus is broad, rightward movement is somewhat degraded.[39]

(446)   *What did you explain to Mary?*
   a.   *I explained [$_F$ my problem] to Mary.*
   b.   *I explained to Mary [$_F$ my problem].*

(447)   *What did Mary explain to Manny?*
   a.   *She explained [$_F$ her feelings] to Manny.*
   b.   *She explained to Manny [$_F$ her feelings].*

(448)   *What did you do in Mary's office?*
   a.   *I [$_F$ explained my problem to Mary].*
   b.   *?I [$_F$ explained to Mary my problem].*

(449)   *What did Mary do when she met Manny?*
   a.   *She [$_F$ explained her feelings to Manny].*
   b.   *?She [$_F$ explained to Manny her feelings].*

The unscrambled word order forms one phonological phrase, the scrambled order in the acceptable narrow focus case forms either one phonological phrase or two, as can be seen in Figure 3.13. The unscrambled word order in (450) violates ALIGN-FOC and ALIGN-PPH. The scrambled word order in (451a) satisfies both constraints, while (451b) satisfies only ALIGN-FOC. Therefore, it is ALIGN-FOC which triggers movement to the right in the latter example.

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39 Three informants were consulted for this data set and recorded. At least one of them found rightward shift in the broad focus case degraded or even unacceptable. The examples improve substantially if the DP is heavier, as in (i).

(i)   a.   *What did you do in Mary's office?*
      b.   *I explained to Mary my involvement in the debate.*
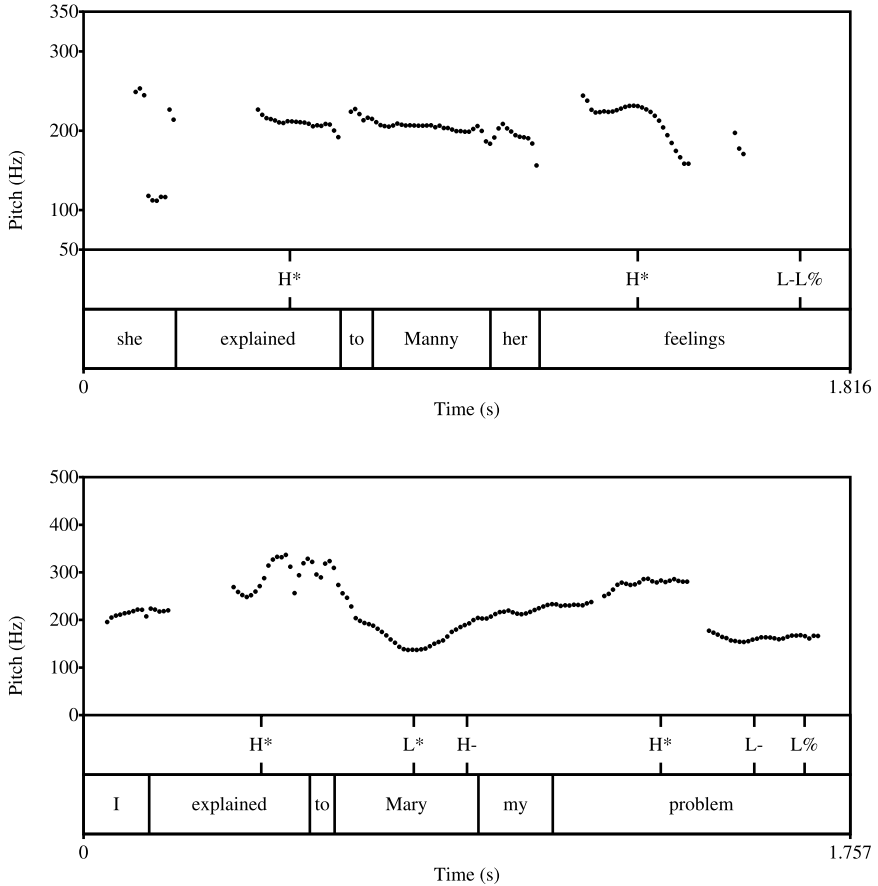
Figure 3.13: Rightward shift of a non-heavy focused NP.

(450)   a.   *What did you explain to Mary?*
        b.   *[(I explained my próblem to Mary)]*$_{IP}$ Align-Foc⋆, Align-PPh⋆

(451)   *What did you explain to Mary?*
        a.   *[(I expláined to Mary my próblem)]*$_{IP}$ Align-Foc√, Align-PPh√
        b.   *[(I expláined to Mary) (my próblem)]*$_{IP}$ Align-Foc√, Align-PPh⋆

The fact that rightward shift is degraded in the broad focus examples (448) and (449) can be attributed to the fact that Align-Foc is satisfied with canonical word

order and ALIGN H-PPH is not strong enough (i. e., is not ranked high enough) to push the DP rightwards.[40]

If my arguments here are essentially on the right track, then ALIGN-FOC cannot be dispensed with and it must be ranked higher than ALIGN H-PPH. In fact, this constraint formalises the very frequently evoked ''principle of end-focus,'' postulated, for example, by Quirk et al. (1985).

3.3 Revision of the end-based theory

In this section I argue that the end-based theory makes wrong predictions for the phonological phrasing of more complex sentences, particularly sentences containing subordinate clauses. The end-based theory will therefore have to be revised to meet at least descriptive adequacy. The solution to be proposed here is to resort to the phase-based model of syntactic derivation, which was introduced in chapter 1 and employed for the syntactic analysis of relative clause extraposition in chapter 2. The phase-based model transfers to PF chunks of structure which the phonology can match with phonological constituents. A particular version of this model was outlined in section 1.2.3. I argued there that whole phases are spelled out (i. e., v*P and CP). This section will not introduce a new, radically revised theory of phonological phrasing, but will preserve the essence of the end-based theory.

3.3.1 Some problems for the end-based theory

One problem for the end-based theory, incorporating ALIGN-XP and WRAP-XP, is that it does not predict the prosodic phrasing of verb phrases containing complement clauses. As noted by Taglicht (1998), both finite and non-finite CPs can be phrased separately, as in (452).[41] WRAP-XP predicts the CPs to be wrapped with

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40 Cf. also Winkler and Göbbel (2008) for an account of comparative inversion along these lines, illustrated in (i).

(i)   *Who could have run faster at the track meeting than who actually did?*

    a.   *[ANNA could have run faster than MARIANA did]*$_{\text{IP}}$
    b.   *[ANNA could have run faster than did MARIANA]*$_{\text{IP}}$

41 The numbers in brackets are the example numbers in his article. Taglicht assumes that the intonational units correspond either to intonational phrases or to the intermediate phrases of Beckman and Pierrehumbert (1986). The latter correspond to my phonological phrase. I have selected only examples in which an intonational phrase is not necessary under normal conditions, a fact which I have also verified in my own production tests.
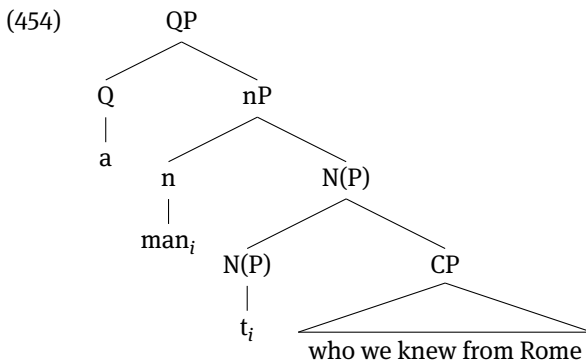
the verb into one phonological phrase and ALIGN-XP is not responsible for the phonological phrase boundary after the verb because there is no vP edge at that point.

(452) a. *(Everyone knows) (that this is not true)* [24]
       b. *(We intended) (for Mary to review the book)* [51]
       c. *(We'd prefer) (for Mary to review the book)* [52]

The end-based theory runs into the same problem with relative clauses in certain positions. While (453a) is well-behaved and follows from the theory of prosodic phrasing assumed so far, (453b) does not. This difference in phrasing has not gone unnoticed. In a corpus-based study, Croft (1995) found that clause-final relatives are always phrased separately, while clause-internal ones do not split off from the noun they modify.[42]

(453) a. *(A man who we knew from Rome) (walked into the bar on Monday)*
       b. *(I received some letters) (that are of interest)*

That only (453a) follows from the end-based theory is immediately obvious if we consider the structure of the complex DP in (454), in which the restrictive relative clause is adjoined to the maximal projection of N and the noun raises to the head of a nominal nP shell (cf. section 2.1).

(454)

```
                QP
              /    \
            Q       nP
            |      /   \
            a    n      N(P)
                 |     /    \
               man_i  N(P)    CP
                      |      /    \
                     t_i   who we knew from Rome
```

The phonological phrase boundary after the complex subject is due to ALIGN-XP, alignment being required for the right edge of the nPs headed by *man* and *Rome* as well as the vP headed by *knew*. They all coincide. WRAP-XP also prevents splitting up of the highest nP and detachment of the relative clause.

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42 Croft actually suggests that clause-final relatives extrapose vacuously. Vacuous clausal extraposition will be considered below.

The end-based theory predicts the same phrasing for (453b), which has the structure in (455). It predicts that the relative should not be phrased separately from the noun. The actual phrasing violates Wrap-XP for the nP headed by *letters* and for the vP headed by *received*. Since the sentence contains exactly three prosodic words, Bin(PPh), which is responsible for a more balanced phrasing, cannot account for the prosodic structure here, nor can Max(PPh), which is not violated. Align-XP cannot account for the phonological phrase boundary after the noun, either.

(455)
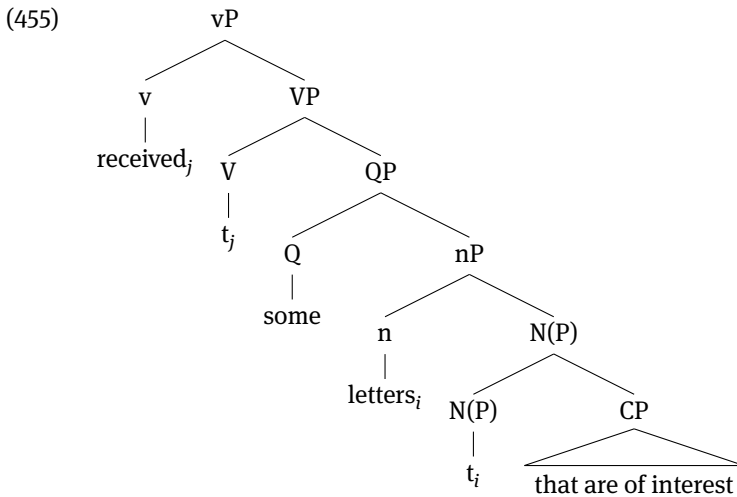
The same argument can be made on the basis of example (456), in which the noun has a complement. Wrap-XP is violated twice, once for the nP node headed by *idea* and for the vP node headed by *have*. There is also no nP edge after *idea*.

(456)   *(I've no idea) (when it will rain)*
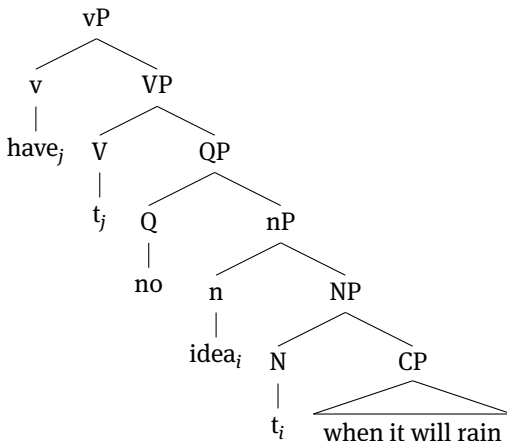
For the example in (457), Max(PPh) predicts that it should be broken up into two phonological phrases in oder to avoid a phrase with more than three prosodic words. The constraints and their ranking developed so far, however, predict the inner phonological phrase edges in the wrong position. The problem is clearly Wrap-XP, as can be seen in the tableau in Figure 3.14. Wrap-XP rules out the well-formed candidate (a). The nP headed by *rat* and the vP headed by *chased* are not contained in one phonological phrase. Candidate (c) is favoured because it violates Wrap-XP only once. The nP headed by *rat* is now contained in a phonological phrase, but not the vP headed by *chased*. Bin(PPh) has no effect on the evaluation in this example.

(457)   a.   *(He chased the rat) (that ate the cheese)* √
          b.   *(He chased the rat that ate the cheese)*
          c.   *(He chased) (the rat that ate the cheese)*

he chased rat that ate the cheese	Max(PPh)	Align-XP	Wrap-XP	Bin(PPh)
(he chased the rat) (that ate the cheese) a.			**	
(he chased the rat that ate the cheese) b.	*!			*
☞ (he chased) (the rat that ate the cheese) c.			*	**

Figure 3.14: Wrong prediction of Wrap-XP.

One way to save Wrap-XP is to allow vacuous movement of the CPs, either in the syntax or at PF. The operation would occur in order to satisfy this constraint. In other words, it is worthwhile to consider whether Wrap-XP can force a CP to shift.

    The idea that at least complement clauses move vacuously can be traced back to Stowell (1981). Stowell argued that the CP in (458) is moved rightward in overt syntax and adjoined to VP.

(458)   a.   *Paul mentioned that his shirt was dirty.*
          b.   Paul [$_{VP}$ [$_{VP}$ mentioned t_i] [$_{CP}$ that his shirt was dirty]$_i$].

Rightward movement in Stowell's analysis is motivated by the Case Resistance Principle, which roughly states that a [−N] category may not be assigned case and must therefore be removed from its theta position. Stowell supports his analysis with examples like (459). For him, movement is virtually obligatory if the verb has a second PP complement.

(459)   a.   *Paul mentioned to Bill that his shirt was dirty.*
          b. ?**Paul mentioned that his shirt was dirty to Bill.*
             (Stowell 1981: 161)

The Case Resistance Principle, however, is not unproblematic. Consider the construction with a raising verb in (460). The verb is unaccusative and does not assign case. The CP is therefore not predicted to move rightwards. Stowell circumvents this problem by raising the complement clause to the matrix subject position, a case position, with subsequent rightward shift and *it*-insertion, a dubious move from a current perspective.[43]

(460)   a.   *It seems to us that John is guilty.*
        b. ?**It seems that John is guilty to us.*
             (Stowell 1981: 164)

Stowell also noticed that an intonational disjuncture occurs after the verb and this would make CP shift similar to heavy NP shift. The intonational break is a phonological phrase boundary and it would follow naturally from the Selkirk/Truckenbrodt theory of prosodic phrasing if the CP is forced to shift in order to satisfy an interface constraint, namely WRAP-XP. This analysis could easily be extended to relative clauses, allowing them to move vacuously and adjoin to nP or DP/QP, as in (461).[44] Note that further movement and adjunction of the CP to vP would also allow wrapping of the vP, as in (461). But this is not possible since adjuncts cannot be extracted from nominal constituents at all, as argued in chapter 2.
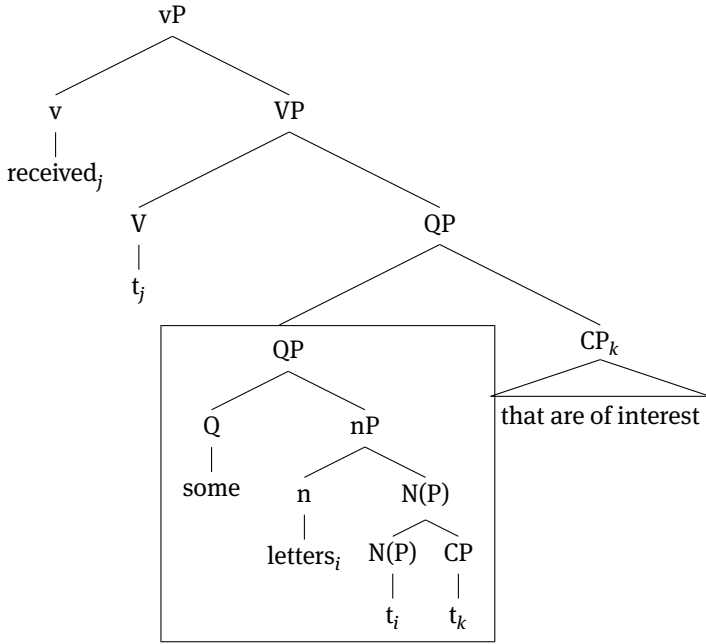
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43 Stowell himself noted that one problem for his analysis is the fact that the CP could also escape case assignment by topicalisation. CP topicalisation, however, is ungrammatical:

(i)   **That John is guilty (it) seems to us.*

44 This analysis allows wrapping of the (boxed) nP and ALIGN-XP would be responsible for the phonological phrase boundary after the nP headed by *letters*. Note that non-vacuous extraposition within the noun phrase is a common operation and examples abound in corpora. Four examples from the British National Corpus are given in (i).

(i)   a.   *It is widely felt that [the death last year **of Graham Greene**] left a gap at the top of the Eng Lit ladder.* [ECT]
       b.   *Sadly this was [one of the last public appearances in London **of Sir William Heseltine**], before he returns to his native Australia this autumn.* [ED9]
       c.   *There was an excellent performance in the Homeowner's account which produced a profit of $10.6m in the fourth quarter, against [a loss in the same period last year **of $3.3m**].* [HB4]
       d.   *At the end of The Counterlife there is [a letter from Nathan Zuckerman to Maria **on this subject**] which has the force of a statement of allegiance on the part of Philip Roth.* [A05]

(461)

```
                        vP
              ┌──────────┴──────────┐
              v                     VP
              │           ┌─────────┴──────────┐
          received_j      V                    QP
                          │         ┌──────────┴──────────┐
                          t_j     ┌─┴─────────────┐       CP_k
                          ┌───────────────────────┐  ┌─────┴──────┐
                          │       QP              │  that are of interest
                          │   ┌───┴────┐          │
                          │   Q        nP         │
                          │   │     ┌──┴───┐      │
                          │ some    n      N(P)   │
                          │         │    ┌──┴───┐ │
                          │      letters_i N(P)  CP│
                          │              │     │  │
                          │              t_i   t_k │
                          └───────────────────────┘
```

(462)

```
                               vP
                  ┌─────────────┴──────────────┐
         ┌────────────────────┐               CP_k
         │       vP           │          ┌─────┴──────┐
         │   ┌───┴────┐       │          that are of interest
         │   v        VP      │
         │ received_j ┌─┴──┐  │
         │   V        QP    │
         │   │     ┌───┴───┐│
         │   t_j   Q       nP│
         │         │    ┌───┴───┐
         │       some   n      N(P)
         │              │    ┌──┴───┐
         │          letters_i N(P)  CP
         │                   │     │
         │                   t_i   t_k
         └─────────────────────────┘
```
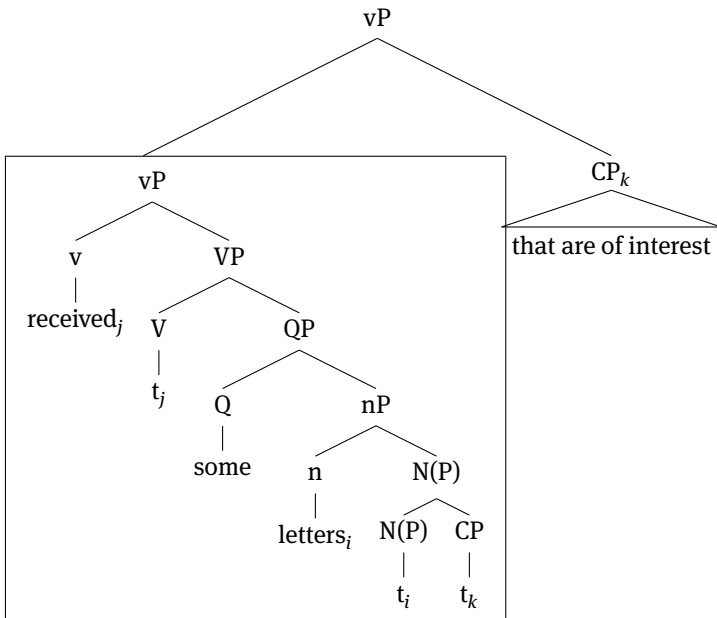
There are also other reasons why such an analysis must be rejected. First, vacuous movement is difficult to prove empirically and remains a stipulation.[45] Stowell tried to motivate it by resorting to examples in which CP movement is obvious, namely, sentences which also contain a PP complement across which the CP has shifted. But these examples are not ungrammatical if the PP is mapped to a separate phonological phrase and carries phrasal stress, as in (463). Furthermore, we have no principled account of why CPs should be mapped to separate phonological phrases in the first place. A more principled solution would be to seek a correlation with transitive vPs, which also form separate phonological phrases.

(463) a. *What did you say about Mary?*
       b. *(She méntioned) (that her jéans were dirty) (to Bíll)*

3.3.2 Cyclic spell-out and prosodic structure

In this subsection I argue that the effects of Wrap-XP can be derived from the model presented in section 1.2.3, where I showed that cyclic spell-out of syntactic structure already gives us the phonological domains we need. Specifically, I will argue here that embedded clauses form phonological phrases and the material to the right and left is either mapped to separate phrases or attached recursively to a clause-based phonological phrase, as shown in (464).

(464) a. (X) (CP) (Y)   separate phonological phrases
       b. (X (CP))...   right-recursive phonological phrase
       c. ...((CP) Y)   left-recursive phonological phrase

As outlined in section 1.2.3, cyclic spell-out of a simple sentence containing a transitive verb derives two phonological phrases, one corresponding to the v*P phase and one corresponding to the string of terminals spelled out on the CP phase, as in (465). A manner adverb adjoined to vP is contained in a phonological phrase together with the verb and its complement (466). I took this as evidence that the v*P phase can be spelled out in full. That is, a phase is evaluated and spelled out when the next higher phase is completed (Chomsky 2001; Inaba 2009).[46]

(465) a. [$_{CP}$ Mary's mother [$_{vP}$ reads to the children]]
       b. (Mary's mother) (reads to the children)

---

45 But see Saito (1991) for some evidence from parasitic gaps.
46 Weak function words like *we* and *can* will be ignored here since they cannot form phonological phrases on their own.

(466)   *With the new technology, (we can quíckly melt góld)*

CPs are phases in syntactic structure, too. If they are spelled out in full after V and v★ are merged, then they may correspond to a phonological phrase in prosodic structure, as in (467). A sample pitch track can be viewed in Figure 3.15. Note that the verb spelled out on the next cycle can, but need not form a phonological phrase on its own, a fact to which I return below.[47]

(467)   a.   She [vP alleged [CP that her wallet had been stolen]]
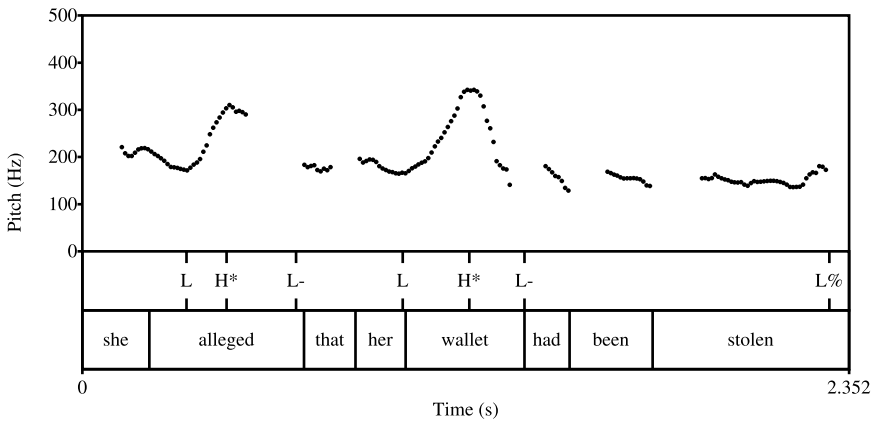   b.   (She alléged) (that her wállet had been stolen)

Figure 3.15: Separate phrasing of a clausal complement.

Non-defective infinitival clauses have a similar prosodic structure. According to Taglicht (1998), a phonological phrase boundary occurs after the verb in (468a) and (469a). In other words, the embedded CP corresponds to a phonological phrase.

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47 The alternative and more popular Spell-Out theory, in which the complement of a phase head is spelled out, would give us the wrong phrasing in this example, namely (ib) or (ic), given the clitic status of the complementiser and also the pronoun. It should be clear that the phonological phrase boundary after the verb cannot be derived by the end-based theory (i. e., ALIGN-XP), as there is no phrase edge after the verb.

(i)   She [vP alleged [CP that [TP her wallet had been stolen]]]
         a.   (She alléged) (that her wállet had been stolen)
         b.   ★(She alléged) (that) (her wállet had been stolen)
         c.   ★(She alléged that) (her wállet had been stolen)

(468)   a.   *(We intended) (for Mary to review the book)*
        b.   **(We intended) (Mary to review the book)* [51]

(469)   a.   *(We'd prefer) (for Mary to review the book)*
        b.   **(We'd prefer) (Mary to review the book)* [52]

Defective clauses prefer a phonological phrase boundary after the subject, as in (470a/c), which are also from Taglicht (1998). In ECM constructions the subject raises to some position within the matrix verb phrase (cf. Postal 1974; Bowers 1993; López 2001). The phrasing in these examples is due to alignment of the right edge of the embedded subject—which behaves like an object—with the right edge of a phonological phrase.

(470)   a.   *(We consider Mary) (to be an expert)* [45a]
        b.   **(We consider) (Mary to be an expert)* [45b]
        c.   *(She has proved the letter) (to be a forgery)* [46a]
        d.   **(She has proved) (the letter to be a forgery)* [46b]

The CP vs. TP categorial status of the embedded clause also has consequences for the direction of cliticisation of a pronominal subject. Taglicht's examples in (471) show that the pronoun can cliticise leftward onto the verb if it is the subject of a defective clause, but not if it is the subject of a finite clause. If the clause is finite, there is a phonological phrase boundary before the embedded subject, which prevents cliticisation to the left.

(471)   a.   *(I néver expécted it) (to bé so dífficult)*
        b.   **(I néver expécted it) (would bé so dífficult)* [FN 18, p. 199]
        c.   *(They consíder it) (ábsolutely vítal)* [101]
        d.   **(They consíder it) (is ábsolutely vítal)* [102]
        e.   **(Nó one expécted he) (would gét his job)* [103]
        f.   *(Nó one expécted him) (to gét his job)* [104]

The examples considered to this point demonstrate that the embedded clauses can be phrased separately, but what happens if spell-out of a matrix v*P phase linearises material to the left and right of an embedded CP? Consider the triadic construction (472) with a CP and a PP complement, which has the syntactic structure in (473). The CP is assembled separately in the syntax and merged with the verb before the matrix v*P phase eventually headed by *mentioned* is complete. If each phase corresponded to a phonological phrase, then the prosodic structure would be a recursive one, as in (474). In this representation one phonological phrase dominates another one.

(472)   a.   *What did you say about Mary?*
      b.   *She mentioned that her jeans were dirty to Bill.*

(473)

(474)
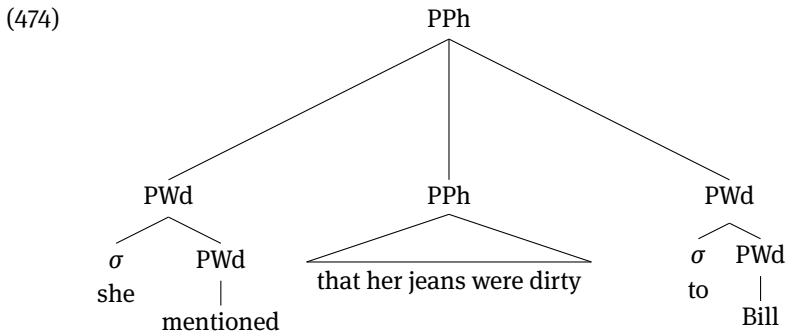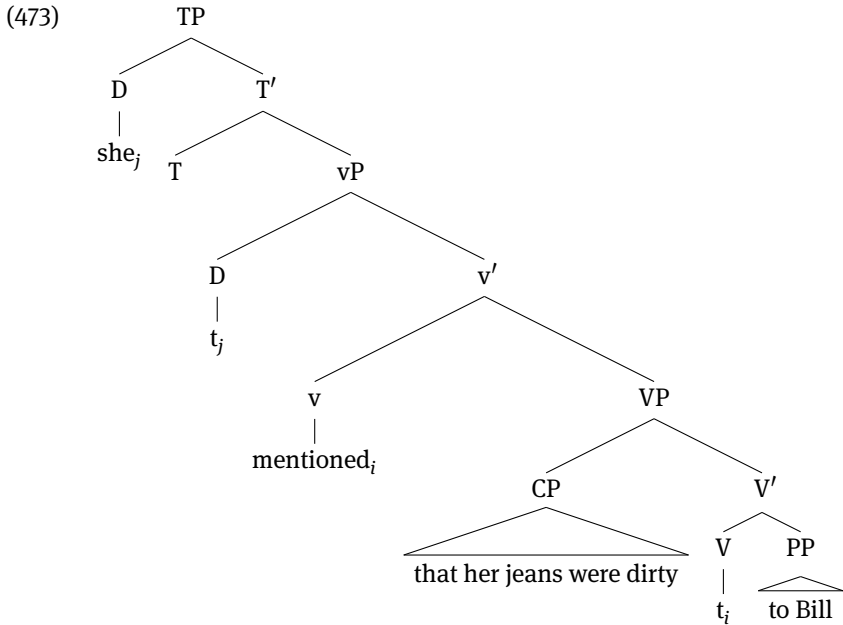
However, the PP complement is mapped to a separate phonological phrase and the verb only optionally so, as can be seen in Figure 3.16, which shows two different renditions recorded with two speakers. In the first pitch track, there is an L-boundary tone after the verb, but not in the second one, which exhibits two rising peak accents within one phonological phrase, i. e., the sequence LH⋆ LH⋆ L-.

(475)   a.   (She méntioned) (that her jéans were dirty) (to Bíll)
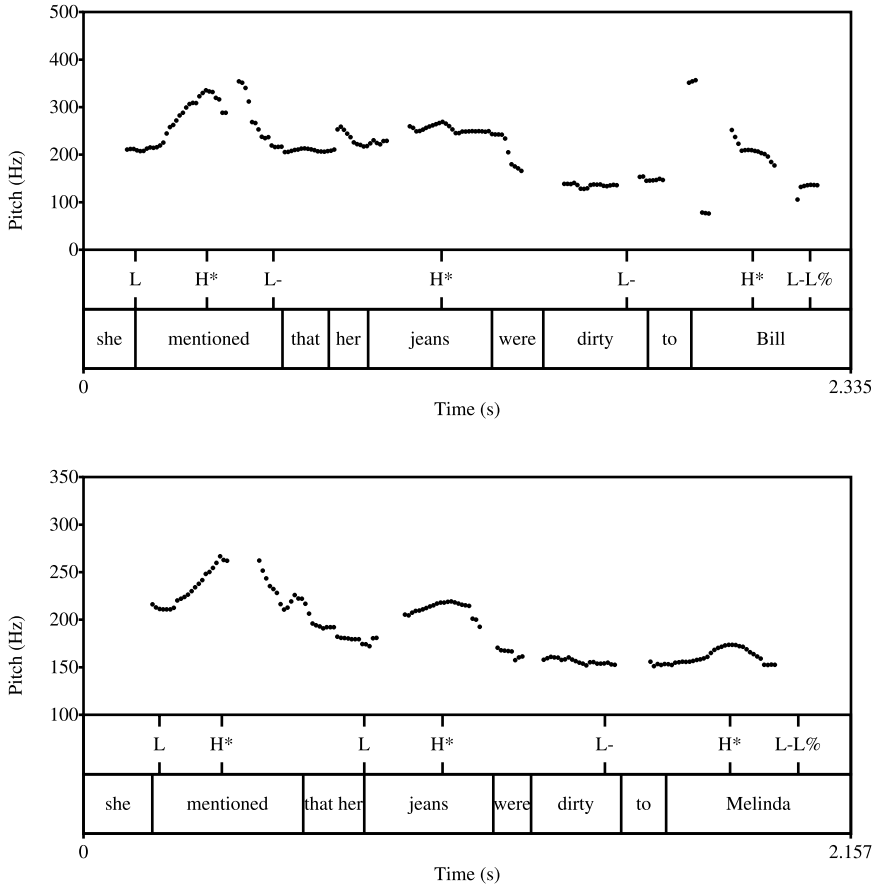   b.   (She méntioned that her jéans were dirty) (to Mélinda)

Figure 3.16: Renditions of non-extraposed clausal complements.

Example (475b) could be analysed as two phonological phrases that have been restructured into one. That is, the L- that marks the edge of a phonological phrase after an accented constituent may be deleted if the following accented constituent is associated with a rising peak accent, resulting in an (L+)H⋆ L+H⋆ tune. The examples from my production data that exhibit such a tune have subject-prominent embedded clauses (i. e., embedded thetic sentences). Cf. also:

(476)   *What did you say about Melinda?*

   a.   *(She cláimed that her wállet had been stolen)*

   b.   *(She alléged her wállet had been stolen)*

However, a restructuring analysis is probably wrong for a number of other cases. The reasons are the following: Firstly, not all verbs that select clausal complements can be mapped to separate phonological phrases. Normally, they are not, as the following recorded examples show. A sample pitch track for (479) can be viewed in Figure 3.17. Only a more emphatic rendition of the verb, with an L+H* tone, may result in a separate phonological phrase. In fact, the verbs here are not even the target of Stress-XP because the vP already contains a constituent with phrasal stress.

(477) a. *Did the prisoner protect his accomplices?*
       b. *Not really, (he revéaled where they were híding) (to his láwyer)*

(478) a. *What did the prisoner do when he was brought into the courtroom?*
       b. *(He decláred that he was ínnocent) (to the júdge)*

(479) a. *What happened in the Commons last week?*
       b. *(The Líberal Démocrats) (vóted for a bán on húnting to be imposed)*

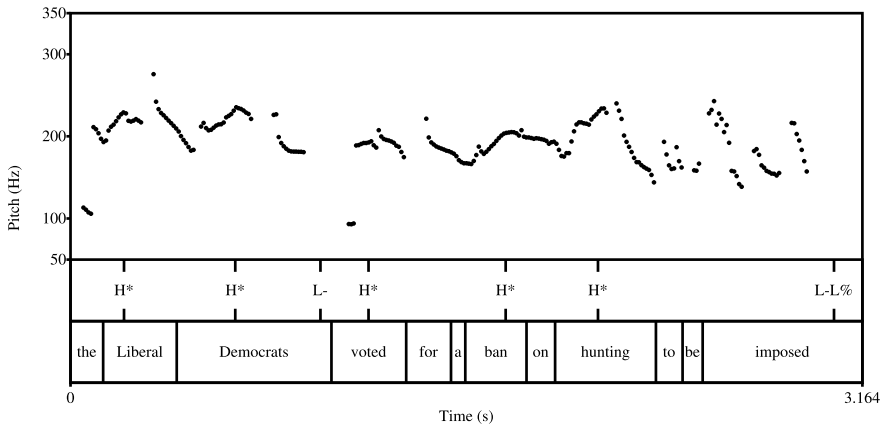**Figure 3.17:** Non-separate phrasing of an infinitival complement.

Secondly, short complex sentences like those in (480) are presumably never broken up into two phonological phrases.

(480) a. *He ásked who'll be thére.*
       b. *He sáid he'd léave.*

Last but not least, the verb can be grouped together with the subject if the subject consists of one prosodic word, as in (481). Grouping the verb with the subject in

this example satisfies BIN(PPH).[48]

(481)   *(Máry mentioned) (that her blóuse was dirty)*

The question is how to deal with these facts. The examples in which the result is the tune (L+)H⋆ L+H⋆, and the L- after H⋆ is deleted in anticipation of a prominent L+H⋆, could in principle be analysed as two phonological phrases.[49] But examples like (477), (478), (479) or (480) are problematic. The verb in these examples is simply forced into the phonological phrase defined by the clausal constituent. In (481), it simply contributes toward the well-formedness of the phonological phrase built around the subject.

     In section 3.2.2 we saw that successively larger phonological phrases can be formed without violating MAX(PPH) by recursively procliticising words to a core phonological phrase. In (482), the phonological phrase formed by *Japanese paintings* can be extended recursively by adding the numeral and also the verb. If a phonological phrase based on a (complex) object can be extended this way, a phonological phrase based on an embedded clause can also be extended by procliticising the verb, as in (483). The accent on the verb is then due to ALIGN(PPh,T⋆,L).

(482)   a.   *(Jápanese páintings)*
          b.   *(níneteen (Jápanese páintings))*
          c.   *(réproduced (níneteen (Jápanese páintings)))*

(483)   a.   *(he ásked (who'll be thére))*
          b.   *(vóted (for a bán on húnting to be imposed))*
          c.   *(she méntioned (that her jéans were dirty))*

In those cases in which the accent can shift to a secondarily stressed foot, it will, in order to satisfy ALIGN(PPh,T⋆,L), which prefers stress on the leftmost accentable syllable in the phonological phrase, and also to avoid a stress clash. However, if the verb is more emphatically accented, it can form a phonological phrase on its own, as in (484). A PP that contains phrasal stress will also form a phonological

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48 Cf. also the discussion of examples (364a) and (365) in section 3.2.2.2. One-word subjects can also be phrased together with an unergative verb, as in (i). They both carry phrasal stress, but it seems that, in this case, size constraints can outrank the interface constraints. A proper account of the phonological representation of subjects will be left to future research.

(i)   a.   *What's going on out there?*
        b.   *(Máry's shóuting).*

49 Cf. Gussenhoven (2004), who does not rely on phrase accents for the determination of phonological phrase boundaries.

phrase, as in (484b).

(484) a. *(She alléged) (that her wállet had been stolen)*
       b. *(She méntioned) (that her jéans were dirty) (to Bíll)*

This analysis can be extended to sentences containing relative clauses. Relative clauses are CPs and phases in the syntax. The examples to be discussed below contain unaccusative verbs of movement or passivised verbs, hence the main clause is one phase and the relative clause embedded in it is also a phase in the syntax. The same situation can be observed as in the examples discussed above, which contain CP complements. The relative clause corresponds to a phonological phrase and the material linearised to the right and left will form separate phrases if it can, e. g., if there are two prosodic words, as in (485).

(485) *I've never seen such an empty neighbourhood.*
       a. *Yeah, a lot of people who used to live here moved away.*
       b. (a lót of péople) (who úsed to líve here) (móved awáy)

Note that nouns like *people*, *man* and *things*, often resist accentuation (Kingdon 1958; Bolinger 1972, 1992). They are avoided in clefts and deaccented in the post-nuclear stretch. As such they also resist forming a phonological phrase on their own and only carry a default pitch accent when they occur at the left edge of a phonological phrase. In the examples (486) and (487), they are simply integrated into the phonological phrase formed by the relative clause, arguably in terms of a recursive phonological phrase. Two sample pitch tracks for (485) and (486) can be viewed in Figure 3.18.

(486) *I've never seen such a desolate place.*
       a. *Yeah, most people who used to live here have been evacuated.*
       b. (most péople (who úsed to líve here)) (have been evácuated)

(487) *What about Mary? Why is she so upset?*
       a. *A man she didn't know phoned her up.*
       b. (A mán (she dídn't knów)) (phoned her úp)

Finally, if a single noun modified by a relative clause is emphatically accented, like *diamond* and *bomb* in (488), it can be parsed into a separate phonological phrase.[50] Clearly, the situation is parallel to the V+CP cases discussed above. Sin-

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50 These examples stem from Bolinger (1992), but were recorded and analysed for this study. I return to them in chapter 4.
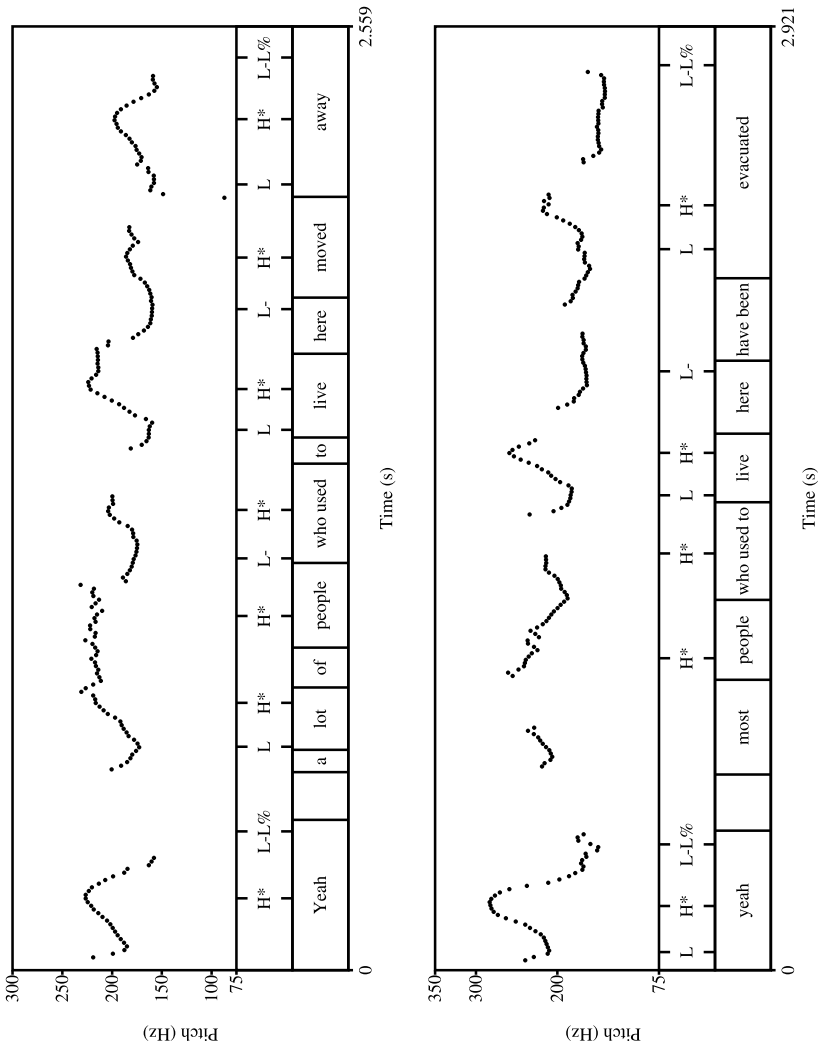
Figure 3.18: Relative clauses.

gle verbs and nouns resist forming phonological phrases on their own unless an emphatic accent is associated with them.

(488) *What caused all that ruckus?*

    a. *(A díamond) (that éverybody was lóoking for) was found.*

    b. *(A bómb) (that someone must have plánted somewhere) exploded.*

The examples discussed so far show that single words preceding clausal constituents are integrated into a recursive phonological phrase structure unless they are emphatic. If more than one prosodic word precede the clausal constituent they are phrased separately. I therefore propose that the size of a phonological phrase in English is not binary, as suggested by Selkirk (2000), but minimally binary, formulated as a constraint in (489).[51]

(489)   MɪɴBɪɴ(PPʜ): A phonological phrase contains at least two prosodic words.

I have also argued that for the analysis of sentences containing embedded complement or relative clauses, the constraint Wʀᴀᴘ-XP is not needed and makes wrong predictions for the phonological structure of such sentences. But Wʀᴀᴘ-XP was an important ingredient in the account of prosodic phrasing in section 3.2.2. In other words, another constraint is needed here which replaces Wʀᴀᴘ-XP and which interacts with size constraints as well as with Aʟɪɢɴ-XP. I propose to replace Wʀᴀᴘ-XP with Pʜᴀsᴇ=PPʜ in (490). A similar constraint has also been proposed by Ishihara (2007), An (2007), Göbbel (2007, 2013a), Dobashi (2006, 2009) and Revithiadou and Spyropoulous (2009).

(490)   Pʜ[ᴀsᴇ]=PPʜ
    a.   A Spell-Out Domain corresponds to a phonological phrase, or
    b.   Lexical terminals spelled out on a syntactic cycle form a phonological phrase if they have phrasal stress.

The disjunctive formulation of Pʜ=PPʜ allows two possibilities: Condition (a) says that a whole Spell-Out Domain (SOD) corresponds to a phonological phrase. This can be a whole embedded phase, which is a syntactic constituent, e. g., an embedded CP or a transitive v*P. Recall that I argued in section 1.2.3, following a proposal by Chomsky (2001), that what is spelled out is a full phase, namely v*P or unaccusative/passive CP. For example, sentences like (491) are spelled out in two cycles forming two phonological phrases. The v*P *visits Alabama* is a phase and is fully spelled out on the first cycle. When the CP phase is spelled out, only *John* will be transferred to PF. The second condition in (490) ensures that *John* forms a separate phonological phrase, as in (491b), if it has phrasal stress. This avoids a default recursive mapping like (491c), which might be appropriate if *John* does not carry phrasal stress. If the subject is contextually given, it can still be

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51 Minimal binarity is also employed by Selkirk (2011) for a number of languages, but she does not discuss English in that article.

associated with a default H* pitch accent due to the fact that it is at the left edge of a phonological phrase.

(491) a. [$_{CP}$ John [$_{vP}$ visits Alabama]]
      b. (JOHN) (visits ALABAMA)
      c. (Jóhn (visits ALABAMA))

The second clause of the constraint (490b) also captures the behaviour of the matrix verbs in (483). They are spelled out on a higher cycle, but do not form separate phonological phrases due to the lack of phrasal prominence. A recursive phonological phrase structure will therefore be formed.

Since PH=PPH replaces WRAP-XP, it will be tied with ALIGN-XP in a relation of free-ranking, deriving the optionality in prosodic phrasing discussed in sections 3.2.2.2 and 3.2.2.3. As shown in (492), PH=PPH tries to preserve the correspondence between a v*P phase and a phonological phrase, while ALIGN-XP requires a phonological phrase boundary to be inserted after the object. As will be discussed in section 4.3.1, the correspondence between phases and phonological phrases has interesting consequences for extraposition.

(492) a. *(She lóaned her róllerblades to Róbin)*   PH=PPH ≫ ALIGN-XP
      b. *(She lóaned her róllerblades) (to Róbin)*   ALIGN-XP ≫ PH=PPH

3.3.3 Final analysis of phonological phrasing

The results of my discussion on prosodic phrasing are summarised in this subsection mainly in tableau format. The tableaux in Figure 3.19 show the evaluation of Selkirk's (2000) ''rollerblade'' example, which requires no further comments. PH-PPH has the same empirical effect as WRAP-XP in the original analysis. Furthermore, MINBIN(PPH) replaces BIN(PPH).

The tableaux in Figure 3.20 show the analysis of more complex vPs which exceed the maximal number of words permissible per phonological phrase uttered at a normal speech rate. Here again PH-PPH has the same empirical effect as WRAP-XP, but this is only due to the fact that the vP is a phase in the syntax. In the first tableau MINBIN(PPH) decides where the internal phrase boundary is inserted, whereas in the second tableau ALIGN-XP decides. Ranking ALIGN-XP higher or lower than PH-PPH does not make any difference here. This is the reason why the two constraints are represented as same-ranked.

Next I provide an analysis of examples like (493), which represent the phrasing possibilities of relatives.

she loaned her rollerblades to Robin	Align-XP	Ph=PPh	MinBin
(she loaned her rollerblades to Robin) a.	*!		
☞ (she loaned her rollerblades) (to Robin) b.		*	*
(she loaned) (her rollerblades) (to Robin) c.		*	**!*
(she loaned) (her rollerblades to Robin) d.	*!	*	*

she loaned her rollerblades to Robin	Ph=PPh	Align-XP	MinBin
☞ (she loaned her rollerblades to Robin) a.		*	
(she loaned her rollerblades) (to Robin) b.	*!		*
(she loaned) (her rollerblades) (to Robin) c.	*!		***
(she loaned) (her rollerblades to Robin) d.	*!	*	*

Figure 3.19: Free ranking of Align-XP and Ph=PPh.

she never completed her work on Miller	Max(PPh)	Align-XP	Ph=PPh	Bin(PPh)
(she never completed her work on Miller) a.	*!			*
(she never) (completed her work on Miller) b.			*	*!*
☞ (she never completed) (her work on Miller) c.			*	
(she never completed her work) (on Miller) d.			*	*!*

we invariably treat guests with champagne	Max(PPh)	Align-XP	Ph=PPh	Bin(PPh)
(we invariably treat guests to champagne) a.	*!	*		*
☞ (we invariably treat guests) (to champagne) b.			*	**
(we invariably treat) (guests to champagne) c.		*	*	

Figure 3.20: More complex verb phrases.

(493)   a.   (a man (who I've never seen before))
        b.   (a lot of people) (who used to live here)

The difference in phrasing between (493a) and (493b) can be captured if Ph=PPh is ranked higher than MinBin(PPh) and NonRec$_{PPh}$ is lowest in rank. Such a ranking allows a recursive phonological phrase structure to be formed if only one word precedes the CP. In order to prevent such a single word from being left unparsed at the level of the phonological phrase, Exh$_{PPh}$ has to be ranked higher than NonRec$_{PPh}$. The two tableaux in Figure 3.21 evaluate these two examples. Ph=PPh is violated by candidate (a) in both tableaux because the relative does not form a separate phonological phrase. MinBin(PPh) rules out candidate (c) in the first tableau, while NonRec$_{PPh}$ rules out a phonological phrase to which two prosodic words are procliticised, as in candidate (b) in the second tableau (a separate phonological phrase being preferred in this case, i. e., candidate [c]).

a man who I've never seen before	Ph=PPh	MinBin	Exh	NonRec
(a man who I've never seen before) a.	*!			
☞ (a man (who I've never seen before)) b.				*
(a man) (who I've never seen before) c.		*!		
[{a man}$_{PWd}$ (who I've never seen before)]$_{IP}$ d.			*!	

| a lot of people who used to live here	Ph=PPh	MinBin	Exh	NonRec
(a lot of people who used to live here) a.	*!			
(a lot of people (who used to live here)) b.				*!
☞ (a lot of people) (who used to live here) c.				
[{a lot}$_{PWd}$ {of people}$_{PWd}$ (who used to live here)]$_{IP}$ d.			*!*	

Figure 3.21: Phrasing possibilities for relatives.

Candidate (d) in both tableaux contains one or two unparsed words, respectively, at the phonological phrase level. This candidate is excluded by Exh$_{PPh}$.

A final question concerns the representation of deaccented constituents at the right edge of an embedded clause. The adverbial in (494), for example, resists accentuation, while the string *I've no idea* can be mapped to a separate phonological phrase. The deaccented prosodic word is either directly dominated by the intonational phrase or a recursive phonological phrase is formed. The two prosodic structures are represented in (495). In any case, there is a phonological phrase boundary after *rain*, which is also enforced by the coincidence of two additional XP edges (the nP headed by *idea* and vP headed by *rain*). If the deaccented prosodic word is dominated by an intonational phrase, it violates Exh at the level of the phonological phrase, due to the fact that parsing has failed at that level. If a recursive structure is formed, it violates NonRec at the level of the phonological phrase. The analyisis so far predicts the correct structure to be (495b) since Exh$_{PPh}$ dominates NonRec$_{PPh}$. I will return to this issue in section 4.3.2.

(494)   *I've nó idéa when it will ráin at the moment*

(495)   a.

b.

```
                              IP
                 ┌────────────┴────────────┐
               PPh                        PPh
              ╱ ╲                    ┌─────┴─────┐
        I've nó idéa               PPh          PWd
                                  ╱ ╲           ╱ ╲
                          when it will ráin   at the moment
```
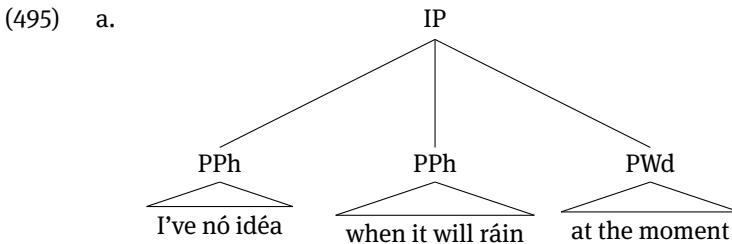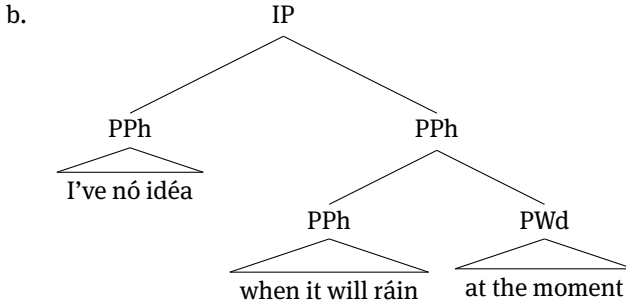
This section ends the discussion of phonological phrasing in English. Extensive use of recursive phonological phrases has been made and I hope that some aspects of the analysis can be refined in the future. Particularly size constraints are not fully understood nor properly investigated to this day. While there is agreement that binarity of prosodic constituency plays a pervasive role, particularly in at the level of foot structure, the same can hardly be said about its role in phonological phrasing. This is so because many more factors contribute to the well-formedness of such phrases. The analysis developed so far will however serve its purpose and form the background for my account of prosodically conditioned extraposition in chapters 4 and 5.

3.4 Conclusion

This chapter has discussed in considerable detail phonological phrasing and prosodic prominence in neutral as well as informationally structured sentences. The discussion has demonstrated that the phonology requires access to syntactic structure and that syntactic phases can be usefully exploited in an account of phonological phrasing. Instead of recapitulating the main points of this chapter in this concluding section, I am going to address potential objections concerning certain details of my analysis.

The final analysis allows for a certain amount of recursion in phonological phrasing, but as it stands it cannot capture all the data that we have encountered. Particularly recursion within DPs (496) is not captured (cf. section 3.2.2.2). Only the constraint PH=PPH introduces a left-edge phonological phrase boundary, all other left boundaries are due to Exh$_{PPh}$. Admittedly, this is a shortcoming of my approach, but do alternative approaches fare any better?

(496)   (he réproduced (níneteen (Jápanese páintings)))

A reasonable alternative is to also allow left alignment of syntactic phrases with phonological phrases. Right and left alignment of syntactic constituents with prosodic constituents can be found in Gussenhoven (2005) and Féry (2016), while Selkirk (2011) develops a correspondence-theoretical approach (McCarthy and Prince 1995) for the syntax-phonology interface. I will concentrate on the latter here, which is known as *Match Theory*. The correspondence constraints are the following:

(497)   Match(α,π) [= S-P faithfulness]
        The left and right edges of a constituent of type α in the input syntactic representation must correspond to the left and right edges of a constituent of type π in the output phonological representation.

(498)   Match(π,α) [= P-S faithfulness]
        The left and right edges of a constituent of type π in the output phonological representation must correspond to the left and right edges of a constituent of type α in the input syntactic representation. (Selkirk 2011: 451)

Most Relevant here is syntax-phonology faithfulness (497). Lexical categories like vP, nP and embedded CP correspond to phonological phrases, while root clauses to intonational phrases. In order to deal with (496), NumP must also be counted for the correspondence. MɪɴBɪɴ, applied to the minimal, most embedded phonological phrase, will give the right result in (499c). I ignore the clitical pronoun here.

(499)   a.   [$_{TP}$ he [$_{vP}$ reproduced [$_{NumP}$ nineteen [$_{nP}$ Japanese [$_{nP}$ paintings]]]]]
        b.   he (réproduced (níneteen (Jápanese (páintings))))
        c.   he (réproduced (níneteen (Jápanese páintings))) √

Adding a complement to the verb already complicates the prosodic structure beyond provability. Particularly vP in (500a), headed by *reproduced*, corresponds to one big phonological phrase, which contains two other recursive phonological phrases (500b). MɪɴBɪɴ can restructure the second and, if we also integrate the clitics, we get (500c). I am not aware of any phonological processes that could provide evidence for this prosodic structure, instead of the one in (500d), in which an intonational phrase contains two phonological phrases.

(500)   a.   [$_{TP}$ he [$_{vP}$ reproduced$_i$ [$_{NumP}$ nineteen [$_{nP}$ Japanese [$_{nP}$ paintings]]]
             [$_{vP}$ t$_i$ [$_{PP}$ for [$_{DP}$ a [$_{nP}$ museum [$_{PP}$ in [$_{nP}$ Montana]]]]]]]]
        b.   he (réproduced (níneteen (Jápanese páintings)) for a (muséum in
             (Montána)))

    c.   (he réproduced (níneteen (Jápanese páintings)) (for a muséum in
        Montána))

    d.   [$_{IP}$ (he réproduced (níneteen (Jápanese páintings))) (for a muséum
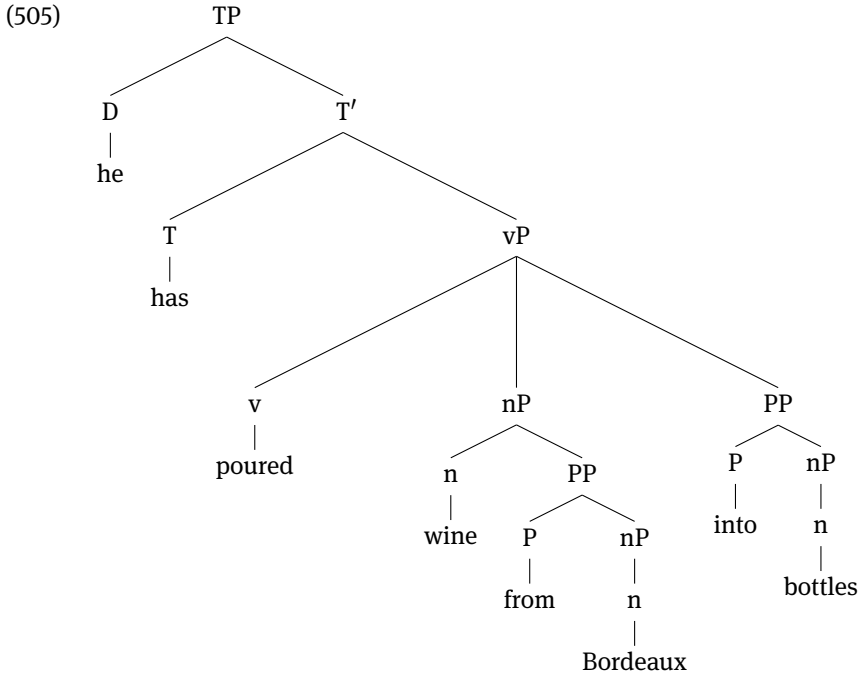   in Montána)]

Turning to relative clauses, Match Theory will generate the expected recursive
phonological structure in (501b), but (502c) is problematic. The observed right
boundary after *people*, which depends on the number of words preceding the rel-
ative, is not predicted.

(501)   a.   [$_{DP}$ a [$_{nP}$ man [$_{CP}$ who I've never seen before]]]
        b.   (a man (who I've never seen before))

(502)   a.   [$_{DP}$ a [$_{nP}$ lot of [$_{nP}$ people [$_{CP}$ who used to live here]]]]
        b.   (a lot (of people (who used to live here)))

Last but not least, the optional phrasing in triadic structures, nicely captured by
Selkirk (2000), is also lost. The generated prosodic structure is (503b), with an
obligatory phonological phrase boundary after the direct object. As far as I can
see, the only advantage here is that Stress-XP is not needed if phrasal stress is
simply due to head alignment, i. e., Align H-PPh. Needless to say, Match The-
ory has to be considerably refined and the evidence for more extensive recur-
sion, at least in English, has to be provided. At the moment, I don't see any ad-
vantages over the approach developed in this chapter, which, admittedly, only
amends Selkirk's end-based theory.

(503)   a.   she [$_{vP}$ loaned$_i$ [$_{DP}$ her [$_{nP}$ rollerblades]] [$_{VP}$ t$_i$ [$_{PP}$ to [$_{nP}$ Robin]]]]
        b.   (she loaned (her rollerblades) (to Robin))

The most objectionable aspect in my analysis of the syntax-phonology correspon-
dence is the introduction of PF representations, which are syntactic trees from
which empty categories and projections of empty categories have been pruned.
Consider the PF representation of (504) in (505). It takes into account head-
movement that has occurred in the syntax (i. e., N-to-n and V-to-v). In accord with
Truckenbrodt's Lexical Category Condition, the traces of N and V as well as their
projections (NP and VP) have been eliminated. Such a tree contains all the infor-
mation that the phonology needs for the application of the interface constraints.
Although the interface constraints do not refer to functional categories, these
must be represented and are normally incorporated into adjacent words to the
right or left, depending on the prosodic properties of the clitic in question and
language-specific constraints on cliticisation.

(504)   *He has poured wine from Bordeaux into bottles.*

(505)

```
                         TP
                    ┌─────┴─────┐
                    D           T′
                    │      ┌─────┴─────────┐
                    he     T               vP
                    │   ┌──┴────────────────┬──────────────┐
                   has  v               nP               PP
                    │            ┌───────┴────┐        ┌───┴───┐
                  poured         n           PP        P       nP
                                 │       ┌───┴───┐     │       │
                               wine      P       nP   into     n
                                         │       │            │
                                       from      n          bottles
                                                 │
                                             Bordeaux
```

PF representations are virtually necessary if a Minimalist phase-based model is assumed, as I do here. As argued in section 1.2.2, in Minimalist Syntax it is now standardly assumed since Chomsky (1995) that the syntax encodes only hierarchical relations and linearisation occurs when a syntactic object is transferred to the PF component. Under current assumptions the hierarchical information would be lost and with it the information about phrasal boundaries. Also lost would be the distinction between heads and maximal projections. If example (504) were just a string of linearised terminals and the phonology could only distinguish lexical categories from functional categories, then there would be no way to decide where to insert a phonological phrase boundary. It could be inserted after *poured*, *wine* or *Bordeaux*, deriving unacceptable phrasings like (506a) or (506b). MɪɴBɪɴ(PPʜ) would then decide in favour of the unacceptable (506b). What this amounts to is that Aʟɪɢɴ-XP, which derives (506c), would have to be given up. The constraint Pʜ=PPʜ could be maintained, but it cannot handle the data alone.[52]

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[52] Ambiguous sentences in which a PP modifies a verb or its object are also a problem because phonological phrasing is highly sensitive to the attachment site of the PP (cf. Price et al. 1991a, 1991b; Schafer 1997; Hirschberg 2004, among many others). Even worse would be to include

(506) a. **(He's poured) (wine from Bordeaux into bottles)*
     b. **(He's poured wine) (from Bordeaux into bottles)*
     c. *(He's poured wine from Bordeaux) (into bottles)* √

What reasonable alternatives are there to PF representations? One possibility is a more articulated Spell-Out procedure, for example the one developed by López (2010) in a discussion of defocused material in English and Catalan. López argues that phrasal stress assignment in English, which is sensitive to syntax, occurs before the construction of prosodic structure and linearisation. In Catalan, stress-assignment, which is claimed to be sensitive to linear order only, occurs after prosodic structure has been built and linearisation has occurred. Prosodic structure building and linearisation in his model proceed in parallel, because the former must also have access to the syntax (cf. also López 2009). The consequence for Catalan is that this language is oblivious to givenness, defocused constituents being accented at the right edge of an intonational phrase, as in the example (507), answering a context question like: Mary drove her blue convertible. What did John drive?

(507) *Va   conduir   [_F un sedan BLAU].*
      PAST drive.INF   a   sedan blue
      'He drove a blue SEDAN.'

While López employs an analysis inspired by Optimality Theory in which constraints similar to STRESS-XP and D-GIVEN are operable in English, such an approach is not readily compatible with standard Optimality Theory, where all constraints apply in parallel in the evaluation of a candidate set generated from one single input. While there is nothing intrinsic to Optimality Theory that prevents ordering of evaluations, it has rarely been pursued in the phonological literature.[53] Without going into the details of his analysis, let me consider the consequences of such an approach. Ordering stress assignment before phonological phrasing is the same thing as saying that the constraints in set A below do not interact with the constraints in set B. They do not conflict with each other, nor can the stress-assignment constraints be subsumed under or derived from the constraints

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something like the Sense Unit Condition (Selkirk 1984), long since abandoned by Selkirk herself, which actually requires the phonology to accesses the semantic component.

53 One notable exception is Stratal Optimality Theory, which recasts the level-analysis of Lexical Phonology within an optimality-theoretic framework (cf. Kiparsky 2000; Bermúdez-Otero 2018). However, the strata or levels are defined differently, essentially over distinct morphosyntactic objects, like root, stem and word. The correspondence with the syntax is one single stratum, namely, the postlexical level of Lexical Phonology.

that are responsible for phonological phrasing (e. g., STRESS-XP cannot be derived from ALIGN-XP, cf. Truckenbrodt 2007). Consequently, they can all apply at the same time. It does not make any difference for the English data.

(508)   Constraint set A: STRESS-XP, D-GIVEN
         Constraint set B: ALIGN-XP, PH-PPH/WRAP-XP

Catalan stress assignment also need not be ordered if it is properly formulated: right-edge prominence in prosodic constituents follows from high-ranked head-alignment constraints in this language (i. e., ALIGN H-PPH and ALIGN H-IP), which are phonological well-formedness constraints ranked higher than D-GIVEN in this language.

   What does it mean, in a model like López's, that linearisation and construction of prosodic structure occurs at the same time? It means that prosodic constituents are built incrementally. Once two terminals are linearised, the grammar must start building a phonological phrase, which will be closed with a left-boundary when it gets an instruction that another terminal must be aligned with a phonological phrase boundary. Reference to syntax is formalised as instructions by the syntax that a new phrase will be linearised. Constraints kick in when a decision has to be made. Such a procedure, however, has the disadvantage that phonological well-formedness constraints (e. g., size constraints) must reevaluate the whole outcome once an initial prosodic structure has been built. Such an approach is not in the spirit of Optimality Theory, even if both phonological well-formedness constraints and interface constraints are employed.

   I don't see any advantage over a standard optimality-theoretic approach, where the generator provides us with a set of candidates that are evaluated against the whole constraint hierarchy. Reference to syntax in my approach is guaranteed by having an impoverished syntactic structure (i. e., a PF representation) available after linearisation. Such a structure is forced upon me by the choice of the two frameworks: the Minimalist Program for syntax and OT for the phonology. Maybe in other syntactic frameworks like Head-driven Phrase Structure Grammar or Lexical Functional Grammar, PF representations would not be needed, if phonological constraints can access the syntactic structure directly. However, chapter 2 shows that the phase-based model of the syntax adopted here allows me to solve a recalcitrant problem posed by extraposition from NP. Besides overt and covert syntactic movement a third type of movement can be established, namely post-syntactic or PF movement. The difference between overt syntactic movement and PF movement is that the semantic component is only fed by the former. PF movement is the type of movement that has no semantic consequences.

4 Phonological solutions

4.1 Preliminary remarks

I argued in chapter 2 that extraposition from NP is not a syntactic operation, but should be delegated to PF. If movement occurs at PF, it is expected that phonological constraints play a crucial role as triggers for this operation. Such constraints can be (i) interface constraints, which are responsible for the correspondence between syntactic structure and phonological structure, and (ii) constraints that are responsible for well-formed phonological representations. Consequently, two central question to be dealt with are the following:

A: How can PF movement be modelled?
B: What kind of phonological constraints play a role in extraposition constructions?

In section 4.2, I present a model of PF movement which is inspired by Selkirk (2001) and Vogel (2006) and which is embedded in an optimality-theoretic framework. Extraposition constructions are taken to be alternative PF representations, made available by the generator. Such an approach allows parallel evaluation of different candidates with different prosodic structures. The phonological constraints that play a role in extraposition constructions can only be established if the phonological representation of the canonical order is compared to that of the scrambled order. The guiding methodological question underlying this whole enterprise is therefore: What improves from the phonological perspective if rightward movement occurs? The following cases will be discussed and analysed:

A: extraposition of PPs and relative clauses across accented constituents
B: extraposition of PPs and relative clauses across deaccented constituents

Both extraposition from object and subject will be considered. The following examples illustrate the four cases just mentioned.

(509)   a.   *You'll find a revíew of Túrner in your ín-tray.*
        b.   *You'll find a revíew in your ín-tray of Túrner.*

(510)   a.   *A mán from Índia walked in today.*
        b.   *A mán walked in today from Índia.*

(511)   a.   *A mán who we knew from Róme wálked into the bár on Mónday.*
           b.   *A mán walked into the bár on Mónday who we knéw from Róme.*

(512)   a.   *I recéived some létters that are of ínterest this morning.*
           b.   *I recéived some létters this morning that are of ínterest.*

The main part of this chapter, section 4.3, will discuss the role different interface and phonological well-formedness constraints play in these constructions in order to provide solutions for the possibility and also for the optionality of extraposition. It will be shown that extraposition leads to a number of optimisations on the phonological side. For example, deaccented and deictic elements at the right edge typically violate constraints related to the Strict Layer Hypothesis. They also violate constraints that account for the right-headedness of prosodic constituents in English. However, this language also has means to avoid such violations. If it did not, extraposition would be obligatory, as it frequently is for German complement clauses (cf. Hartmann 2013). The main result of this chapter is that the interface constraints Align-XP and Ph=PPh, linked in a relation of free ranking, are responsible for the optionality of extraposition. In other words, these two constraints, which are responsible for optional phonological phrasing (cf. sections 3.2.2.3 and 3.3.3), are also responsible for optional extraposition.
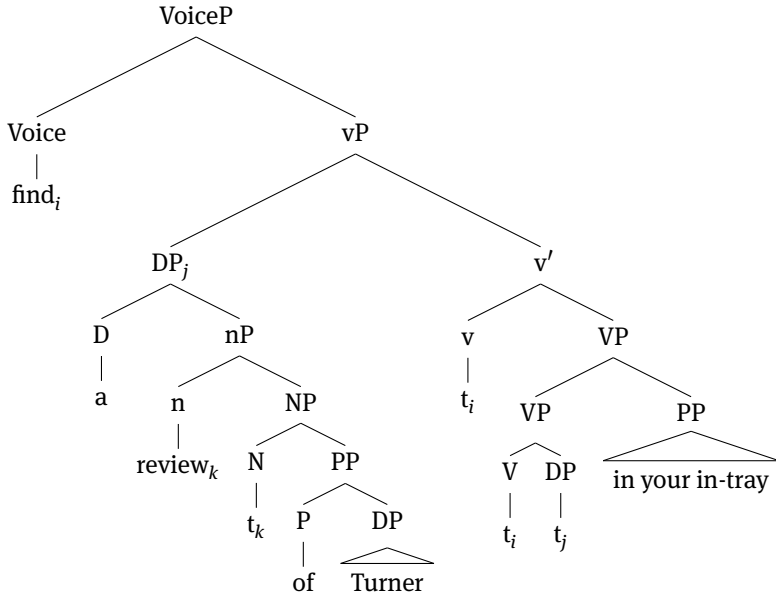
4.2 Modelling PF movement

In this section I present a model of PF movement embedded within the framework of Optimality Theory, which was initially proposed in an unpublished manuscript by Selkirk (Selkirk 2001) and, as far as I can tell, independently by Vogel (2006). Selkirk's manuscript deals with heavy NP shift, while Vogel's paper is concerned with leftward movement of weak pronouns in a number of Germanic languages.

    Recall from chapters 1 and 3 that syntactic structures are transferred to PF in terms of chunks, called phases. I argued there that Spell-Out does not only linearise syntactic terminals, but also creates PF representations, which are essentially impoverished syntactic structures, from which empty categories and copies of moved constituents as well as their projections have been pruned. Such representations contain necessary and sufficient syntactic information for the interface constraints to apply to. For example, the syntactic structure of a verb phrase is (514) and its PF representation is (515).[1]
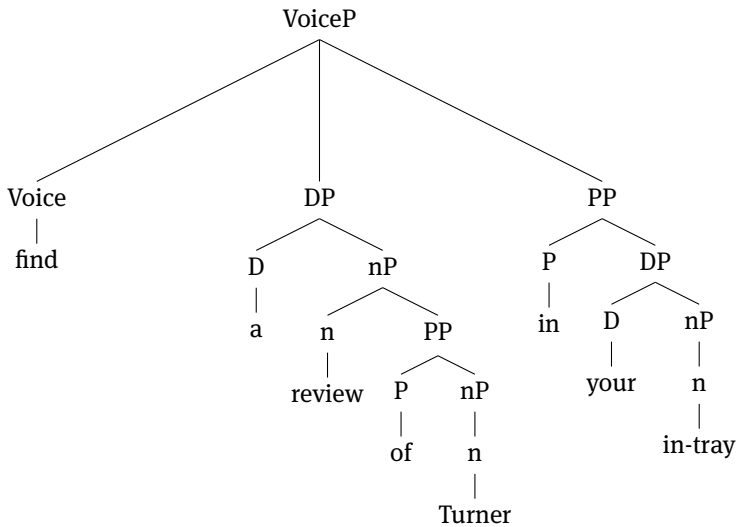
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1 The subject trace is ignored here. Cf. section 3.2.3.1 for this more articulated structure of the verb phrase. I also argued there that VP adverbials can be low (i. e., adjoined to VP), which has

(513)   *You'll find a review of Turner in your in-tray.*

(514)

```
                          VoiceP
                         /      \
                   Voice          vP
                     |           /  \
                  find_i      DP_j    v′
                             /   \   /  \
                            D    nP  v    VP
                            |   /  \  |  /   \
                            a  n    NP t_i VP    PP
                               |   /  \    / \   /  \
                         review_k N   PP  V  DP in your in-tray
                                  |  /  \  |   |
                                 t_k P   DP t_i t_j
                                    |   / \
                                   of  Turner
```

(515)

```
                              VoiceP
                          /      |       \
                    Voice       DP        PP
                      |        /  \       /  \
                    find      D   nP     P    DP
                              |  /  \    |   /  \
                              a n    PP  in  D   nP
                                |   /  \      |   |
                             review P  nP   your  n
                                    |   |        |
                                    of  n      in-tray
                                        |
                                      Turner
```
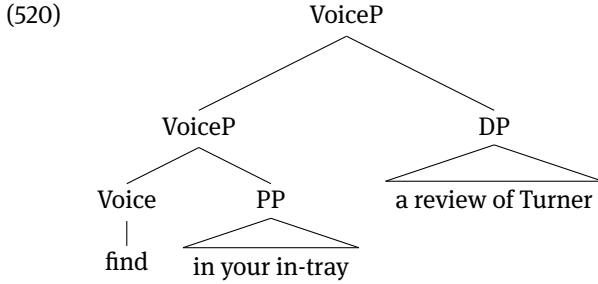
consequences for phrasal stress assignment and also phonological phrasing. For example, a verb plus PP adjunct sequence may have phrasal stress on the adjunct only and they can form one phonological phrase.

Essentially following Selkirk (2001) and Vogel (2006), I assume that the generator takes as input such impoverished syntactic structures and generates a set of candidates, consisting of pairs of PF representations and prosodic structures. The output of the generator are therefore prosodic structures associated with canonical word order, prosodic structures associated with extraposition from NP and prosodic structures associated with a heavy NP shift configuration. The distinct PF representations these prosodic structures are paired with are also made available by the generator. Hence, the prosodic structures in (516) are paired with the PF representation spelled out by the syntax, the one in (515). The prosodic structures in (517) are paired with a PF representation in which the PP *of Turner* is adjoined to VoiceP, namely the structure in (519). And heavy NP shift in (518) presumably has the PF representation in (520). The evaluator will then select the optimal candidates.[2]
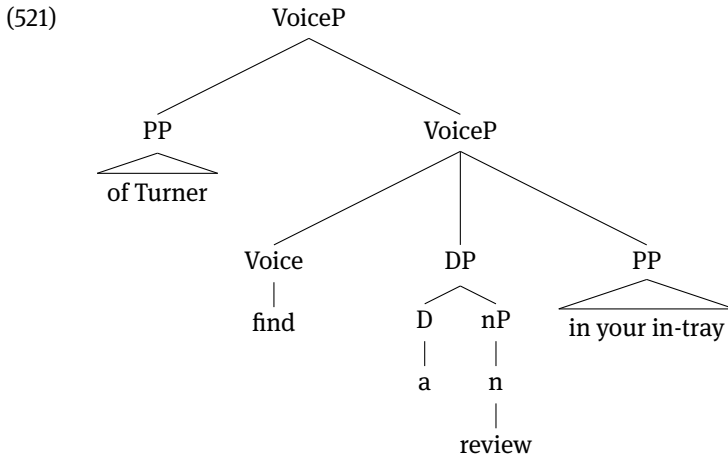
(516)   a.   *(You'll find a review of Túrner in your ín-tray)*
          b.   *(You'll find a review of Túrner) (in your ín-tray)* √
          c.   *(You'll find) (a review of Túrner) (in your ín-tray)*

(517)   a.   *(You'll find a review in your ín-tray) (of Túrner)* √
          b.   *(You'll find a review) (in your ín-tray) (of Túrner)*

(518)   a.   *(You'll find in your ín-tray) (a réview of Túrner)* √
          b.   *(You'll find) (in your ín-tray) (a réview of Túrner)*

(519)

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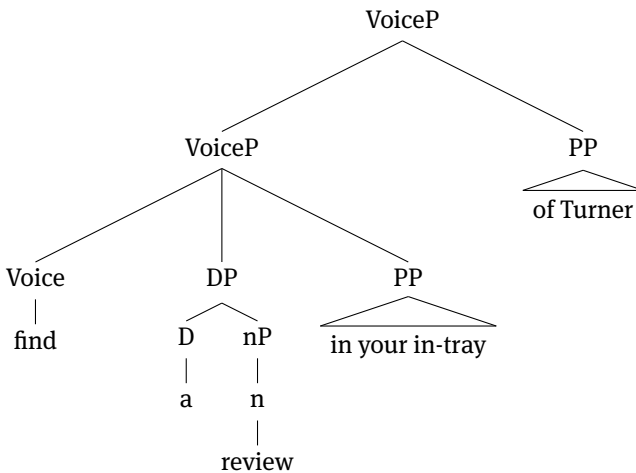
2 As for heavy NP shift, Selkirk (2001) argues that it should be generated on the PF branch of the grammar. However, it is far from obvious that this holds for all instances of heavy NP shift.

(520)

```
                        VoiceP
                  ┌───────┴────────┐
              VoiceP               DP
           ┌────┴────┐          ┌───┴──────┐
         Voice      PP      a review of Turner
          │      ┌───┴───┐
        find   in your in-tray
```

One crucial but non-trivial question is how to ensure that PF movement is to the right in English, and not to the left. In other words, what excludes candidates like the following?

(521)

```
                           VoiceP
                     ┌────────┴──────────┐
                    PP                 VoiceP
                 ┌───┴───┐      ┌─────────┼──────────┐
              of Turner      Voice       DP          PP
                              │       ┌───┴──┐    ┌───┴────┐
                            find      D     nP  in your in-tray
                                      │      │
                                      a      n
                                             │
                                          review
```

I assume that extraposed constituents are subject to the constraints that are responsible for the linearisation of adjuncts in a language (cf. section 1.2.4), namely:

(522) a. ADJUNCT-L: The right edges of adjuncts are aligned with the left edges of XPs
       b. ADJUNCT-R: The left edges of adjuncts are aligned with the right edges of XPs

This account relies on the fact that the PF representations resulting from extraposition are essentially adjunction structures. Regardless of whether the extraposed constituent is an adjunct or complement, it will be a sister of a maximal projection and subject to the constrains ADJUNCT-L or ADJUNCT-R. In English, all adverbials (NP, PP, CP) are linearised to the right of their sister constituent. Left-edge position of such constituents can only be derived by merger in a specifier position or

by syntactic movement.[3] Syntactic movement targets specifiers and specifiers are linearised to the left. Therefore, adjectives and adverbs, excepting VP adverbs and some predicative adjectives within DP, can only be linearised to the left and are not found in extraposed position. It also follows that topicalisation in English and other leftward movement operations are not cases of PF movement.

If the directionality of extraposition is constrained by the adjunct linearisation constraints, then the generator can generate any number of candidates, including candidates like (521) in English. But it is subject to ADJUNCT-R and simply cannot be pronounced in front of the extended verb phrase.

Looking beyond English, strict SOV languages like Japanese do not have extraposition to the right, only to the left. An example of clausal complement extraposition is given in (523) and in (524) a possesor DP has been extraposed from a DP complement. But in this language all adjuncts are linearised to the left and if extraposition results in an adjunction structure, then the extraposed clause can only be linearised to the left.

(523)   *[Kinoo   John-ga kekkonsi-ta to] Mary-ga it-ta*.
        Yesterday John   married   that Mary   said
        'Mary said that yesterday John got married.
        (Hawkins 1990: 231)

(524)   *[Tanaka sensei-no], tabun   kore-ga   [saigo-no choso-ni]*
        Tanaka Prof.-GEN probably this-NOM last-GEN book-DAT
        naru   darô.
        become-PRES it seems
        'It seems that this will probably become Prof. Tanaka's last book.'
        (Yatabe 1996: 304)

In mixed languages like German and Dutch, extraposition to the right is very productive (525). But these languages do not prohibit linearisation of adjuncts to the right. The adverbial in (526) can be pronounced at the left or right edge of its VP sister, hence extraposition to the right is not excluded.[4,5]

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3 For example, sentence adverbials in clause initial position are presumably merged in the specifier of a TopP. There is no evidence that they are moved in the syntax. VP adverbials, however, do move in the syntax if they occur sentence initially (cf. Frey 2003).

4 Cf. Wagner (2005) for the prosodic properties of right linearised adverbials and for arguments that they are fully integrated in the syntactic structure.

5 An alternative to the directionality of extraposition sketched here is that it is determined by the directionality of prosodic alignment. English has right-alignment, but SOV languages like German, Dutch, Tohono O'odham (Hale and Selkirk 1987) also have right-alignment and extra-

(525) *Ich habe ein Buch gekauft über   Isaac Newton.*
      I   have a   book bought about Isaac Newton
      'I've bought a book about Isaac Newton

(526) *Ich habe (in Isaacs Garten) [*$_{VP}$* ein Buch gelesen] (in Isaacs Garten)*
      I   have (in Isaac's garden)   a   book read   (in Isaac's garden)
      'I've read a book in Isaac's garden.'

What then are the advantages of such a model? In this model, PF movement is conceived of as alternative PF representations, which are crucially paired with prosodic structures, both made available by the generator. Some of them will be chosen as optimal candidates by the interface and phonological well-formedness constraints.

   An obvious advantage of this model is that it does not commit one to an interaction of genuine syntactic conditions on movement operations (e. g., the (generalised) EPP property) with phonological constraints, as has been pursued, for example, by Samek-Lodovici (2005) and Dehé (2005). A grammar which allows syntactic constraints to interact directly with phonological constraints is not a modular grammar. A grammar which orders syntactic constraints before phonological constrains is modular. The approach taken here is standard in the sense that I adhere to a modular conception of the grammar, without embracing an optimality-theoretic approach to the syntax. Nothing forces me to do so. However, it incorporates Selkirk's and Vogel's proposal that aspects of word order can be evaluated on the PF branch, thereby capturing phonological effects on word order. Reordering constituents on the PF branch by allowing the generator to generate pairs of PF representations and prosodic structures which are then evaluated against a set of ranked interface and prosodic well-formedness constraints seems to me an elegant approach to post-syntactic movement. Such movement has no effect on the interpretation of the sentence. It is invisible to the semantic component.

4.3 Solutions for extraposition

This section explores the role different phonological constraints play in extraposition constructions. The constraints that may play a role or become active depend on various factors, like the complexity of the constituents involved or focus structure. For instance, focus structure has an effect on accentuation, which may

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position to the right. Japanese is head-final and alignment of phonological constituents is with the left edge of lexical constituents (Selkirk and Tateishi 1991). Extraposition is predicted to be leftward. This is an interesting hypothesis to pursue once more typological data is available.

lead to violation of certain phonological well-formedness constraints if the nuclear stress is not final in the intonational phrase. Extraposition of an accented constituent may give rise to a phonological structure that satisfies those very constraints. The extraposition structure would then be the optimal one from the point of view of phonology. However, such a line of argumentation is overly simplistic. A careful analysis of the data will reveal that putative triggering constraints only have an indirect impact on this construction, often enforcing a phonological representation that violates lower ranked constraints.

Strictly speaking, PF movement is neither triggered nor blocked by any of the constraints since the generator and the evaluator are different components of an optimality-theoretic grammar. While the generator provides a number of candidates from a given input, the evaluator chooses the optimal one by evaluating the candidates against a hierarchy of ranked constraints. According to Prince and Smolensky (2004: 27–28), a process is apparently triggered when a structural option is favoured by some constraint A. Satisfaction of this constraint typically leads to violation of a lower ranked constraint B, which bans this structural option or candidate. The converse is apparent blocking of a process, which emerges when a lower ranked constraint favours some structural option which is rejected by a higher ranked constraint. Both triggering and blocking are the consequence of constraint domination. This is an important difference between an optimality-theoretic grammar and rule-based approaches or Minimalist syntax. In a rule-based approach, the triggering environment has to be stated in the formulation of the rule. In Minimalist syntax, triggering and blocking are handled in terms of presence vs. absence of features that are (sub)labels of functional heads. For example, if a focused constituent moves leftward in the syntax, there must be a corresponding functional projection with a semantico-pragmatic (sub)label [focus], which attracts the focused constituent into its specifier. If a focused constituent moves rightward in the PF component, there must be a constraint A that would be violated if the focused constituent does not occur at the right edge of a particular phonological category.

Consequently, the main purpose of the following sections is to show that constraint domination can provide phonological solutions for rightward displacement. I will first consider the role of the interface constraints, then the role of phonological well-formedness constraints. The results in a nutshell are as follows: (i) the interface constraints ALIGN-XP and PH=PPH are responsible for extraposition and its optionality (sections 4.3.1), (ii) EXHAUSTIVITY and head-alignment constraints favour extraposition across deaccented constituents (sections 4.3.2 and 4.3.3), but are not responsible for the optionality of the operation, and (iii) head-alignment constraints can block extraposition (section 4.3.3.1).

4.3.1 The role of interface constraints

4.3.1.1 PP extraposition from object

In this section it is argued that the interface constraints Align-XP and Ph=PPh, repeated in (527) and (528), are responsible for optional extraposition of PPs, particularly in those cases in which a PP complement or adjunct is moved across another accented constituent, like the adverbials in (529).

(527)   Align-XP R (XP, R; PPh, R)
         The right edge of any XP in syntactic structure must be aligned with the right edge of a phonological phrase in prosodic structure.

(528)   Ph[ase]=PPh
        a.   A Spell-Out Domain corresponds to a phonological phrase, or
        b.   Lexical terminals spelled out on a syntactic cycle form a phonological phrase if they have phrasal stress.

(529)   a.   *(I read a mágazine on the tráin) (about Túrner)*
       b.   *(I read a mágazine on Mónday) (about Túrner)*
       c.   *(He sold a páinting at Sótheby's) (by Túrner)*
       d.   *(He sold a cópy at Sótheby's) (of Túrner's Wárkworth Cástle)*

The accentuation and phrasing is that of information-structurally neutral utterances.[6] The sentences were recorded without any context or with context questions/statements like those in (530). Sample pitch-tracks of both the canonical order and the scrambled order can be viewed in Figure 4.1.

(530)   *What do you want to tell me?/Let me tell you something.*
       a.   *(You'll find a revíew of Túrner) (in your ín-tray)*
       b.   *(You'll find a revíew in your ín-tray) (of Túrner)*

---

6 The accentual pattern can vary somewhat among speakers, depending on various factors. Speakers of a dialect for whom *magazine* has primary stress on the final syllable (ia) also readily accent the verb in (ib), in order to avoid a stress lapse at the beginning of the phonological phrase. A phonological phrase certainly also wants to begin with a tone (cf. section 3.2.3.1), so avoidance of a lapse is just an additional condition. These details do not play any role here, only the mapping to phonological phrases matters.

(i)   a.   *màgazíne*
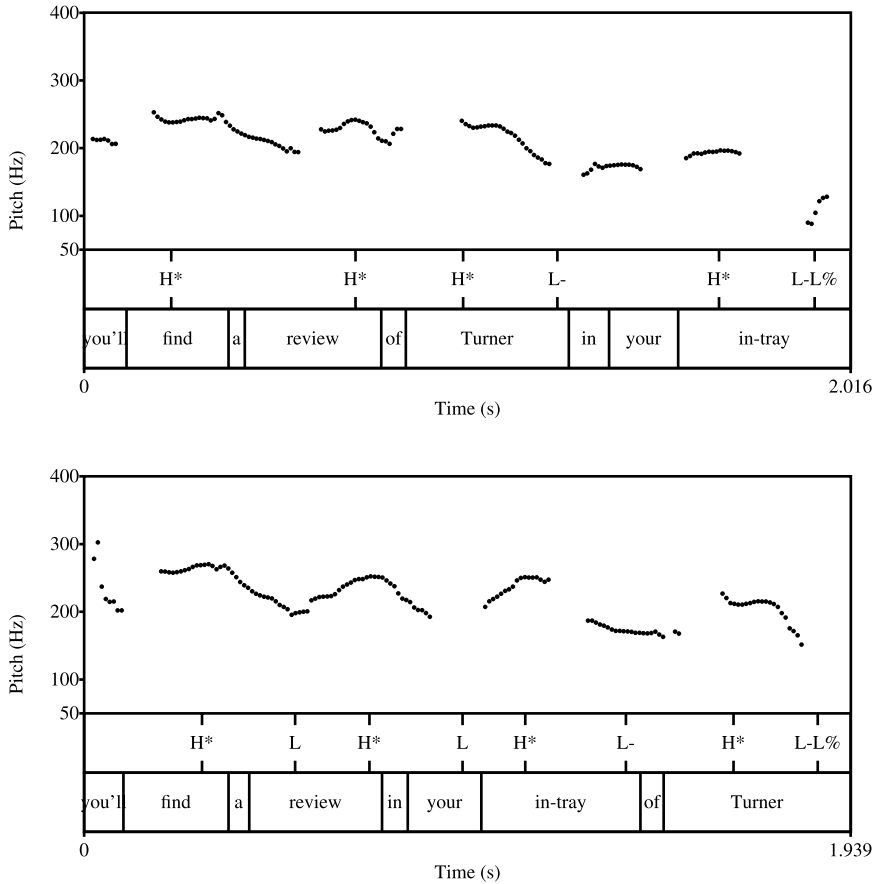   b.   *(I réad a magazíne on Mónday) (about Túrner)*

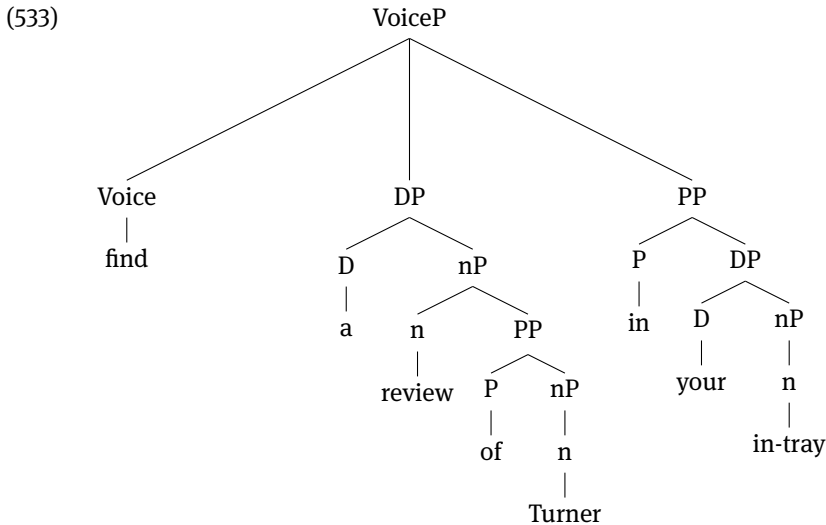**Figure 4.1:** PP extraposition from object.

The most dominant aspect observable in these sentences is that extraposition results in the PP adverbial being phrased together with the noun and the verb, while the extraposed PP forms its own phonological phrase. There is no heaviness requirement in these sentences: the extraposed PP may contain only one noun. But the object itself is complex in this construction, containing two or more prosodic words. In fact, it can also undergo heavy NP shift. In order to account for the optionality of extraposition here, only the constraints and the account from chapter 3 of optional phrasing in double complement constructions is in fact needed.

Recall from section 3.3 that Align-XP and Ph=PPh are tied in a relation of free-ranking, deriving the optionality of prosodic phrasing in (531). While Ph=PPh tries to preserve the correspondence between a phase and a phonological phrase, Align-XP calls for a phonological phrase boundary after the object. It is exactly the free ranking of these two constraints that derives the optionality.
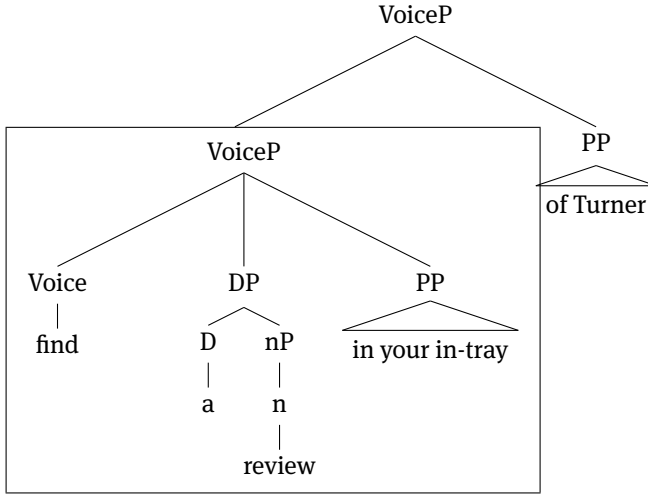
(531)   a.   *(She lóaned her róllerblades to Róbin)*   Ph=PPh ≫ Align-XP
       b.   *(She lóaned her róllerblades) (to Róbin)*   Align-XP ≫ Ph=PPh

Given my approach to PF movement as alternative PF representations associated with different prosodic structures, the generator provides candidates like those in (532). These candidates are associated with the PF representations in (533) and (534), respectively, which are repeated here for convenience.

(532)   Output of GEN:
       a.   *(You'll fínd a revíew of Túrner in your ín-tray)*
       b.   *(You'll fínd a revíew of Túrner) (in your ín-tray)*
       c.   *(You'll fínd a revíew in your ín-tray) (of Túrner)*
       d.   *(You'll fínd a revíew) (in your ín-tray) (of Túrner)*

(533)

(534)

VoiceP
- VoiceP
  - Voice
    - find
  - DP
    - D
      - a
    - nP
      - n
        - review
  - PP
    - in your in-tray
- PP
  - of Turner

Arguably, the complexity of the object itself is responsible for the possibility of extraposition, in this case due to the PP complement of the noun. When the object is complex, the correspondence between the spelled-out phase (VoiceP) and a phonological phrase cannot be established. The syntactic phase contains too many lexical words to be mapped to one phonological phrase. Consequently, either a phonological phrase boundary is inserted after the complex object or the PP complement is removed. Once it is adjoined to VoiceP, as in (534), the lower (framed) segment of VoiceP, can form a phonological phrase. Since this lower segment is exactly the constituent that is spelled out by the syntax, Ph=PPh will be satisfied.

In order to restrict the size of phonological phrases, I introduced the constraint Max(PPh) in section 3.2.2.2, repeated in (535). Given the difficulties I encountered in giving it a precise definition, I will resort to it only if I have no alternative. As it happens, it is not needed for the formal account of extraposition, if it is assumed, following a proposal by Fodor (2002b), that Align-XP is a gradable constraint. That is, if the right edges of two or more lexical XPs coincide, then each XP wants to be aligned with the right edge of a phonological phrase. Failure to do so will incur a violation mark for each XP that is not aligned, as in (536). The gradability of Align-XP renders Max(PPh) redundant whenever there is a pile-up of XP edges, as the evaluation of the candidate set below will show.

(535)   Max(PPh): A phonological phrase contains maximally three prosodic words at normal speech rate, possibly more at faster speech rates.

(536) a. You'll [$_{VoiceP}$ find a [$_{nP}$ review of [$_{nP}$ Turner]] in your in-tray]
       b. (You'll find a revíew of Túrner in your ín-tray)   Align-XP**

With this in mind, let me proceed with the analysis of our extraposition example. The ranking Align-XP≫Ph=PPh forces a phonological phrase boundary after the complex object in (537). In this case, Ph=PPh is violated because VoiceP does not correspond to a phonological phrase.

(537) a. You'll [$_{VoiceP}$ find a [$_{nP}$ review of [$_{nP}$ Turner]] in your in-tray]
       b. (You'll fínd a revíew of Túrner) (in your ín-tray)   Ph=PPh*

The ranking Ph=PPh≫Align-XP favours the PP complement of *review* to shift rightwards, as in (538). This allows the correspondence between the phase (VoiceP) and a phonological phrase to be established, but violates Align-XP once because the nP headed by *review* is not aligned.

(538) a. You'll [$_{VoiceP}$ [$_{VoiceP}$ find a [$_{nP}$ review] in your in-tray] of Turner]
       b. (You'll fínd a revíew in your ín-tray) (of Túrner)   Align-XP*

In this example, the number of phonological phrases can be kept to a minimum with the constraint MinBin(PPh), introduced in section 3.3.2. The structures in (539) have three phonological phrases, two of which containing only one prosodic word.

(539) a. (You'll find a review) (of Turner) (in your in-tray)
       b. (You'll find a review) (in your in-tray) (of Turner)

(540) MinBin(PPh): A phonological phrase contains at least two prosodic words.

The analysis of PP extraposition from an object in neutral contexts is summarised in Figure 4.2. In each tableau, one winner is selected depending on the ranking of Align-XP with respect to Ph=PPh. Essential for the analysis is that Align-XP is violated for each nP that is not aligned with the right edge of a phonological phrase. Hence, candidate (a) incurs two violations of Align-XP, whereas candidate (d) only one. The prosodic complexity of a noun phrase is a function of the number of phrasal edges that require alignment. Consequently, the driving force behind extraposition is the constraint Ph=PPh, particularly when it is ranked higher than Align-XP. The consequence of this ranking is that the verb and its complements can be phrased together, but the PP *of Turner* has to be removed from the object for this phrasing to become possible.

you'll find a review of Turner in your in-tray	Align-XP	Ph=PPh	MinBin
(you'll find a review of Turner in your in-tray) a.	*!*		
☞(you'll find a review of Turner) (in your in-tray) b.		*	*
(you'll find a review) (of Turner) (in your in-tray) c.		*	**!
(you'll find a review in your in-tray) (of Turner) d.	*!		*
(you'll find a review) (in your in-tray) (of Turner) e.		*	**!

you'll find a review of Turner in your in-tray	Ph=PPh	Align-XP	MinBin
(you'll find a review of Turner in your in-tray) a.		**!	
(you'll find a review of Turner) (in your in-tray) b.	*!		*
(you'll find a review) (of Turner) (in your in-tray) c.	*!		**
☞(you'll find a review in your in-tray) (of Turner) d.		*	*
(you'll find a review) (in your in-tray) (of Turner) e.	*!		**

Figure 4.2: Optional PP extraposition from object.

4.3.1.2 PP extraposition from subject

The classical case of extraposition from subject involves thetic sentences, in which the predicate is completely deaccented, as in (541). However, extraposition is not excluded if an unaccusative/passive predicate is accented, as in (542). Only extraposition of PPs from subjects of unergative and transitive verbs is blocked, as in (543).

(541)   a.   *A bóok has just arrived about Túrner*
        b.   *A mán walked in today from Índia.*
        c.   *Píctures were taken of évery térrorist.*

(542)   a.   *(Píctures of every térrorist) (will be distríbuted)*
        b.   *(Píctures will be distríbuted) (of évery térrorist)*

(543)   a.   **A man walked in the park from India.*
        b.   **[A criminal _] shot a lawyer (yesterday) from the Cosa Nostra.*

In this section, I will deal with the optionality of extraposition across an accented predicate, extraposition across deaccented constituents will be discussed in section 4.3.2 and examples like (543) in section 4.3.1.4.
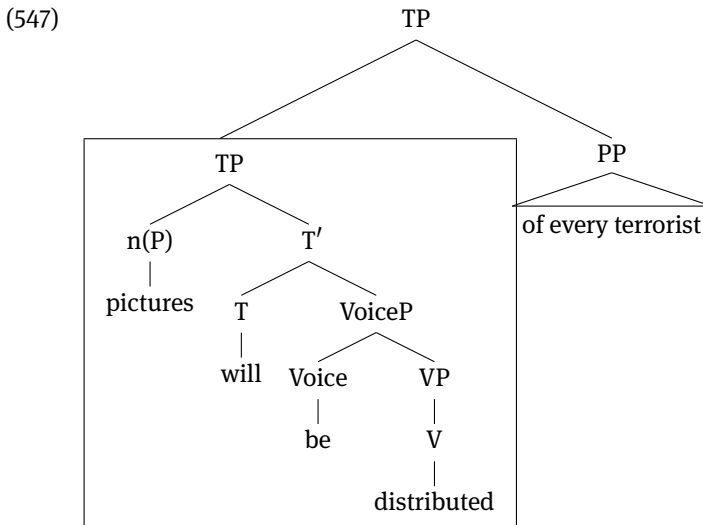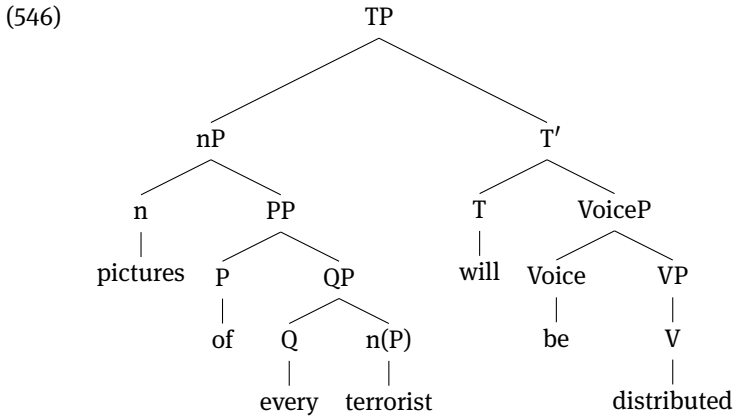
Recall from chapter 2 that the classic syntactic analysis of extraposition from subject NP, going back at least to Baltin (1981), adjoins the extraposed constituent to S/TP. One piece of evidence is that VP ellipsis strands a constituent extraposed from the subject, as in (544). The ellipsis data are not evidence against PF movement of the PP and relative clause, respectively, because ellipsis is post-syntactic deletion or the phonological features are simply not spelled out.

(544)   a. *Although no reviews appeared of Chomsky's book, one did ~~appear~~ of Jakobson's book.*
        b. *Although not many people would ride with Fred who knew just him, some would ~~ride with Fred~~ who knew his brother.*
            (Baltin 2006: 241)

The analysis of extraposition from subject is similar to the analysis of extraposition from object. Sentences with passive/unaccusative verbs are spelled out in one phase in the syntax and the phonology seeks to establish a correspondence between this phase and a phonological phrase. The syntactic structure that is transferred to PF is (545). I follow Sternefeld (1995) and particularly Blight (1997, 2004), who argue and provide evidence for the fact that Voice is headed by the auxiliary *be* and that the participle does not move in the extended projection of the verb.

(545)
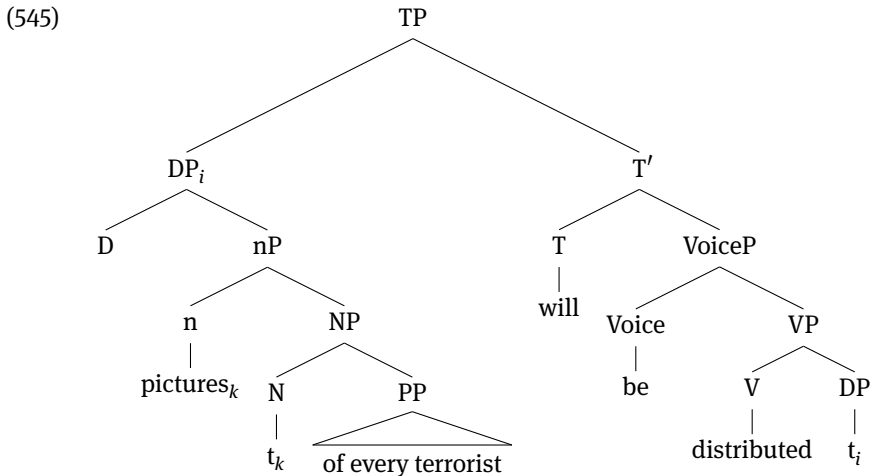
Null C is not spelled out since it has no phonological features. Spell-Out strips the empty categories from the syntactic representation, which gives us the PF representation in (546). If Spell-Out of root sentences with no material in SpecCP is just TP, then PF movement of the PP can be analysed as adjunction to TP, as in (547).

(546)

```
                              TP
                    ┌─────────────┴──────────────┐
                   nP                            T′
              ┌─────┴─────┐                 ┌─────┴─────┐
              n          PP                 T          VoiceP
              │      ┌────┴────┐            │       ┌────┴────┐
          pictures  P         QP          will    Voice      VP
                    │     ┌────┴────┐               │         │
                   of     Q       n(P)             be         V
                          │        │                         │
                        every   terrorist              distributed
```

(547)

```
                                   TP
                    ┌───────────────┴──────────────────┐
          ┌─────────────────────────────────┐          │
          │         TP                       │         PP
          │    ┌─────┴──────┐                │    ┌─────┴─────┐
          │  n(P)          T′                │   of every terrorist
          │   │       ┌─────┴─────┐          │
          │ pictures  T          VoiceP      │
          │           │       ┌────┴────┐    │
          │          will    Voice      VP   │
          │                   │         │    │
          │                  be         V    │
          │                             │    │
          │                        distributed │
          └─────────────────────────────────┘
```

The output of the generator are candidates like those in (548), paired with one of the PF representations in (546) and (547).

(548) a. *(Píctures of every térrorist will be distríbuted)*
       b. *(Píctures of every térrorist) (will be distríbuted)*
       c. *(Píctures will be distríbuted) (of évery térrorist)*
       d. *(Píctures) (will be distríbuted) (of évery térrorist)*

The free ranking approach developed in the last section captures the optionality here, too. The evaluation can be viewed in Figure 4.3. Candidate (a) violates ALIGN-XP twice because the nPs headed by *pictures* and *terrorist* are not aligned. Candidate (b) violates PH=PPH. If the PP is extraposed (candidate c), ALIGN-XP is

pictures of every terrorist will be distributed	Align-XP	Ph=PPh	MinBin
(pictures of every terrorist will be distributed) a.	*!*		
☞ (pictures of every terrorist) (will be distributed) b.		*	*
(pictures will be distributed) (of every terrorist) c.	*!		*
(pictures) (will be distributed) (of every terrorist) d.		*	**!*

pictures of every terrorist will be distributed	Ph=PPh	Align-XP	MinBin
(pictures of every terrorist will be distributed) a.		**!	
(pictures of every terrorist) (will be distributed) b.	*!		*
☞ (pictures will be distributed) (of every terrorist) c.		*	*
(pictures) (will be distributed) (of every terrorist) d.	*!		***

Figure 4.3: Optional extraposition from subject.

violated once since only the nP headed by *pictures* is not aligned. Candidate (d) is ruled out by MɪɴBɪɴ(PPʜ), which is violated for every phonological phrase that does not contain at least two prosodic words.[7] If Aʟɪɢɴ-XP is ranked higher than Pʜ=PPʜ, a phonological phrase boundary will be aligned with the complex subject. With the reverse ranking, the complex subject will be broken up and part of it will be moved to the edge of the clause in order to maintain the correspondence between the syntactically spelled-out constituent (the framed TP in (547)) and a phonological phrase.

Note that in this analysis it is the size constraint MɪɴBɪɴ(PPʜ) which excludes candidate (d) in Figures 4.3. The same constraint excludes candidates with an increased number of small phonological phrases in Figure 4.2. One could, as well, evoke a more general constraint here that keeps the number of phonological phrases at a minimum by prohibiting them altogether, for example the constraint *PPh in (549), proposed by Truckenbrodt (1999). Such a constraint must also be ranked lower than the interface constraints.

(549)　*PPʜ: Do not form any phonological phrases.

4.3.1.3 Extraposition of relative clauses
The upshot of the discussion in the previous two sections is that the driving force behind extraposition is the constraint Pʜ=PPʜ, more exactly when it out-

---

7 Note incidentally that Mᴀx(PPʜ) is not violated in candidate (a) because the whole sentence contains only three prosodic words. *Every* is a function word prosodified as a footed clitic of *terrorist*. The fact that there are two nPs that require alignment with a phonological phrase boundary is a sufficient condition for breaking up the utterance into two phonological phrases or for removing the PP complement of the noun.

ranks ALIGN-XP. The full force of PH=PPH becomes apparent when the shifted constituent is a syntactic phase, like the relative clause in (550) and (551) or the control infinitives in (552). Sample pitch tracks of both the canonical and the scrambled word order of (550) can be viewed in Figure 4.4. In (550), the adjunct *from Rome* modifies *knew*, whereas in (551) *in the dark* is an adjunct of the matrix
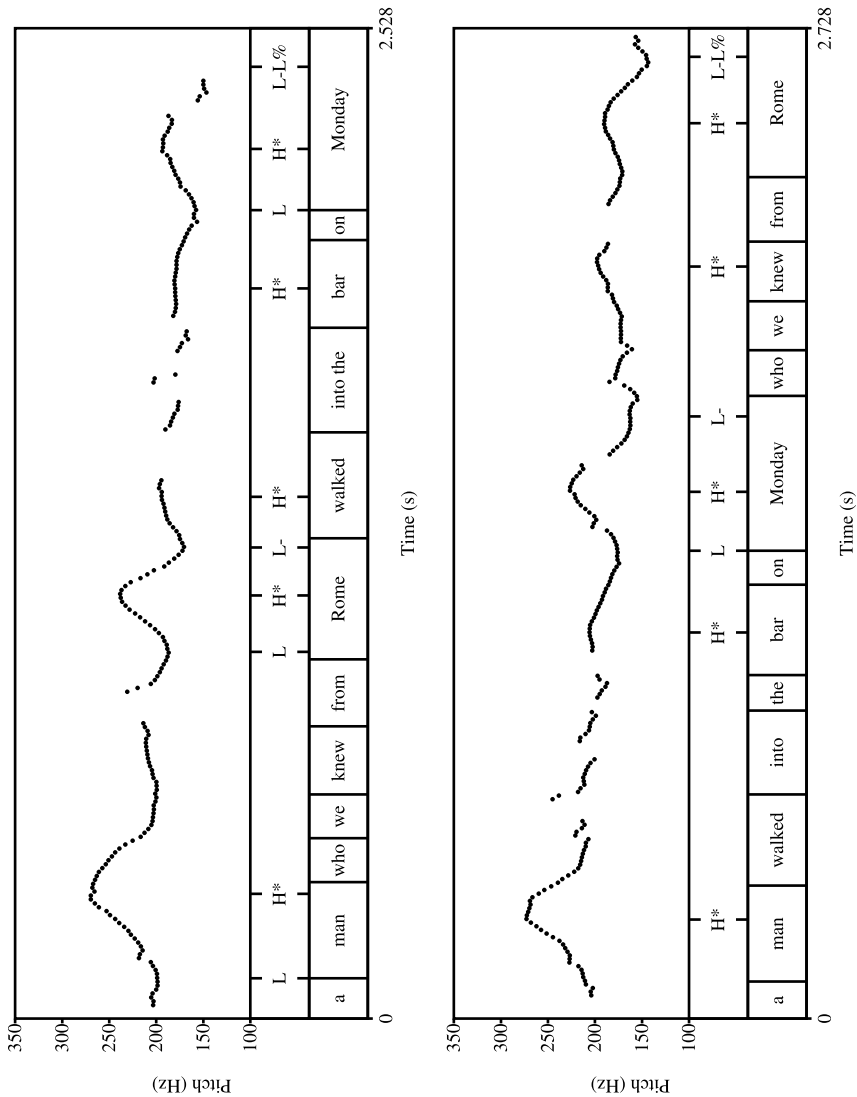

Figure 4.4: Extraposition of a relative clause from subject.

verb. In (551), the adjunct forms a separate phonological phrase if it follows the relative clause, but it can have a reduced pitch accent (L* or !H*) if the relative is extraposed.

(550)   *Let me tell you something.*

    a.   *(A mán who we knew from Róme) (wálked into the bár on Mónday)*

    b.   *(A mán walked into the bár on Mónday) (who we knéw from Róme)*

(551)   *Let me tell you something.*

    a.   *(I búmped into a wíndow) (that sómeone had ópened) (in the dárk)*

    b.   *(I búmped into a wíndow in the dark) (that sómeone had ópened)*

(552)   *Tell me what happened last night!*

    a.   *(Órders were given to the rébels) (to blów up the ráilway bridge)*

    b.   *(Órders were given by two géenerals) (to blów up the ráilway bridge)*

Recall from sections 3.3.2 and 3.3.3 that relative clauses tend to be phrased together with the noun they modify unless the noun can form a phonological phrase with a word that precedes it. More precisely, I argued that examples like (550a), which have the syntactic structure (553), form a recursive phonological phrase, as shown in (554). In other words, "complemented" nouns resist forming phonological phrases on their own.

(553)
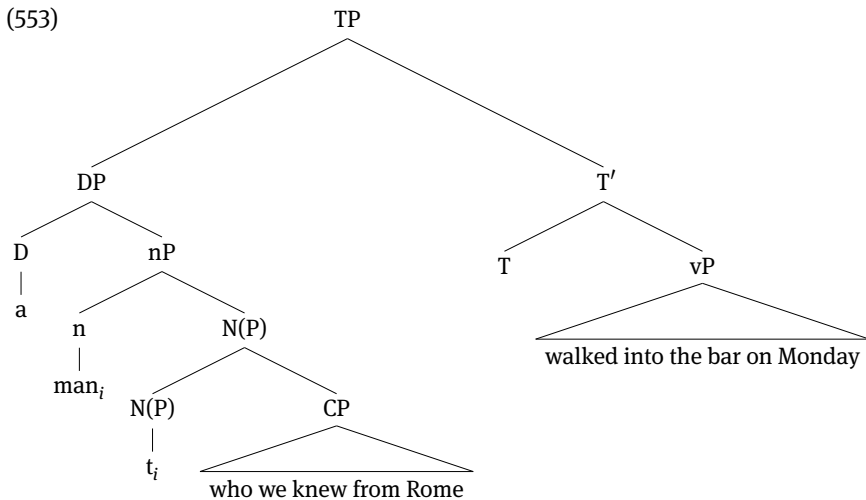
(554)   (A mán (who we knew from Róme)) (wálked into the bár on Mónday)

If the relative clause in its base-generated position is preceded by more than one prosodic word, the noun does not form a phonological phrase with the relative

clause. In (551a), a more balanced distribution of weight is achieved by phrasing the noun with the verb. The first two phonological phrases contain exactly two prosodic words. In other words, a binary phonological phrase is preferred over a recursive one.

Why do the relative clauses extrapose? All the sentences considered here have unaccusative/passive predicates. In all examples only the relative corresponds to a phonological phrase, but not the whole matrix clause, which is a phase and Spell-Out Domain, too. The solution to extraposition is straightforward: right-ward displacement yields a prosodic structure in which the matrix clause and the relative clause form separate phonological phrases. Particularly, the matrix clause will not be segmented into more than one phonological phrase. On the approach pursued here, extraposition occurs if Ph=PPh dominates Align-XP, a ranking which prefers separate phrasing of the matrix and the relative.

Let me consider extraposition from subject first. The evaluation of the examples in (550) can be inspected in the tableaux in Figure 4.5.

In candidate (a), the noun *man* forms one phonological phrase with the relative clause. This candidate violates Align-XP once because the noun *bar* is not aligned with a phonological phrase edge. It violates Ph=PPh twice because neither the relative clause nor the matrix clause corresponds to a phonological phrase. In candidate (b), the noun *man* is procliticised to the phonological phrase based on the relative, forming a recursive phonological phrase. This structure violates Ph=PPh only once because the relative clause satisfies this constraint, but not the matrix clause. This candidate is therefore preferred over candidate (a), even if it violates NonRecursivity at the level of the phonological phrase. Candidates (c) and (d) are extraposition candidates. Candidate (c) violates Align-XP twice because the nPs headed by *man* and *bar*, the former not modified now, are not aligned with a phonological phrase boundary. It does not violate Ph=PPh. So if Ph=PPh outranks Align-XP, the ranking of the second tableau, this candidate is the optimal one. If Align-XP is ranked higher than Ph=PPh, candidate (b) is the most harmonic one.

I now turn to extraposition from object. The example in (555a) has a ditransitive verb and the whole verb phrase is a phase in the syntax. The relative clause is phrased separately, as discussed above. So there is only one violation of Ph=PPh. If the relative clause is extraposed, as in (555b), and adjoined to VoiceP in the PF representation (556), Ph=PPh is not violated. The lower segment of VoiceP now corresponds to a phonological phrase. A sample pitch track can be viewed in Figure 4.6.

a man who we knew from Rome walked into the bar on Monday	Align-XP	Ph=PPh	MinBin	NonRec
(a man who we knew from Rome) (walked into the bar on Monday) a.	*	**!		
☞ (a man (who we knew from Rome)) (walked into the bar on Monday) b.	*	*		*
(a man walked into the bar on Monday) (who we knew from Rome) c.	**!			
(a man) (walked into the bar on Monday) (who we knew from Rome) d.	*	*	*!	

a man who we knew from Rome walked into the bar on Monday	Ph=PPh	Align-XP	MinBin	NonRec
(a man who we knew from Rome) (walked into the bar on Monday) a.	*!*	*		
(a man (who we knew from Rome)) (walked into the bar on Monday) b.	*!	*		*
(a man walked into the bar on Monday) (who we knew from Rome) c.		**		
☞ (a man) (walked into the bar on Monday) (who we knew from Rome) d.	*!	*	*	

Figure 4.5: Optional extraposition of a relative.

(555)   *Excited about Greece and its cultural heritage,*

    a.   *(he dónated a váse) (that shows Zeús and Apóllo fíghting) (to a múseum)*

    b.   *(he dónated a váse to a múseum) (that shows Zeús and Apóllo fíghting)*
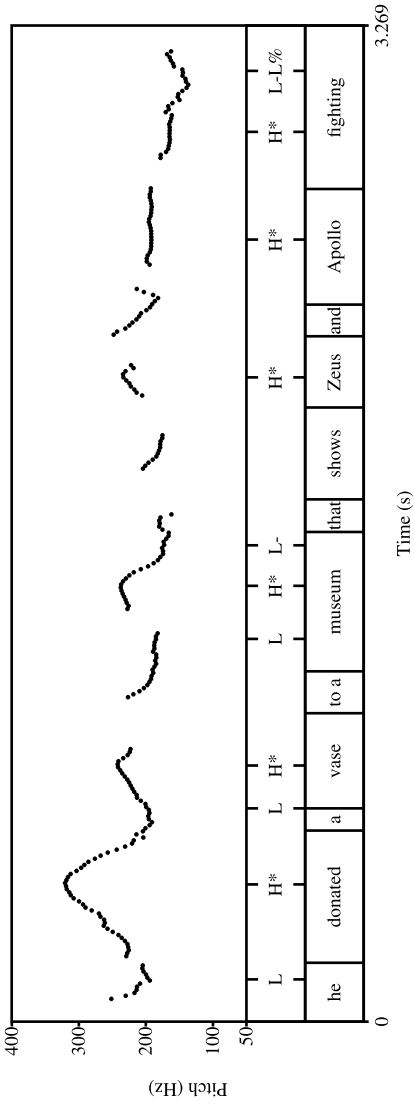
Figure 4.6: Extraposition of a relative clause from object.

(556)
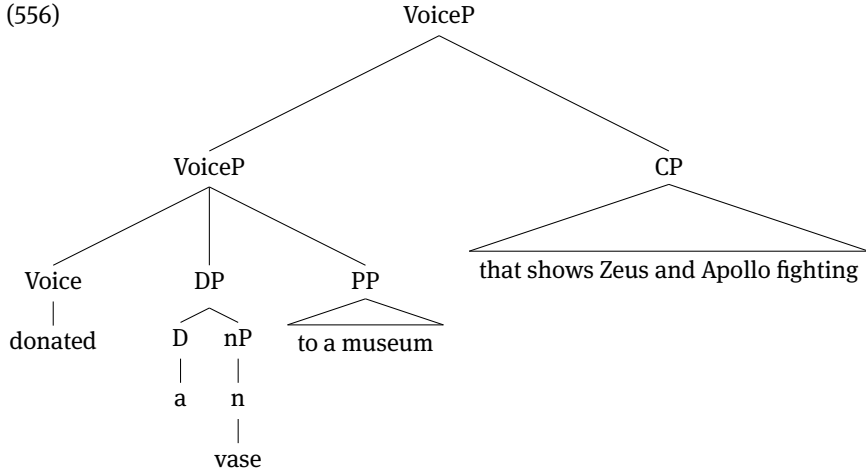
In the analysis of extraposition pursued so far, an unexpected problem shows up. To illustrate the problem, consider a slightly less complex example like (557).

(557)   *Tell me something about Jason.*

    a.   *(He sóld a páinting) (that he'd acquíred in Nórway) (at Sótheby's)*

    b.   *(He sóld a páinting at Sótheby's) (that he'd acquíred in Nórway)*

As the evaluation of (557) in Figure 4.7 shows, ranking Ph=PPh higher than Align-XP in the second tableau selects the extraposition candidate as the optimal one. However, the reverse ranking in the first tableau correctly selects the canonical word order as optimal (candidate a), but incorrectly tolerates candidate (c) because both (a) and (c) incur the same number of constraint violations. This phrasing (c) is rarely attested in my recordings of focus-neutral extraposition and it is only ruled out in the second tableau.

he sold a painting that he'd acquired in Norway at Sotheby's	Align-XP	Ph=PPh	MinBin
☞(he sold a painting) (that he'd acquired in Norway) (at Sotheby's) a.		*	*
(he sold a painting at Sotheby's) (that he'd acquired in Norway) b.	*!		
☞(he sold a painting) (at Sotheby's) (that he'd acquired in Norway) c.		*	*

he sold a painting that he'd acquired in Norway at Sotheby's	Ph=PPh	Align-XP	MinBin
(he sold a painting) (that he'd acquired in Norway) (at Sotheby's) a.	*!		*
☞(he sold a painting at Sotheby's) (that he'd acquired in Norway) b.		*	
(he sold a painting) (at Sotheby's) (that he'd acquired in Norway) c.	*!		*

Figure 4.7: A problematic evaluation (I).

At first sight some economy condition that minimises the number of phonological phrases would be needed to exclude the non-occurring candidate (c). However, evoking a constraint like *PPh, which bans a proliferation of phonological phrases, does not solve the problem since both candidates (a) and (c) would violate it three times. EVAL would still not distinguish the two candidates on the ranking ALIGN-XP ≫ PH=PPH. Nor does a binarity condition on intonational phrases (558), which I have explored in earlier work (Göbbel 2009), solve the problem.

(558)   BIN(IP): An intonational phrase contains exactly two phonological phrases.

An alternative has been explored by Truckenbrodt (1995a), mainly on the basis of German data. He proposes the restriction on extraposition from NP in (559).

(559)   Let XP be a syntactic category that is canonically mapped into the prosodic category π upon extraposition (where π is either the phonological phrase or the intonational phrase). Then extraposition from NP will take XP as far as out of a prosodic constituent of the same category π.
$(\dots \text{XP} \dots)_{\pi} \rightarrow (\dots t_i \dots)_{\pi} (\text{XP}_i)_{\pi}$

This restriction forbids movement across a prosodic constituent of the same type and also within a prosodic constituent, as shown schematically in (560). It captures the tendency that I observe in my recordings: the constituents preceding the extraposed one tend to be grouped into one phonological phrase. For the problematic candidate (c) in the first tableau in Figure 4.7, it has the desired effect. Nonetheless, the restriction is construction specific, an aspect which I have tried to avoid in my account developed so far. It is also not clear to me how it could be formalised within an optimality-theoretic framework.

(560)   If an XP will usually be mapped into π in the prosody, then
   a.   ⋆ $(\dots \text{XP}_i \dots)_{\pi} (\dots)_{\pi} \rightarrow (\dots t_i \dots)_{\pi} (\dots)_{\pi} (\text{XP}_i \dots)_{\pi}$
   b.   ⋆ $(\dots \text{XP}_i \dots \dots)_{\pi} \rightarrow (\dots t_i \dots \text{XP}_i \dots)_{\pi}$

Extraposition across a separate phonological phrase was recorded with more complex adverbials like (561). But even in examples like these the material preceding the extraposed relative can form one phonological phrase, as in (562b). The constituents making up the adverbial are deaccented and the sentence was uttered at an increased speech rate.[8]

---

8 The temporal adjunct in (562b) is presumably included in a recursive phonological phrase, as in (i). Cf. section 4.3.2.

(i)   ((I réad a magazíne) two or three days ago) (about Túrner)

(561) a. *(I recéived some létters) (that are of ínterest) (twó or three dáys ago)*
       b. *(I recéived some létters) (twó or three dáys ago) (that are of ínterest)*

(562) *Let me tell you something.*
       a. *(I réad a magazíne about Túrner) (twó or three dáys ago)*
       b. *(I réad a magazíne two or three days ago) (about Túrner)*

The problematic aspect of my analysis also shows up with PP extraposition from object, in examples like (563) and (564). The PP complements in the canonical word order are too complex to be phrased together with the selecting noun, violating high ranked Max(PPh), which restricts the size of a phonological phrase to three prosodic words at a normal speech rate. Once the PP is extraposed the locative adjunct is phrased together with the remainder of the verb phrase. Sample pitch tracks can be viewed in Figure 4.8.

(563) *Let me tell you something about John.*
       a. *(He sóld a cópy) (of Túrner's Wárkworth Cástle) (at Sótheby's)*
       b. *(He sóld a cópy at Sótheby's) (of Túrner's Wárkworth Cástle)*

(564) a. *(You'll fínd a revíew) (of Túrner's páintings) (in your ín-tray)*
       b. *(You'll fínd a revíew in your in-tray) (of Túrner's páintings)*

Now consider the evaluation of (564) in Figure 4.9. The ranking Align-XP ≫ Ph=PPh in the first tableau also selects the non-occurring candidate (e) as a possible prosodic structure. The problem also remains unsolved in the extended analysis in section 4.4, which takes into account the weight factor and the competing heavy NP shift construction in (565) and (566). Since heavy NP shift also occurs in focus-neutral contexts, it should also be evaluated in the same tableau with extraposition from object.

(565) a. *What did Jason do yesterday?*
       b. *(He sóld at Sótheby's) (a páinting he'd acquíred in Nórway)*

(566) a. *(He sold at Sotheby's) (a copy of Turner's Warkworth Castle)*
       b. *(You'll find in your in-tray) (a review of Turner's paintings)*

4.3.1.4 Extraposition from external arguments
In the previous sections I have developed a unified account for extraposition of PPs and relative clauses. This was possible because PPs can, and relatives must, form phonological phrases. The analysis also predicts that extraposition is only possible within domains that are syntactic phases (i. e., transitive v*P and unac-
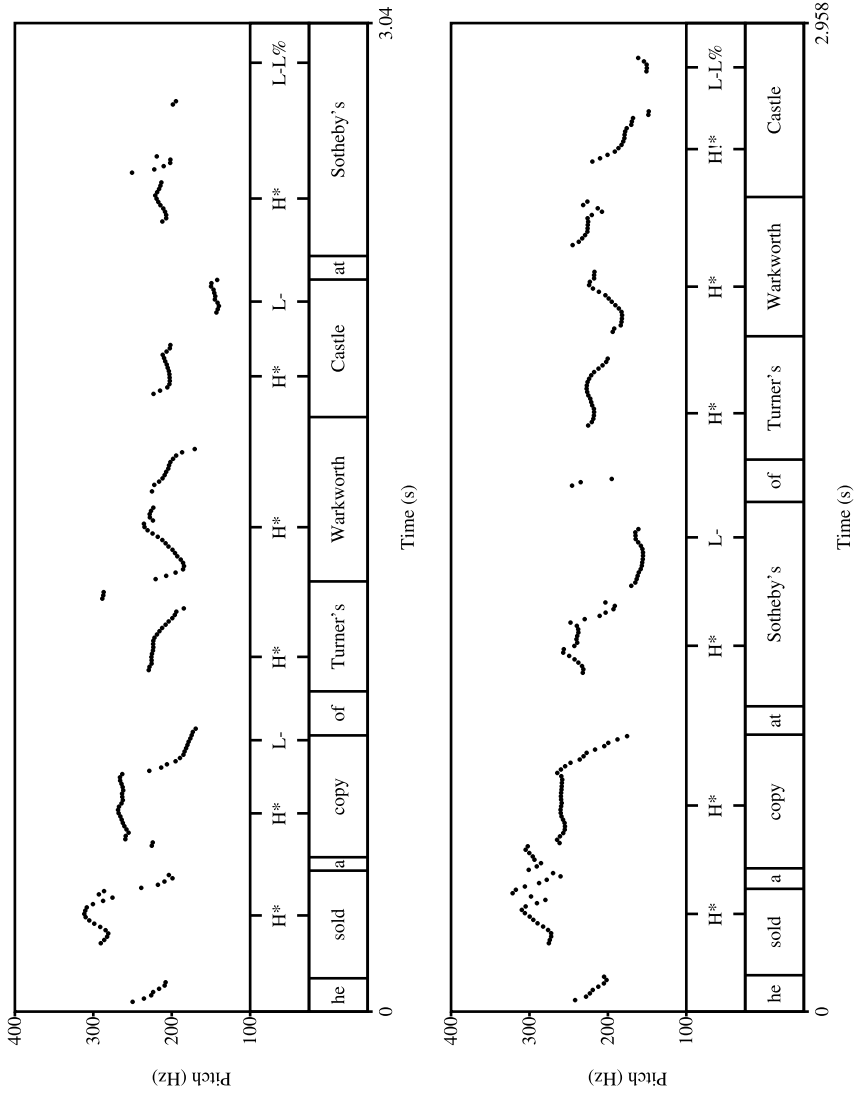
Figure 4.8: Extraposition of a more complex PP.

cusative/passive sentences; cf. also Johnson 1985 and Chomsky 2008). By moving the PP or relative to the right edge, the syntactic object that constitutes a phase will also form one phonological phrase.

An interesting result of this overall approach to extraposition is the fact that there is a straightforward explanation of why extraposition is not possible from

	Max(PPh)	Align-XP	Ph=PPh	MinBin
you'll find a review of Turner's paintings in your in-tray				
a. (you'll find a review of Turner's paintings in your in-tray)	*!	**		
b. (you'll find a review of Turner's paintings) (in your in-tray)	*!		*	*
c. ☞(you'll find a review) (of Turner's paintings) (in your in-tray)			*	*
d. (you'll find a review in your in-tray) (of Turner's paintings)		*!		
e. ☞(you'll find a review) (in your in-tray) (of Turner's paintings)			*	*

	Max(PPh)	Ph=PPh	Align-XP	MinBin
you'll find a review of Turner's paintings in your in-tray				
a. (you'll find a review of Turner's paintings in your in-tray)	*!		**	
b. (you'll find a review of Turner's paintings) (in your in-tray)	*!	*		*
c. (you'll find a review) (of Turner's paintings) (in your in-tray)		*!		*
d. ☞(you'll find a review in your in-tray) (of Turner's paintings)			*	
e. (you'll find a review) (in your in-tray) (of Turner's paintings)		*!		*

Figure 4.9: A problematic evaluation (II).

subjects of unergative and transitive verbs, as in the following examples.[9] This issue remained unsolved in section 2.2.2.2.

(567)   *_A man walked in the park from India._

(568)   a.   _(An ágent from the ÉBÍ) (shóuted at me)_
         b.   *_[An agent _] shouted at me from the FBI._

(569)   a.   *_A man spoke to me from India._
         b.   *_A man spoke to Elsa from India._

---

9 The sentences in (569) are grammatical if the PP is a VP adjunct (e. g., if the man was located in India, speaking on the phone).

(570)   a.   *(A críminal from the Cósa Nóstra) (shót a láwyer yesterday)*
        b.   **[A criminal _] shot a lawyer (yesterday) from the Cosa Nostra.*

In these examples, the verb phrase and the subject correspond to separate phonological phrases. Pʜ=PPʜ is satisfied and so is Aʟɪɢɴ-XP. Extraposition is not forced by the ranking of Pʜ=PPʜ with respect to Aʟɪɢɴ-XP and therefore not possible. The tableaux in Figure 4.10 show the evaluation of (570). The optimal candidate is (b) because neither Aʟɪɢɴ-XP nor Pʜ=PPʜ is violated.[10] Candidate (d) satisfies both interface constraints, too, but has an increased number of phonological phrases. In this example, it is ruled out by MɪɴBɪɴ, because the phonological phrase *a criminal* violates this lower ranked constraint. In candidate (a), the whole sentence is parsed into one phonological phrase, a parse that incurs two violations of Aʟɪɢɴ-XP because the two nPs headed by *criminal* and *Cosa Nostra* are not aligned. It also violates Pʜ=PPʜ twice because the two phases do not correspond to phonological phrases. Finally, candidate (c) violates Aʟɪɢɴ-XP once because the nP headed by *criminal* is not aligned. It also violates Pʜ=PPʜ twice for the same reason as candidate (a).

However, there are clearly documented cases of extraposition from external arguments (cf. Rochemont and Culicover 1990; Kuno and Takami 2004). Firstly,

a criminal from the Cosa Nostra shot a lawyer	Align-XP	Ph=PPh	MinBin
(a criminal from the Cosa Nostra shot a lawyer) a.	*!*	**	
☞(a criminal from the Cosa Nostra) (shot a lawyer) b.			
(a criminal shot a lawyer) (from the Cosa Nostra) c.	*!	**	
(a criminal) (shot a lawyer) (from the Cosa Nostra) d.			*!

a criminal from the Cosa Nostra shot a lawyer	Ph=PPh	Align-XP	MinBin
(a criminal from the Cosa Nostra shot a lawyer) a.	*!*	**	
☞(a criminal from the Cosa Nostra) (shot a lawyer) b.			
(a criminal shot a lawyer) (from the Cosa Nostra) c.	*!*	*	
(a criminal) (shot a lawyer) (from the Cosa Nostra) d.			*!

Figure 4.10: Excluded extraposition.

10 I assume that PP adjuncts like *from the Cosa Nostra* are integrated into the DP like relative clauses. They are adjoined to NP, while N moves to n (cf. section 2.1). There is also no observable difference between adjunct and complement PPs concerning phrasing and phrasal stress in the data I have recorded (cf. the discussion of phrasal stress in section 3.2.3.1). In other words, candidate (b) in Figure 4.10 does not violate Aʟɪɢɴ-XP because the right edges of the nPs headed by *man* and *Cosa Nostra* coincide, while phrasal stress is assigned to *Cosa Nostra*.

thetic sentences based on transitive verbs, which can be optionally deaccented, readily allow extraposition, as shown in (571).[11] Such predicates behave like unaccusative ones and have generated a fair amount of discussion and controversial analyses in the past (cf. Drubig 1992; Rosengren 1997; Jacobs 1999; Rochemont 2013).

(571)   *What about Mary? Why is she so upset?*

    a.   *(A mán she dídn't knów) (phoned her úp)*

    b.   *A mán she didn't KNOW phoned her up.*

    c.   *(A mán phoned her úp) (she dídn't knów)*

Secondly, examples like (570b) improve considerably if the PP is replaced with a relative, as in (572). In this case the extraposed relative forms a separate intonational phrase (572b). With canonical word order, the whole root clause normally forms one intonational phrase (cf. Downing 1970; Nespor and Vogel 1986, Selkirk 2005 and section 3.2.4). In this example, extraposition gives rise to a more balanced phrasing, involving two binary intonational phrases.

(572)   *Have you heard the news?*

    a.   *[(A pétty críminal) (who políce said) (was from the Cósa Nóstra) (robbed a bánk this morning)]*$_{\text{IP}}$

    b.   *[(A pétty críminal) (róbbed a bánk this morning)]*$_{\text{IP}}$ *[(who políce said) (was from the Cósa Nóstra)]*$_{\text{IP}}$

Thirdly, as observed by Guéron (1980), Johnson (1985) and Rochemont and Culicover (1990), defocusing (part of) a transitive/unergative predicate also allows extraposition. Cf.:
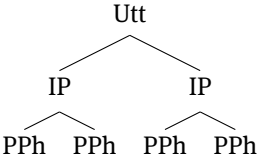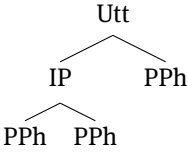
(573)   a.   **A man ran/walked/jumped/drove/etc. from the EPA.*

    b.   *First a man with a green parachute jumped, and then a man jumped with a brown parachute.*
       (Johnson 1985: 109)

(574)   *Suddenly there was the sound of lions growling. Several women screamed. Then a man screamed who was standing at the very edge of the crowd.*
    (Rochemont and Culicover 1990: 65)

---

11 The following examples in this subsection were provided by a reviewer of Göbbel (2013b) without context questions/statements. Some of them can be traced back to Rochemont and Culicover (1990). The examples were recorded and analysed together with similar examples.

In the following examples, the relative forms either a phonological phrase (575) or an intonational phrase (576b), depending on the complexity of the relative and also of the overall sentence.

(575)   a.   *Who asked Mary to dance at the party last night?*
        b.   *(A mán asked Mary to dance) (who she didn't knów)*

(576)   *We were waiting for my sister to join us at John's farewell party last night,*
        a.   *[(when we nóticed) (that an élderly mán) (who nóne of us knéw) (had accómpanied her to the party)]*$_{\text{IP}}$
        b.   *[(when we nóticed) (that an élderly mán) (had accómpanied her to the party)]*$_{\text{IP}}$ *[(who nóne of us) (knéw)]*$_{\text{IP}}$

Examples like these suggest that the relative can extrapose from the subject of a transitive verb only if it forms a prosodic constituent of the same type as the root clause. Since relatives do not normally map to intonational phrases in English (unless they are syntactically fairly complex), extraposition is most natural if the root clause can also form one phonological phrase, as in (571) and (575). The result is an intonational phrase containing two phonological phrases. If the root clause maps to an intonational phrase, the relative must also be mappable to an intonational phrase in order to avoid a violation of Exhaustivity at the level of the intonational phrase. Recall that Exh requires exhaustive parsing at all levels of the prosodic hierarchy. Hence (577a), but not (577b) is a licit representation.

(577)   a.
```
              Utt
            /     \
          IP       IP
         /  \     /  \
      PPh  PPh PPh  PPh
```

b.
```
              Utt
            /     \
          IP      PPh
         /  \
      PPh  PPh
```

The same holds for heavy NP shift. If the root clause forms an intonational phrase, the heavy NP must also be mappable to an intonational phrase. The compound *Air Force general* in (578), consisting of three prosodic words, does not seem to contribute the same weight as the three word object in (579).

(578)   ??*In order to avoid world-wide criticism, the President fired nine or ten weeks ago an Air Force general.*

(579)   *In order to avoid world-wide criticism,*
        a.   *[(the mínister fíred) (a híghly décorated géneral) (níne weeks before eléctions to Párliament)]*$_{\text{IP}}$
        b.   *[(the mínister fíred) (níne weeks before eléctions to Párliament)]*$_{\text{IP}}$ *[(a híghly décorated géneral)]*$_{\text{IP}}$

This may explain why extraposition of relatives from external arguments is better than extraposition of PPs, but at the moment, I have no phonological explanation for what triggers extraposition in the non-thetic cases. Note that thetic sentences like (571) allow deaccentuation of the predicate, while defocusing requires deaccentuation in (575). Nevertheless, defocusing and deaccentuation of the predicate does not necessarily lead to a grammatical result, as the examples in (580), which are distinctly odd, show. I leave this issue for future research, but I will return to thetic sentences in sections 4.3.3.3 and 4.3.3.4.

(580)   *Who stole the melon?*
     a. **A girl stole the melon from the neighbourhood.*
     b. **A girl stole the melon who lives near-by.*

4.3.2 The role of exhaustivity

In this section I look into the problem posed by short predicates and other light-weighted constituents at the right edge of the sentence, which particularly favour and in some cases seem to require extraposition. The analysis builds on and further develops a proposal made by Hartmann (2013).

To set the scene, consider the examples in (581) discussed by Quirk et al. (1985: 1398). They suggest that extraposition in this case occurs in order "… to achieve a stylistically well-balanced sentence in accordance with the norm of English structure; in particular to achieve END-WEIGHT. For example, it would be usual to avoid forming a sentence with a long subject and a short predicate. Thus we would prefer [(581a)], with discontinuity, to [(581b)], without discontinuity."

(581)   a.   *The story is told of her phenomenal success in Australia.*
     b.   ?*The story of her phenomenal success in Australia is told.*

While heaviness unquestionably plays a role in rightward displacement (cf. Arnold et al. 2000; Wasow 2002; Francis 2010; Francis and Michaelis 2014 and section 4.4), the light constituent at the right edge itself may also be responsible for favouring the discontinuity. Let me first consider Hartmann's proposal developed on the basis of German complement clause extraposition, which is obligatory in focus neutral contexts. Cf.:

(582)   *?*Peter hat Hans, dass Melanie kommt, erzählt.*
       Peter has Hans that Melanie comes told
       'Peter told Hans that Melanie will come.'

(583)   *Peter hat Hans erzählt, dass Melanie kommt.*

Hartmann argues convincingly that the reason for extraposition has to be sought in the prosodic structure of the ungrammatical sentence. In German, the complement clause is mapped to an intonational phrase, whereas the verb can only be prosodified as a prosodic word. The ungrammatical (582) would have the prosodic structure in (584). This structure violates NONRECURSIVITY at the level of the intonational phrase (NONREC$_{IP}$) because an intonational phrase dominates another intonational phrase. It also violates EXHAUSTIVITY at the level of the phonological phrase (EXH$_{PPh}$) because the verb, which cannot be accented under normal conditions, is not parsed into a phonological phrase (cf. also Truckenbrodt 2002).[12]

(584)
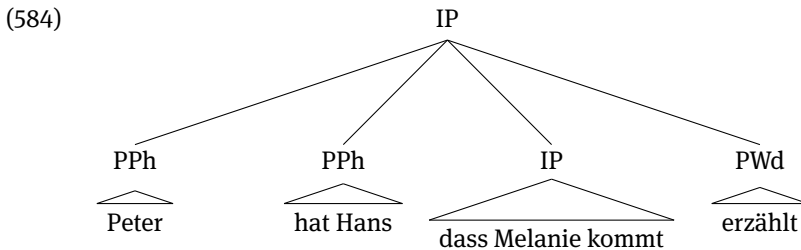
Hartmann argues that extraposition of the complement clause still results in a recursive prosodic structure. The whole sentence is one intonational phrase before and after extraposition. In (585), the higher intonational phrase now dominates an intonational phrase at its right edge and the verb can form a phonological phrase with the indirect object.[13] Therefore, what is violated before, but not after extraposition, is EXH$_{PPh}$.

---

12 A reviewer remarks that complement clauses need not extrapose if the verb is accented or if the clause is short. The example in (i), provided by the reviewer, is normally uttered with a rise on *dumm* and a fall on *gesagt*. I would like to add here that the clause is scrambled to the left across the quantificational adverb. Stressing the verb under the right contextual conditions allows it to form the head of a phonological phrase (see also the discussion below in the main text). The short complement clause can form a phonological phrase, hence there is no violation of EXHAUSTIVITY and NONRECURSIVITY in this example. The clause scrambles to the left presumably in order to avoid a stress clash.

(i) *Ich habe doch   [dass Peter DUMM ist] nie   geSAGT.*
     I   have certainly [that Peter stupid is] never said
     'I have certainly never said that Peter is stupid.'

13 Essentially, there is no intonational phrase boundary tone preceding the extraposed clause. If there were such a boundary tone, the sentence would be an utterance containing two intonational phrases. The reader is referred to Hartmann's paper for the phonological details.

(585)

```
                              IP
           ┌───────────────────┼───────────────────┐
         PPh                  PPh                  IP
          △                   △                   △
        Peter          hat Hans erzählt     dass Melanie kommt
```
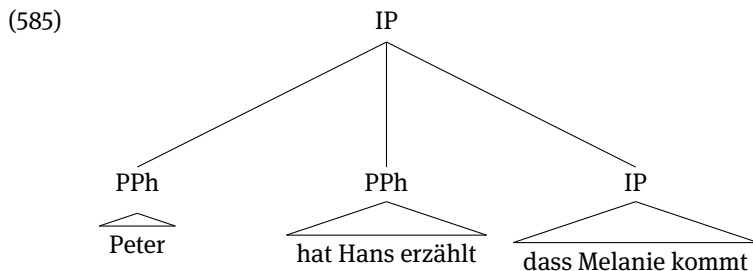
While English is not head-final, data that comes close to the German facts can be found in verb-particle constructions. Exh*Pph* also seems to be violated in (586a). To the extent that speakers accept and can produce such sentences, they also set the relative clause off from the noun in a separate phonological phrase, as in (586b). In fact, the constraint PH=PPH requires the relative clause to be mapped to one phonological phrase. Additionally, there are three lexical phrasal projections whose right edges coincide, as shown in (587). ALIGN-XP requires that they be aligned with a phonological phrase boundary. The particle seems to be stranded and not integrated into the phonological phrase formed by the relative clause. If the relative clause is extraposed, the particle is phrased together with the verb and noun. Sample pitch tracks of the base and extraposed variant can be viewed in Figure 4.11.

(586)   *What did he do next?*

    a. ?*He called a woman who he knew from Rome up.*

    b.   (He cálled a wóman) (who he knéw from Róme) up

(587)   He called a [nP woman who he [vP knew from [nP Rome]]] up.

According to Emonds (1985), particles are intransitive prepositions. Unlike regular (transitive) Ps, they do not have weak forms and are therefore footed. But like regular prepositions, a particle does not count as a lexical category for the syntax-phonology correspondence. Higher levels of phrasing can only be enforced by Ex-HAUSTIVITY. Due to Exh*PWd*, the particle can be parsed into a prosodic word like the stranded P in (588).[14] However, the particle is too light to form a phonological phrase and is normally deaccented, unless it is narrowly focused or the object is defocused (cf. Dehé 2005).

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14 Cf. Selkirk (1995b), Anderson (2005) and Ito and Mester (2009b) on the prosodic representation of stranded Ps.
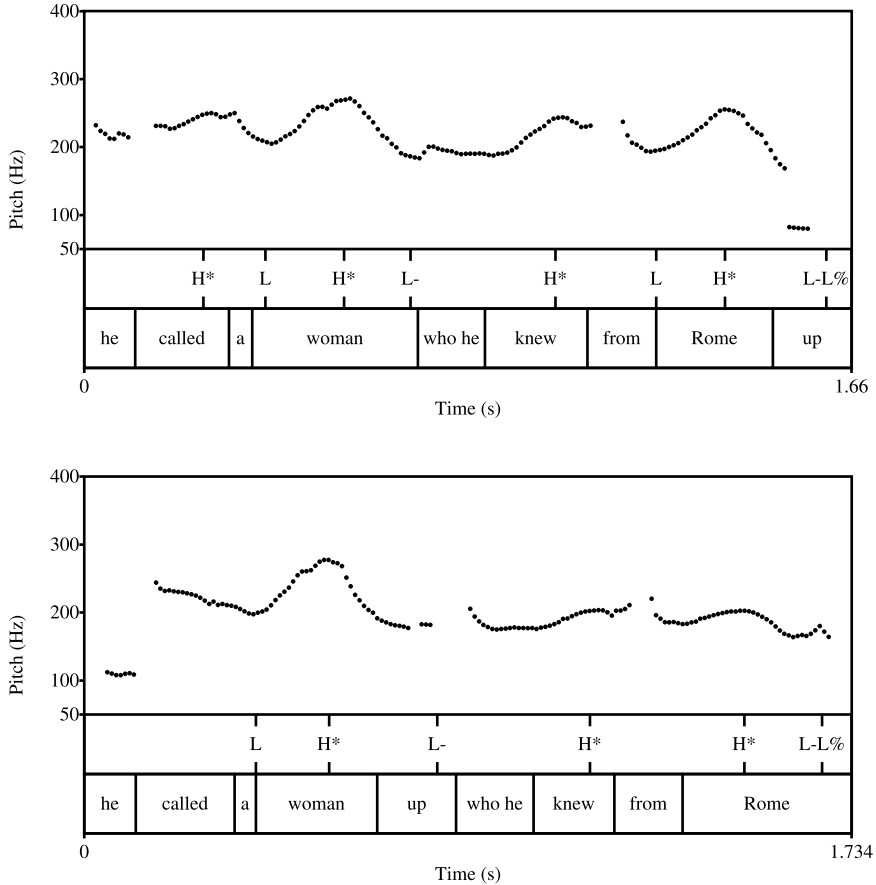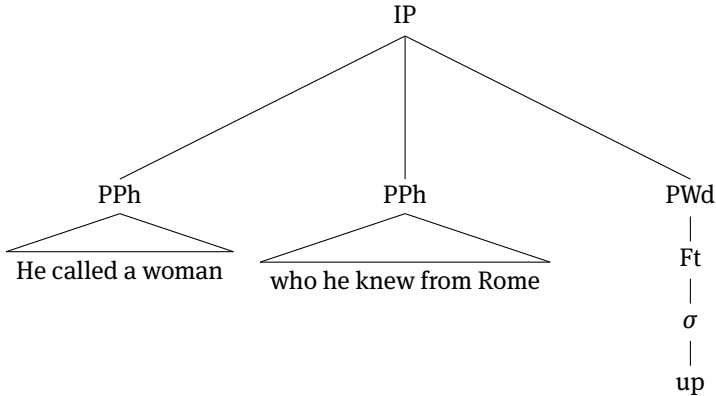
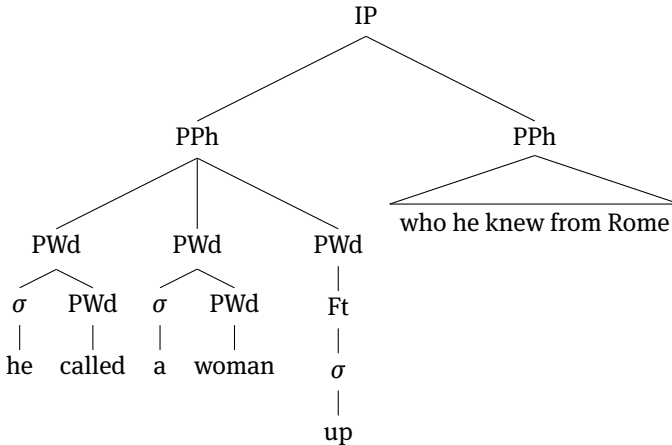**Figure 4.11:** Extraposition in verb-particle construction.

(588) a. *Who did you do it for?*
       b. (Who did you dó it [fɔː]/*[fə])

Example (587a) can therefore be analysed as having the prosodic structure in (589). This structure violates Exh$_{PPh}$. If the relative clause moves rightward, as in (590), the particle can be integrated into the lefthand phonological phrase, where it does not violate Exh$_{PPh}$.

(589)

```
                          IP
            _____|_____
          PPh              PPh              PWd
           |                |                |
    He called a woman  who he knew          Ft
                        from Rome            |
                                             σ
                                             |
                                             up
```

(590)

```
                          IP
              _____|_____
            PPh                        PPh
      _____|_____                   |
    PWd    PWd    PWd            who he knew from Rome
    _|_    _|_     |
   σ  PWd σ PWd   Ft
   |   |  |   |    |
   he called a woman σ
                      |
                     up
```

Hartmann's analysis could be extended to deaccented predicates at the right edge, like the one in (591), and also to the example from Quirk et al. (1985) in (581) above. The verb in (591a), being lexical, corresponds to a prosodic word.

(591)   *Let me tell you something.*

    a.   *Last night, a mán who we'd néver séen before arrived.*

    b.   *Last night, a mán arrived who we'd néver séen before.*

Many unaccusative verbs, particularly verbs of appearance, as well as many passivised verbs do not tolerate or avoid phrasal stress and do not form a phonological phrase.[15] The relative clause forms a recursive phonological phrase together

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15 Note that phrasal stress on a certain constituent is a sufficient, but not a necessary condition for phonological phrase status. In section 4.3.3.2 I argue that a phonological phrase which is formed as a consequence of the demands of the interface constraints can also be completely

with the noun it modifies, as shown in (592a). The verb cannot be integrated into this phonological phrase, due to the fact that there are two phrase edges that require alignment with a phonological phrase boundary, namely nP and vP in (593). Therefore, the verb is dominated directly by the intonational phrase under the analysis developed so far, in violation of Exh_{PPh}. Movement of the relative to the right fixes this problem and the verb can be phrased with the noun *man*.

(592) a. [(a mán (who we'd néver séen before)) arrived]$_{IP}$
  b. [(a mán arrived) (who we'd néver séen before)]$_{IP}$

(593) a [$_{nP}$ man we had never [$_{vP}$ seen before]] arrived

Another case to which this analysis can be applied are deictic expressions at the right edge of the sentence, e. g., *now*, *then*, *here*, *there*, *today*, *this morning*, *at the moment*, etc. They all resist phrasal stress assignment unless they are narrowly focused (cf. Rochemont 1986). In (594a) and (595b), the temporal adjuncts are deaccented and form (recursive) prosodic words, as shown in (596). Lack of phrasal stress prevents them from forming a phonological phrase on their own. Again, movement to the right, as in (594b) and (595b), avoids a violation of Exh_{PPh}. Once integrated into the right-hand phonological phrase, they may also be associated with non-prominent accents, particularly L*. If they occur in the postnuclear stretch, as in (594a) and (595a), no tonal events are possible (i. e., they are completely deaccented), which I take as an indication that they are not integrated into the phonological phrase formed by the relative or complement clauses. So they are preceded by the nuclear stress and a phonological phrase boundary. Cf. the pitch tacks in Figure 4.12.

(594) a. *[(I recéived some létters) (that are of ínterest) this morning]$_{IP}$*
  b. *[(I recéived some létters this morning) (that are of ínterest)]$_{IP}$*

(595) a. *[(I've nó idéa) (when it will ráin) at the moment]$_{IP}$*
  b. *(I've nó idéa at the moment) (when it will ráin)*

(596) a.

deaccented. The light constituents discussed in this section are neither accented nor mapped to separate phonological phrases by the interface constraints.
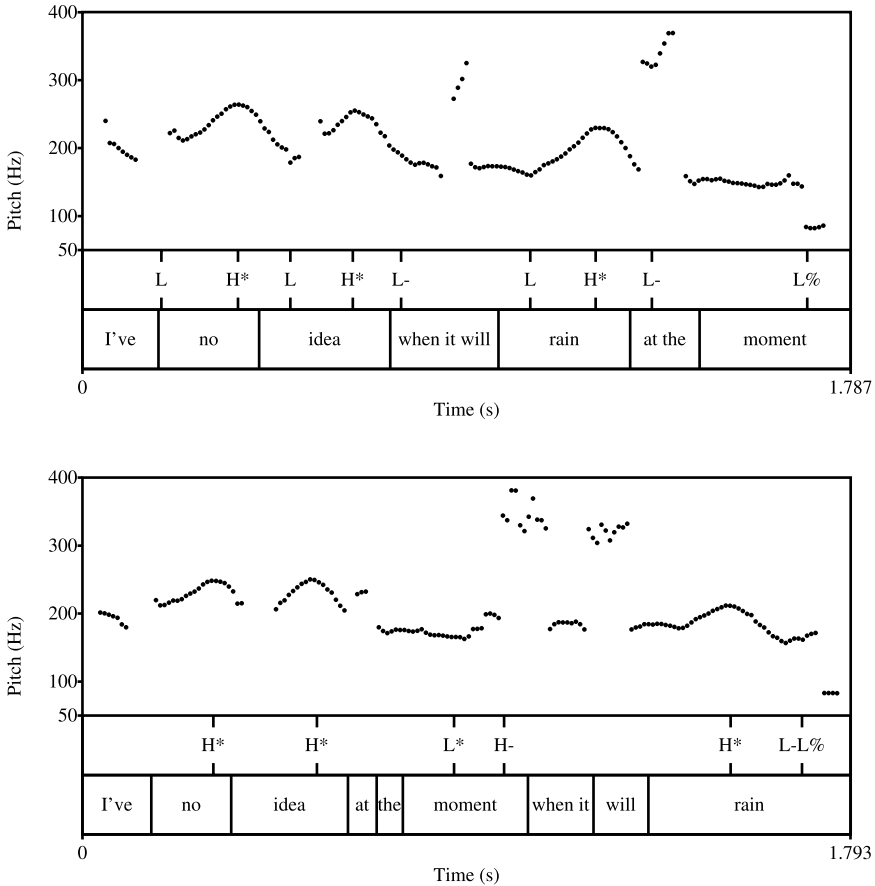
Figure 4.12: Extraposition across a deaccented PP.

Whereas Hartmann's explanation of extraposition of clausal complements in German is convincing, resorting to exhaustivity in English is not the right solution because the operation is in principle optional. Although it is strongly preferred in the case of the verb-particle construction, it is optional in the other examples mentioned here. Exh_{PPh} certainly requires the light constituents at the right edge to be integrated into phonological phrases. Extraposition is one possibility because the deaccented prosodic words can be phrased naturally with the other constituents of the verb phrase. The question to be answered is why extraposition is not obligatory. In German, extraposition of relatives, as opposed to extraposition of complement clauses, is not obligatory either. Hartmann notes that a final verb in an example like (597) can avoid a violation of exhaustivity if it is accented. If it is ac-

cented, it can be parsed into a phonological phrase. For reasons that are unclear at the moment, such a strategy is not available if the CP is a complement of the verb, as in (582) above.[16]

(597) *Ich werde heute Abend   ein Kleid, das ich selber genäht habe, tragen.*
       I   will   this evening a dress that I   myself sewn   have wear
       'This evening, I will wear a dress that I have sewn myself.'

The accentuation strategy is not available in English thetic sentences unless the vP contains several constituents. In that case, phrasal stress can be assigned optionally. Examples are given in (598) and (599). Capital letters mark the nuclear accent in the (a) examples and everything following it is deaccented.

(598) *Let me tell you something.*
   a. *A néw bóok about TURNER appeared last year.*
   b. *(A néw bóok about Túrner) (appéared lást yéar)*
   c. *(A néw bóok about Túrner) (appéared last year)*
   d. *(A néw bóok appeared last year) (about Túrner)*

(599) a. *A mán who I know from ROME just walked into my room.*
   b. *(A mán who I know from Róme) (just wálked into my róom)*
   c. *(A mán just walked into my room) (who I know from Róme)*
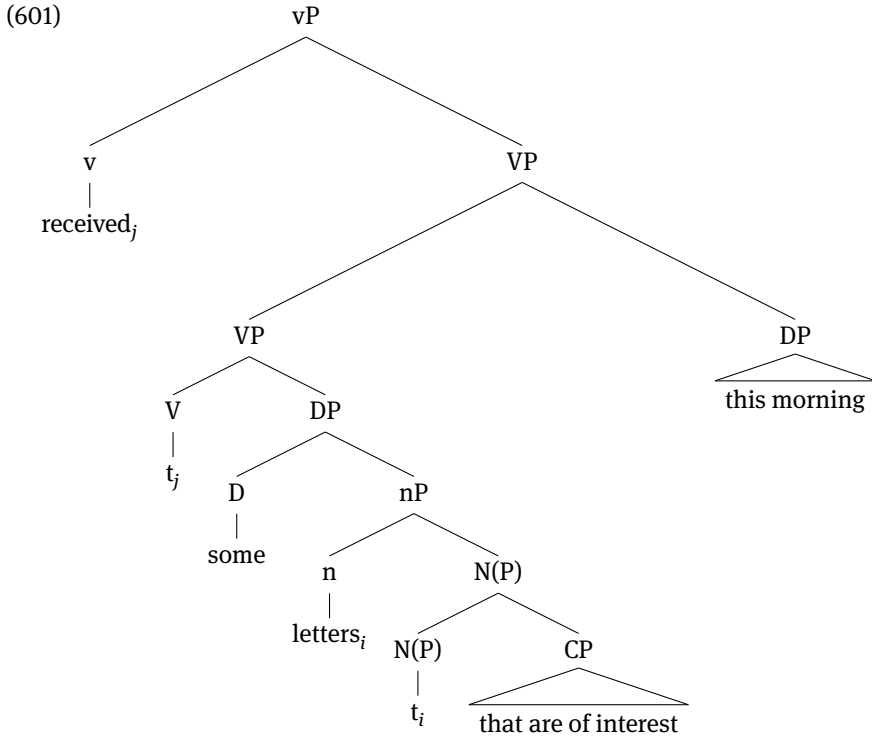
The solution, I think, is a recursive phonological phrase, as in (600). English allows such structures quite freely (Ladd 1992; Gussenhoven 1991, 2005). This structure is practically enforced by the ranking $\text{Exh}_{PPh} \gg \text{NonRec}_{PPh}$, established in section 3.3.3.

(600) *(I recéived some létters) ((that are of ínterest) this morning)*

Obligatory parsing of prosodic words at the phonological phrase level may be due to Exh_{PPh}, but can also be a consequence of the interface constraints. Applied to a structure like (601), Align-XP already demands a phonological phrase boundary after *interest* and after the whole vP headed by *received*, accounting for the recursive structure of the right-hand phonological phrase. Consequently, Exh_{PPh} is not

---

16 Note that phrasal stress on the verb in (597) cannot be attributed to Stress-XP because the DP which contains the relative is the object of the verb and phrasal stress assignment within the object should also satisfy Stress-XP for the VP, as it does in the case of CP complements. Extraposition of the relative remains optional even if the verb is contextually deaccented, e. g., if (597) is uttered as an answer to *Was trägst du heute Abend?* 'What will you be wearing tonight?.' The resolution of this problem remains a research question and it is not clear to me whether the solution for English below can be extended successfully to German.

needed for the accommodation of light constituents at the right edge of the sentence. It is, therefore, not an obvious 'trigger' for extraposition in English. However, EXH_{PPh} (together with NONREC_{PPh}) is responsible for the formation of the left-hand phonological phrase because ALIGN-XP is not responsible for the phonological phrase boundary after *letters*. There is no XP edge at that point.

(601)

```
                              vP
                   ┌───────────┴──────────────┐
                   v                          VP
                   │                  ┌────────┴────────────┐
               received_j            VP                    DP
                             ┌────────┴──────┐             ╱ ╲
                             V              DP        this morning
                             │          ┌────┴─────┐
                            t_j         D          nP
                                        │      ┌────┴──────┐
                                      some     n         N(P)
                                               │      ┌────┴────┐
                                           letters_i N(P)       CP
                                                      │        ╱ ╲
                                                     t_i  that are of interest
```

The evaluation of this example can be inspected in the tableaux in Figure 4.13.[17] It is based on the structure in (601). Henceforth, all evaluations will refer to syntactic (pre-spell-out) structures directly, not to PF representations. This move only simplifies the presentation, without having any theoretical consequences for the analysis.

In candidate (a) all material spelled out on the v⋆P cycle is unparsed at the phonological phrase level. Insertion of a phonological phrase boundary at the right edge in candidate (b), as demanded by ALIGN-XP, still leaves two prosodic words unparsed. Hence, this candidate is excluded by EXH_{PPh}. Candidate (c) in-

---

17 MINBIN(PPH) has no effect on the evaluation and has been omitted for the sake of clarity.

First tableau (input: *I received some letters that are of interest this morning*)

Candidate	Align-XP	Ph=PPh	Exh	NonRec
a. $[\{$I received$\}_{PWd}$ $\{$some letters$\}_{PWd}$ (that are of interest) $\{$this morning$\}_{PWd}]_{IP}$	*!	*	***	
b. $[\{$I received$\}_{PWd}$ $\{$some letters$\}_{PWd}$ (that are of interest) this morning$)]_{IP}$		*	**!*	*
c. (I received some letters ((that are of interest) this morning)		*		**!
☞ d. (I received some letters) ((that are of interest) this morning)		*		*
e. (I received some letters) (that are of interest this morning)	*!*	**		
f. (I received some letters this morning) (that are of interest)	*!			

Second tableau (input: *I received some letters that are of interest this morning*)

Candidate	Ph=PPh	Align-XP	Exh	NonRec
a. $[\{$I received$\}_{PWd}$ $\{$some letters$\}_{PWd}$ (that are of interest) $\{$this morning$\}_{PWd}]_{IP}$	*!	*	***	
b. $[\{$I received$\}_{PWd}$ $\{$some letters$\}_{PWd}$ (that are of interest) this morning$)]_{IP}$	*!		**	*
c. (I received some letters ((that are of interest) this morning)	*!			**
d. (I received some letters) ((that are of interest) this morning)	*!			*
e. (I received some letters) (that are of interest this morning)	*!*	**		*
☞ f. (I received some letters this morning) (that are of interest)		*		

Figure 4.13: Extraposition across a light constituent.

tegrates these two prosodic words in terms of a recursive structure. This structure is not attested (there is an L-boundary tone after *letters*) and is ruled out by Non-Rec_{PPh}. Insertion of a phonological phrase boundary after *letters*, as in candidate (d), yields the optimal structure. In candidate (e), the deictic expression is integrated into the phonological phrase based on the relative although it does not bear any syntactic or semantic relation to this clause. This violates Ph=PPh for the relative clause, but also for the matrix v*P. It also incurs two violations of Align-XP

because the nPs headed by *letters* and *interest*, whose right edges coincide, are not aligned. Candidate (f) is the extraposition candidate, which is chosen as optimal in the second tableau, in which Pʜ=PPʜ dominates Aʟɪɢɴ-XP.

Summing up the discussion so far, this section has examined sentences with light constituents at the right edge in order to determine whether exhaustivity plays any role in extraposition. The fact that light constituents can be pronounced after the relative suggests that English has a strategy to accommodate them, namely a recursive prosodic structure. The recursive phonological phrase structure follows from the requirements of the interface constraints. Since these constraints are freely ranked, the driving force behind extraposition in English is Pʜ=PPʜ, specifically, when it dominates Aʟɪɢɴ-XP. This ranking forces the relative to the right edge of the matrix clause, allowing the light constituent to be phrased with material it is syntactically and semantically related to.

The remainder of this section addresses the verb-particle construction in (602), which shows a clear preference for the extraposition construction.

(602)   a.   ?*(He cálled a wóman) (who he knéw from Róme) up*
       b.   *(He called a wóman up) (who he knéw from Róme)*

In the account developed here such a preference is clearly not expected. The particle can be integrated in terms of a recursive phonological phrase structure, the same way a deictic element or unaccented verb can. Proof for this is that (602a) is not completely unacceptable for all speakers. Some native speakers can cope with this construction even if the object is complex and followed by the particle. But it is not optimal.[18]

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18 For other speakers, a clausal edge preceding the particle has a much more devastating effect on acceptability, as the following contrast from Fraser (1974: 19) shows. The examples are interesting since the objects seem to be roughly equal in length.

(i)   a.   **I called the man who left up.*
   b.   *He called all of my best friends up.*

Ross (1967: 50) provides the following contrasts, showing different degrees of acceptability. Full relatives preceding the particle are fully ungrammatical for him, although the object is not excessively complex.

(ii)   a.   **I ran a man who was old down.*
       b.   *I ran an old man down.*

(iii) a.   **I'm going to call somebody who is strong up.*
       b.   ?*I'm going to call somebody strong up.*

I think the degraded acceptability is due to interference from the syntax, namely the additional syntactic option of particle shift, which strands the whole complex DP at the right edge, as in (603). In other words, the word order in (603b) is derived in the syntax, while extraposition in (602b) is derived at PF. Nevertheless, there are three word orders associated with different prosodic structures which can and should be evaluated in parallel.
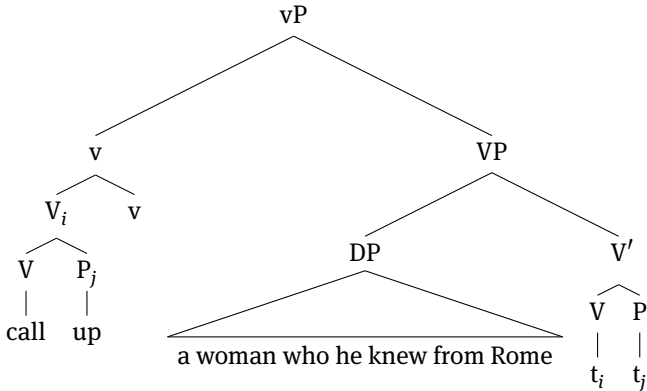
(603) a. *What did he do next?*
       b. *(He cálled up a wóman) (who he knéw from Róme)*

So what is the input structure corresponding to the word order in (602a), from which (602b) is then derived by PF movement? Without reviewing the vast literature on this topic here, I will essentially assume the syntactic analysis in Göbbel (2003b: 119–126). There it is argued that in verb-particle constructions in which the particle is non-predicative (idiomatic or aspectual, e. g., *call up*, *lay off*, *eat up*), the verb merges with the particle and the object is merged as the specifier of VP, as shown in (604). In an idiomatic verb-particle construction like this one, the verb and particle conjointly determine the theta-role of the argument in SpecVP. The verb moves to the head of the vP, which gives us the word order in (602a). The particle, however, can also incorporate into the verb by head adjunction and take a ride up to v, as in (605). This verb-particle-object order has the prosodic structure in (603b).
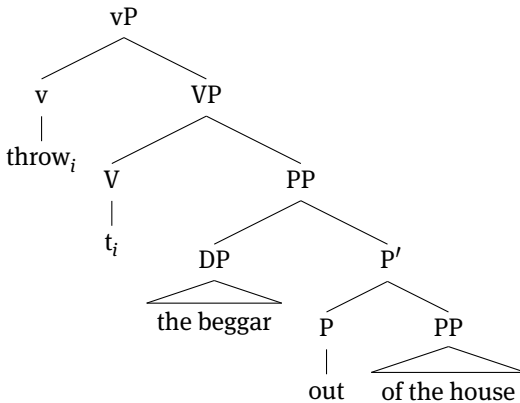
(604)
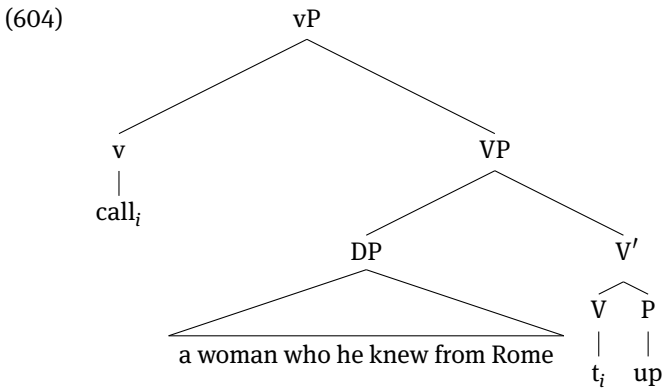
(iv) a. **I polished the vase which was from India up.*
      b. *?I polished the vase from India up.*

(605)

```
                              vP
                ┌──────────────┴──────────────┐
                v                             VP
           ┌────┴────┐              ┌──────────┴──────────┐
          Vᵢ         v             DP                     V′
        ┌──┴──┐                 ┌───┴───┐              ┌───┴───┐
        V     Pⱼ                                       V       P
        │     │         a woman who he knew from Rome  │       │
      call    up                                       tᵢ      tⱼ
```

A slightly different analysis must be assumed if the particle is predicative and can determine the theta-role of the object itself (e. g., *throw someone out* or *turn the lights on*). In this case, the object is first merged as the specifier of the PP headed by the particle, as in (606).

(606) *Throw the beggar out (of the house)!*

```
                    vP
          ┌──────────┴──────────┐
          v                     VP
          │          ┌──────────┴──────────┐
        throwᵢ       V                     PP
                     │          ┌──────────┴──────────┐
                     tᵢ        DP                     P′
                           ┌────┴────┐          ┌──────┴──────┐
                          the beggar           P            PP
                                               │        ┌────┴────┐
                                              out      of the house
```

Consequently, in sentences with predicative and non-predicative particles the verb selects as its complement the particle or a projection of the particle (which is of category P). The difference between them is that in predicative structures the object is an argument of the particle, merged in SpecPP, while in nonpredicative ones it is the argument of the V+P combination. In the latter, it cannot be merged as complement of V+P because the particle can project a whole PP in its base position, accepting modifiers only in that position. Cf.

(607) a. *He looked the reference [ₚₚ right up].*
       b. **He looked right up the reference.*

    c.   *He ate it [PP all up].*
    d.   **He at all up the sandwich.*

In predicative structures the argument is licensed in the SpecPP because in many cases a verb is not needed at all, as the examples in (608) demonstrate.

(608)   a.   *Throw the beggar out of the house!*
           b.   *The beggar is out of the house.*
           c.   *He turned the lights on.*
           d.   *The lights are on.*

After this short excursion into the syntax of this construction, let us return to the examples in (602) and (603b). What has to be explained is why the relative clause prefers the right-peripheral position, regardless of whether it is extraposed or stranded there. The analysis developed so far captures these two preferences without any further qualifications if all three word order options are evaluated in the same tableau. In fact, the recursive prosodic structure which I have argued to accommodate light constituents at the right edge is now excluded because there are two other acceptable candidates which do not require this strategy. The evaluation can be viewed in the tableaux in Figure 4.14. The evaluation of the candidates refers to the structure in (604), except candidate (d), which is evaluated on the basis of the syntactic structure in (605).

    If the intonational phrase dominates the particle directly, as in candidate (a), then the structure violates ExhₚₚₕExh*PPh* and also ALIGN-XP because the vP, which is headed by *called*, is not aligned with a phonological phrase boundary. It also violates PH=PPH because only the relative clause corresponds to a phonological

he called a woman who he knew from Rome up	Align-XP	Ph=PPh	Exh_PPh	NonRec
[(he called a woman) (who he knew from Rome) {up}_PWd]_IP a.	*!	*	*	
(he called a woman) ((who he knew from Rome) up) b.		*		*!
(he called a woman) (who he knew from Rome up) c.	*!**	**		
☞ (he called up a woman) (who he knew from Rome) d.		*		
(he called a woman up) (who he knew from Rome) e.	*!			

he called a woman who he knew from Rome up	Ph=PPh	Align-XP	Exh_PPh	NonRec
[(he called a woman) (who he knew from Rome) {up}_PWd]_IP a.	*!	*	*	
(he called a woman) ((who he knew from Rome) up) b.	*!			*
(he called a woman) (who he knew from Rome up) c.	*!*	***		
(he called up a woman) (who he knew from Rome) d.	*!			
☞ (he called a woman up) (who he knew from Rome) e.		*		

Figure 4.14: Extraposition in a verb-particle construction.

phrase, but not the matrix vP. Candidate (b), which has a recursive phonological phrase structure, violates NONREC_{PPh}. It also violates PH=PPH for the same reason as candidate (a). Candidate (c) has the particle included in the phonological phrase containing the relative clause, which leads to three violations of ALIGN-XP, because the nP headed by *woman*, the vP headed by *knew* and the nP headed by *Rome* are not aligned. This candidate also violates PH=PPH twice because neither the relative nor the matrix vP forms a phonological phrase. Candidate (d) only violates PH=PPH because the matrix vP, which includes the relative, is not contained in one phonological phrase. Removing the relative from vP at PF, as in candidate (e), satisfies PH=PPH, but incurs a violation of ALIGN-XP because the nP headed by *woman* is not aligned with a phonological phrase boundary. Free ranking of the interface constraints will choose as the optimal candidates either candidate (d), in which the particle has moved leftward with the verb, or candidate (e), in which the relative clause has moved rightward.

4.3.3 The role of head-alignment constraints

The discussion so far has focused on optional extraposition. Nothing has been said about what could block extraposition. In this section, I consider cases in which right-edge prominence blocks this operation. This section also clarifies the ranking of the head-alignment constraints and their role in accentuation of thetic sentences. Finally, I examine whether the head-alignment constraints can also trigger extraposition, particularly in those cases in which the PP/relative is focused. The reason is that focused constituents contain the nuclear stress and head-alignment constraints prefer prominent constituents at the right edge of a phonological phrase or intonational phrase.

4.3.3.1 Blocking extraposition
Consider (609), a typical example of extraposition in thetic sentences.

(609)   a.   *In 1911, a steamer sank from the Cunard Line.*
        b.   *(In níneteen eléven) (a stéamer sank) (from the Cúnard Line)*

If the sentence contains an adverb, as in (610), extraposition is blocked. In fact, it is not the adverb *per se* that blocks extraposition, but the prosodic structure that such a VP-final adverb induces. Defocussing the predicate together with the adverb, as in (611), makes extraposition possible again.

(610) ??*In 1911, a steamer sank quickly from the Cunard Line.*

(611)   *Tell me something about memorable steamers during WW I!*

    a.   *Well, let's see. The Cunard Liner Lusitania was torpedoed by a U-boat and sank quickly. I'm also pretty sure a steamer sank quickly from the White Star Line. I think it was the Arabic.*

    b.   *(I'm álso pretty sure) (a stéamer sank quickly) (from the Whíte Stár Line)*

On the other hand, it is not the case that any accented constituent at the right edge of the phrase blocks extraposition. We have seen in section 4.3.1 that the predicate itself can be accented, as in (612a), or there can be an accented argument at the right edge, as in (612b).

(612)   a.   *(Píctures will be distríbuted) (of évery térrorist)*
    b.   *(Órders were given to the rébels) (to blów up the ráilway bridge)*

Extraposition from object obeys similar restrictions. An extraposed constituent can cross different VP adverbials, particularly, locative, temporal and object-oriented adverbials. But it resists movement across certain VP adverbs, like manner and rate adverbs. Cf.:

(613)   a.   *(I read a mágazine on the tráin) (about Túrner)*
    b.   *(I read a mágazine on Mónday) (about Túrner)*
    c.   *(You'll find a réview in your ín-tray) (of Túrner)*
    d.   ??*I read a magazine carefully about Turner.*
    e.   ??*He read a book slowly of more than 500 pages.*
    f.   ??*I hired a man immediately from Wuppertal.*

Now, what is special about postverbal adverbs such that they can block extraposition? The adverbs in (613) all have the option to occur in preverbal position, and this is the canonical position if they are integrated into a larger focus or if the adverb is defocused. Postverbal position of manner adverbs is typically the position in which they are focused or asserted (Mittwoch, Huddleston, and Collins 2002; Shaer 2003; Larson 2003). This has been demonstrated by Wickboldt (2000) and Shaer (2003) with temporal *since*-clauses. These clauses introduce presuppositions and disallow asserted information. The examples in (614) from Shaer (2003) show that only the causal interpretation of the subordinate clause is available if the adverb is postverbal.

(614)   a.   *Since John quietly entered the room, he's been looking for a seat.*
    b.   #*Since John entered the room quietly, he's been looking for a seat.*
    c.   *Since John entered the room quietly, no one noticed him.* (=causal)

Postverbal adverbs tend to be phonologically prominent and are often associated with a rising pitch accent (L+H⋆). By default they also associate with focus-sensitive operators like negation and question operators.[19] On the other hand, in the grammatical cases of extraposition, the constituent moved across is often downstepped, following the natural declination of the intonational contour. The phonological phrase formed by the extraposed constituent is also downstepped with respect to the preceding phonological phrase, as can be seen in the first pitch track in Figure 4.15.

I can think of two ways to explain in phonological terms the restriction an emphatic or focused adverb imposes on extraposition. In Göbbel (2007a), I suggested that such a constituent induces an intonational phrase boundary at its right edge and extraposition is confined WITHIN the boundaries of an intonational phrase.

(615)   No movement across an intonational phrase boundary:

    a.   (... ~~XP~~ ...)$_{PPh}$ XP
    b. ⋆(... ~~XP~~ ...)$_{IP}$ XP

Confinement of extraposition within the boundaries of an intonational phrase seems to be confirmed by that fact that detectable intonational phrase boundary cues, such as pause or significant disjuncture, are rare in my recordings of regular extraposition from objects or promoted internal arguments (cf. also Downing 1970). Furthermore, continuation rises (H%) preceding the extraposed constituent are completely absent in the same dataset. Only relatives extraposed from external arguments can map to a separate intonational phrase and pattern with heavy NP shift, as discussed in section 4.3.1.4. In heavy NP shift constructions, a continuation rise (H%) is more readily available and a VP adverb does not necessarily interfere, as in the example (616).

(616)   In order to avoid world-wide criticism, [(the Président) (fired immédiately)]$_{IP}$ [(a híghly decorated géneral)]$_{IP}$

---

19 Cf. Takami (1990) with reference to extraposition. See also Gabby and Moravcsik (1978) and Moser (1995) for association of adjuncts with negation. Gabby and Moravcsik discuss examples like (i). In the first three examples, negation associates with the adjunct. In (id), however, it is the whole VP that is negated by default.

(i)   a.   *This is not a large house.*
        b.   *He did not make this hole with a drill.*
        c.   *He did not run quickly.*
        d.   *He is not hunting lions.*
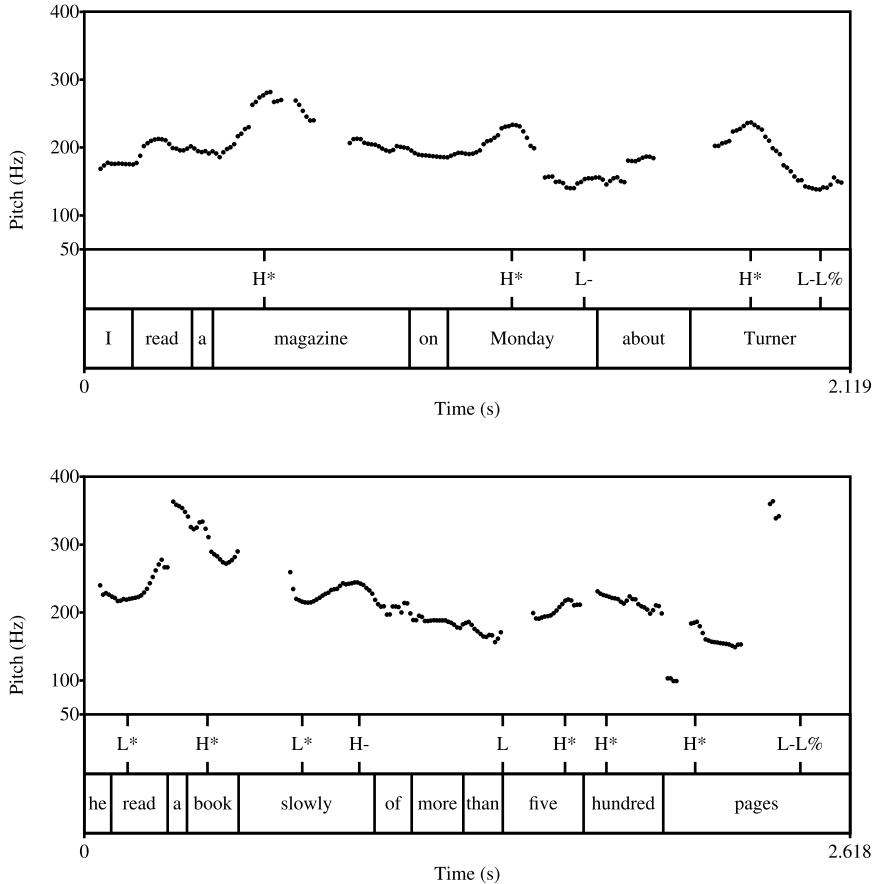   (Gabby and Moravcsik 1978: 252)

Figure 4.15: Extraposition of PP across different types of adjunct.

There is however a problem with this analysis: if the shifted NP in (616) cannot form an intonational phrase itself, heavy NP shift is also not very good (e. g., if the NP is replaced with *an Air Force general*). The same holds for extraposition of relatives from external arguments, which must be mappable to an intonational phrase in order to avoid a violation of EXH$_{IP}$ (cf. section 4.3.1.4).

Another problem is that some speakers I have consulted can have VP-final adverbs integrated into a broad focus. That is, they are not necessarily emphatic or narrowly focused (cf. Göbbel 2007b). If they are integrated into a broad focus, then the adverb may be associated with a non-prominent L* tone. For speakers who can integrate an adverb into a broad focus with a non-prominent accent, extraposition

is not blocked. This can be seen in the second pitch track in Figure 4.15, the pitch track of example (617).

(617)   *(He read a book slowly) (of more than 500 pages)*

Consider also the examples (618), in which extraposition is blocked. Neither of the two PP complements can shift rightwards. While (618b) would count as a Subjacency violation, (618c) would not. The pitch track in Figure 4.16 clearly shows that the strongest prominence is on the adverb. It is this prominence within the intonational phrase that blocks extraposition. It does not block heavy NP shift in (618d), in which the shifted DP may be preceded by a continuation rise (H%).
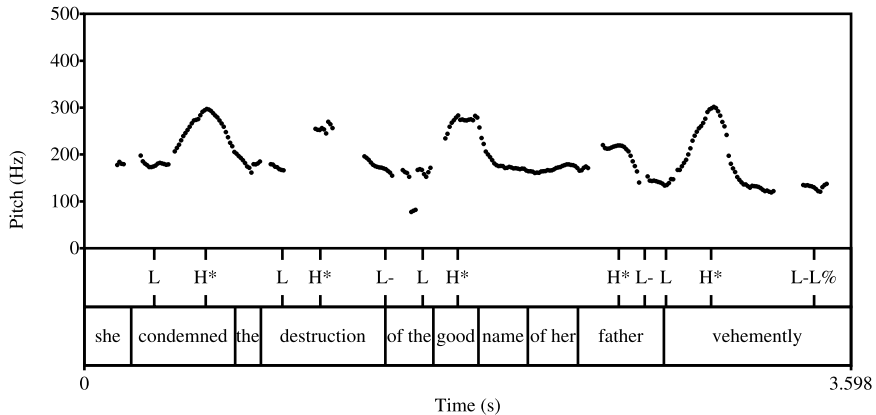
Figure 4.16: Prominent adverb at the right edge.

(618)   *What did Mary do at the rally last night?*

    a.   *(She condémned the destrúction) (of the góod name of her fáther) (VE-HEMENTLY)*

    b.   **She condemned the destruction of the good name VEHEMENTLY of her father.*

    c.   **She condemned the destruction VEHEMENTLY of the good name of her father.*

    d.   *She condemned VEHEMENTLY the destruction of the good name of her father.*

I think that a more principled explanation of the final adverb effect is the following: movement of a non-defocussed PP complement/adjunct over an emphatic and prosodically more prominent adverb within the same intonational phrase

gives rise to a phonological structure in which the most prominent constituent of the intonational phrase is not rightmost. What has to be ruled out is actually the representation in (619b), derived from a representation like (619a).

(619) a. [(a stéamer from the Cúnard Line) (sánk QUICKLY)]$_{IP}$
       b. *[(a stéamer) (sánk QUICKLY) (from the Cúnard Line)]$_{IP}$

The metrical grid in Figure 4.17 shows that the PP adjunct only has phonological phrase level prominence, while the designated terminal element of the intonational phrase (i. e., the constituent with intonational phrase level metrical prominence) is not contained in the righthand phonological phrase.

```
(                    *                           )        IP
(     *   ) (        *    ) (          *         )        PPh
(     *   ) ( * ) (  *    ) (      (  *       ))          PWd
(     *   ) ( * ) (  *    )        (  *   ) ( * )         PWd
 a steamer  sank   quickly  from the Cunard  Line
```

Figure 4.17: Metrical grid.

Recall from section 3.2.3.1 that prosodic constituents typically require their heads to occur at their right or left edges, the head of a prosodic constituent being the most prominent constituent at the immediately lower level of the prosodic hierarchy. English is left-headed at the foot level, but the hierarchically higher constituents (i. e. prosodic word, phonological phrase, intonational phrase) are all right-headed. It was noted there that edge prominence has been formalised in terms of the head-alignment constraints ALIGN H-PWD (Prince and Smolensky 2004; McCarthy and Prince 1993), ALIGN H-PPH and ALIGN H-IP (Truckenbrodt 1995b; Samek-Lodovici 2005), which are repeated below for convenience.

(620) ALIGN H-PWD (PWd, R; Head-PWd, R)
       Align the right edge of every phonological word with the right edge of its head.

(621) ALIGN H-PPH (PPh, R; Head-PPh, R)
       Align the right edge of every phonological phrase with the right edge of its head.

(622) ALIGN H-IP (IP, R; Head-IP, R)
       Align the right edge of every intonational phrase with the right edge of its head.

According to the categorical interpretation (McCarthy 2003), the constraint Align H-PPh receives a violation mark for every prosodic word that separates the head word from the right edge of the phonological phrase. Align H-IP receives a violation mark for every phonological phrase that separates the head phonological phrase from the right edge of the intonational phrase. In order to show how they are applied, consider the two (hypothetical) prosodic structures in (623).

(623)   *A man from INDIA walked in today.*
          a.   [((A man from INDIA) walked in today)]$_{IP}$ Align H-PPh***
          b.   [(A man from INDIA) (walked in today)]$_{IP}$ Align H-IP*

The prosodic structure (623a) violates Align H-PPh three times because the head word *India* is separated from the right edge of the recursive phonological phrase by three prosodic words. It does not violate Align H-IP because there is no phonological phrase that separates the head phonological phrase from the right edge of that intonational phrase. In (623b), two phonological phrases are dominated directly by the intonational phrase. Align H-PPh is not violated in any of the two phonological phrases. The head of the first one is *India*, and the head of the second one, which contains only deaccented prosodic words, is *today*. But Align H-IP is violated now, because the most prominent phonological phrase, the one containing the nuclear stress is not final in the intonational phrase.

Now consider again extraposition across an emphatically accented constituent, the metrical grid in Figure 4.17. This prosodic structure violates Align H-IP. It also violates Align H-PPh because *Cunard Line* is a compound consisting of two prosodic words. The final one is destressed due to final word extrametricality.

The evaluation of example (619), which contains an unaccusative verb and is spelled out in one phase, can be viewed in the tableau in Figure 4.18. Nuclear stress is indicated by big caps, whereas phrasal stress is indicated by small caps. Regardless of the ranking of the head-alignment constraints with respect to the interface constraints, Align H-IP blocks extraposition in this configuration. Align H-PPh is violated in both candidates and has no effect on the evaluation.

a steamer from the Cunard Line sank quickly	Align H-IP	Align H-PPh	Align-XP	Ph=PPh
☞(a steamer from the CUNARD Line) (sank QUICKLY) a.		*		*
(a STEAMER) (sank QUICKLY) (from the CUNARD Line) b.	*	*		*

Figure 4.18: Blocked extraposition.

4.3.3.2 Ranking the head-alignment constraints

Having shown that Align H-IP can block extraposition in certain configurations, let me turn to the question of the rank of the head-alignment constraints in the constraint hierarchy. Ranking these constraints allows me to establish the correct representation in (623), but also the representation for a transitive deaccented and defocused vP like (624).

(624)   a.   *Who invented the wheel?*
        b.   *The inhábitants of MESOPOTAMIA invented the wheel.*

A recurring question in this chapter is how deaccented material is integrated into the prosodic structure. I have argued that deictic material at the right edge is integrated in terms of a recursive phonological phrase. A PP like *at the moment* is not mapped to a separate phonological phrase by the interface constraints, nor is an unaccusative vP like (623). However, transitive vPs are normally mapped to separate phonological phrases. If they are deaccented, as in (624), there are several options to consider. One possibility is that they are not parsed at the level of the phonological phrase, as in (625a). A second option is a recursive phonological phrase, as in (625b). However, a widespread assumption is that focus triggers restructuring of phonological domains. This analysis is actually built into the ToBI annotation conventions (Beckman and Hirschberg 1994, Beckman and Ayers Elam 1997). If a sentence with a transitive verb is normally mapped to two phonological phrases, the defocused material is collapsed with the phonological phrase containing the focused constituent, as in (625c). A different position is defended by Winkler and Göbbel (2008) and Féry (2010), namely, that the defocused material does not undergo restructuring, but forms a phonological phrase which does not contain any pitch accents at all, as in (625d). Align H-PPh is violated twice in (625b) and (625c). Align H-IP is violated in (625d).

(625)   a.   [(The inhabitants of MESOPOTAMIA) {invented}$_{PWd}$ {the wheel}$_{PWd}$]$_{IP}$
             Align-XP**, Ph=PPh*
        b.   [((The inhabitants of MESOPOTAMIA) invented the wheel)]$_{IP}$
             Align H-PPh**, NonRec$_{PPh}$*, Ph=PPh*
        c.   [(The inhabitants of MESOPOTAMIA invented the wheel)]$_{IP}$
             Align H-PPh**, Align-XP**, Ph=PPh**
        d.   [(The inhabitants of MESOPOTAMIA) (invented the wheel)]$_{IP}$
             Align H-IP*

The ToBI analysis can be rejected on the following grounds. Focus restructuring is of course possible in English, but to the left, not to the right. Firstly, phonological phrase boundary tones like L- do not occur after a defocused subject, even if they

are accented. This is well known and discussed, for instance, by Ladd (1990, 1996: 249). One of his well-known examples is (626), on the epithet interpretation of *the butcher*.

(626) a. *Everything OK after the operation?*
      b. *Don't talk to me about it!*
         (The bútcher charged me a thousand BUCKS)

Secondly, Kenesei and Vogel (1995) have shown that the Rhythm Rule, whose domain is the phonological phrase, may shift the primary stress within a subject if the verb is focused. Compare the neutral rendition of (627) with (628).

(627) *(Paulíne) (called Jím)*

(628) a. *Did Pauline invite Jim?*
      b. *No, (Páuline CALLED Jim)*

Here I follow Féry (2010), who argues that, in the postnuclear stretch, the pitch accent associated with phrasal stress is suppressed due to radical downscaling of the pitch register. She also provides compelling arguments and experimental evidence from German that the phrasing derived from the syntax is preserved under deaccenting. Additional support for higher level deaccented prosodic constituents also comes from languages like Catalan, in which right-dislocated constituents, which are always given, are mapped to separate, completely deaccented intonational phrases (cf. Feldhausen 2006).

There is also some evidence from English that the phrasing derived from the syntax is maintained. Horne (1993) and Kenesei and Vogel (1995) argue that the Rhythm Rule also applies in the postfocal domain. For example, Horne argues that stress shift occurs in all three environments exemplified below. The book title, like any complex object, can reasonably be assumed to form a phonological phrase if it is not defocused. In (629), stress shift occurs in an environment of clash. In (630), it occurs even without a clash configuration, but *maintain* is initial in the phonological phrase. In (631), *maintain* is not initial in the phonological phrase, but occurs in a clash environment. In her experiment the frequency of stress shift decreases from 84 % in (629) to 75 % in (630), and to 53 % in (631).

(629) a. *Whose book is called "Maintain Temperament"?*
         màintáin témperament →
      b. *MY book is called ("Máintain Témperament")*

(630) a. *Whose book is called "Maintain Tenacity"?*
         màintáin tenácity →
      b. *MY book is called ("Máintain Tenácity")*

(631) a. *Whose book is called "Don't Maintain Tenements"?*
  màintáin ténements →
  b. *MY book is called ("Don't Máintain Ténements")?*

Now, we have seen in section 3.2.2.2 that stress shift is not only due to a stress clash, but also serves to mark the left edge of a phonological phrase boundary. Horne, following Shattuck-Hufnagel (1992), reaches the same conclusion, arguing that stress shift marking a phonological phrase boundary has priority over resolution of a clash (cf. also Shattuck-Hufnagel, Ostendorf and Ross 1994).[20]

Given the fact that phonological phrasing is maintained in the postnuclear stretch, we can return to our ranking issue. In order to preserve the phrasing derived from the syntax, the head-alignment constraints, particularly Align H-IP, must be ranked lower than the interface constraints, as in the first tableau in Figure 4.19. If Align H-IP is ranked higher than the interface constraints, the recursive phonological phrase will be chosen, candidate (b) in the second tableau. If both head-alignment constraints are ranked higher than the interface constraints, the transitive vP remains unparsed at the level of the phonological phrase, candidate (a) in the third tableau. Hence the ranking in (632).

(632)   Align-XP, Ph=PPh ≫ Align H-IP, Align H-PPh

4.3.3.3 Accentuation of the predicate in thetic sentences

In this section I discuss the role of the head-alignment constraints in thetic sentences in which the predicate is optionally accented. Optionality of accentuation is observed when the predicate is more complex, as in (633) and (634). Accentuation of the predicate does not have any effect on the possibility of extraposition.

(633) *Let me tell you something.*

  a. *A néw bóok about TURNER appeared last year.*
  b. *(A néw bóok about Túrner) (appéared lást yéar)*
  c. *(A néw bóok about Túrner) (appéared last year)*
  d. *(A néw bóok appeared last year) (about Túrner)*

---

20 Note that the perceived stress shifts are not the result of pitch accent association, since accentuation does not occur in the postnuclear stretch. Horne shows that it is not even duration that plays a crucial role. The difference in duration between the first and second syllable of *maintain* is too short for hearers to perceive. She suggests that the second syllable of *maintain* is defooted, undergoing reduction from a diphthong to a monophthong. But see Gussenhoven (1991) for a different explanation of stress shift in the postnuclear stretch.

[F the inhabitants of Mesopotamia] invented the wheel

	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
a. [((the inhabitants of MESOPOTAMIA) {invented} {the wheel}_PWd]_IP	**	*			
b. [((the inhabitants of MESOPOTAMIA) invented the wheel)]_IP		*		**	*
c. [(the inhabitants of MESOPOTAMIA invented the wheel)]_IP	**	**		**	
d. ☞ [(the inhabitants of MESOPOTAMIA) (invented the wheel)]_IP			*		

[F the inhabitants of Mesopotamia] invented the wheel

	Align H-IP	Align-XP	Ph=PPh	Align H-PPh	NonRec
a. [((the inhabitants of MESOPOTAMIA) {invented} {the wheel}_PWd]_IP		**	*		
b. ☞ [((the inhabitants of MESOPOTAMIA) invented the wheel)]_IP			*	**	*
c. [(the inhabitants of MESOPOTAMIA invented the wheel)]_IP		**	**	**	
d. [(the inhabitants of MESOPOTAMIA) (invented the wheel)]_IP	*!				

[F the inhabitants of Mesopotamia] invented the wheel

	Align H-IP	Align H-PPh	Align-XP	Ph=PPh	NonRec
a. ☞ [((the inhabitants of MESOPOTAMIA) {invented}_PWd {the wheel}_PWd]_IP			**	*	*
b. [((the inhabitants of MESOPOTAMIA) invented the wheel)]_IP		**	**	*	
c. [(the inhabitants of MESOPOTAMIA invented the wheel)]_IP		**	**	**	
d. [(the inhabitants of MESOPOTAMIA) (invented the wheel)]_IP	*				

Figure 4.19: Ranking the head-alignment constraints.

(634) a. *A mán who I know from ROME just walked into my room.*
       b. *(A mán who I know from Róme) (just wálked into my róom)*
       c. *(A mán just walked into my room) (who I know from Róme)*

What could be the reason for accentuation of the predicate in an essentially thetic sentence? Accentuation seems optional with canonical word order and avoided if the PP is extraposed.[21] Furthermore, deaccentuation of the predicate goes hand in hand with the scaling of the pitch accent on the constituent assigned phrasal stress in the subject NP, as can be seen in Figure 4.20. If *Turner* is given special
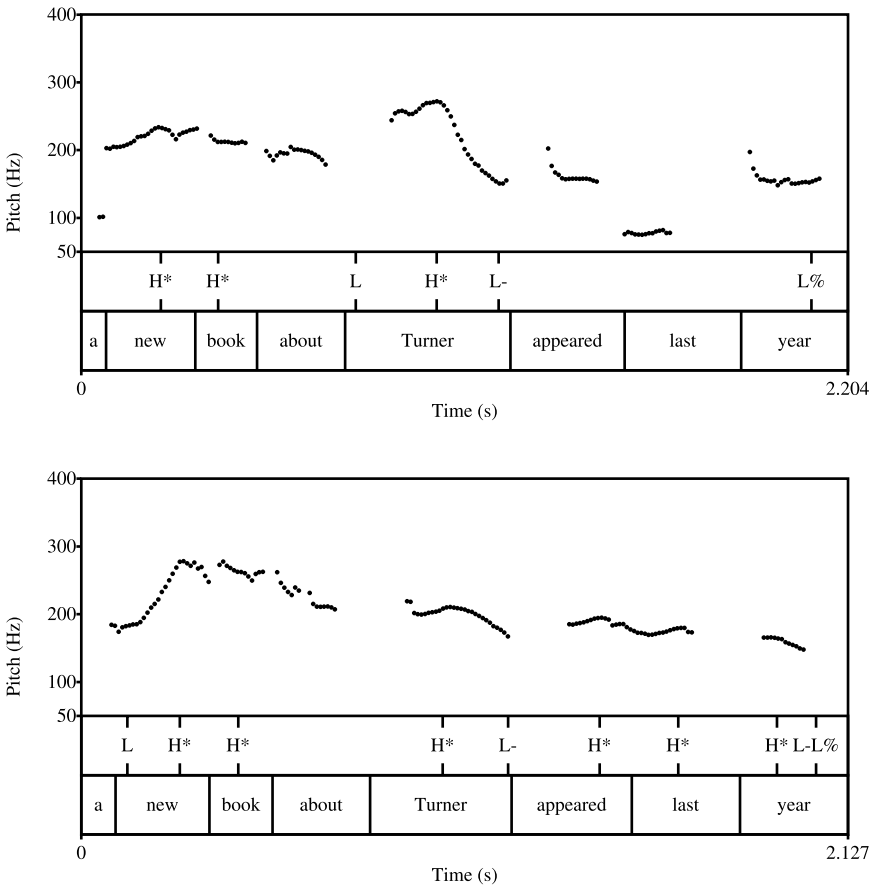
Figure 4.20: Optional accentuation in a thetic sentence.

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21 A typical intonational contour of the extraposition structure has an L* H- sequence of tones at the right edge of the first phonological phrase.

emphasis and is associated with a prominent accent (L+H*), the predicate is deaccented. If the pitch accent on *Turner* is downstepped with respect to the previous accents (i. e., if it follows the natural declination of the intonational contour), the predicate is also accented and the second phonological phrase is downstepped with respect to the first one. In the first pitch track, nuclear stress is on *Turner*. In the second pitch track, the nuclear stress is on *year* (i. e. the final accented constituent in the intonational phrase). Nuclear stress can also occur on *appeared* if *last year* is treated like a deictic element, as in (633c).

A similar point about essentially thetic sentences is made by Ladd (1996: 232–235). He argues that the normal accentual pattern of a thetic sentence like (635) is not possible if the subject and predicate are more complex. For him, accentuation of the predicate is virtually necessary in (636) and (637). According to Ladd, these sentences form two intermediate phrases (i. e., phonological phrases), of which the second one is metrically stronger.

(635)   a.   *The COFFEE machine broke.*
        b.   *JOHNSON died.*

(636)   a. ??*The coffee machine in the ANTHROPOLOGY office broke down this morning.*
        b.   *(The coffee machine in the* ANTHROPOLOGY *office) (broke DOWN this morning)*

(637)   a. ??*Former President JOHNSON unexpectedly died today.*
        b.   *(Former President* JOHNSON*) (unexpectedly DIED today)*

The literature on thetic sentences has largely ignored the fact that many predicates can be optionally accented. They are generally represented as deaccented since thetic sentences in English, German and Dutch are by definition subject-prominent sentences. Ladd attributes the phrasing and accentual pattern to the complexity of the examples. Since a subject-prominent sentence cannot be formed due to the complexity of both subject and predicate, separate phonological phrases are formed and each carries phrasal stress. This does not explain why the examples (633) and (634) can still be deaccented although both subject and predicate are complex.

A different approach is pursued by Rochemont (2013), who offers a solution in terms of givenness accommodation. For him, thetic predicates can be deaccented if construed or presented as given. What this actually means is that the normal pattern should be one in which the predicate is accented. While this approach seems reasonable for thetic sentences based on unergative verbs (e. g., *Your MOTHER called*), it overlooks the fact that the majority of thetic sentences are based on unaccusative or passivised verbs (cf. Drubig 1992).

Here I follow the thetic tradition and consider the default pattern the deaccented one, while providing an account for the accented one. The reason that the thetic predicate can be accented is due to the fact that it can form a phonological phrase (i. e., it is minimally binary), which agrees with Ladd's position. Some constraint will then require phrasal stress to be assigned, making the last phonological phrase the most prominent one. The constraint is ALIGN H-IP, which requires the intonational phrase to have its head at its right edge. On the other hand, a relatively prominent or emphatic subject will prevent formation of a phonological phrase based on the predicate. In other words, if nuclear stress is on the subject or some constituent within the subject phrase, like *Turner* in (633), any accents after it are ruled out by POSTNUCLEAR DEACCENTING, introduced in section 3.2.3.2 and repeated in (638).

(638)   POSTNUC-D
        No pitch accents are realised in the postnuclear stretch.

In the approach developed so far the interface constraints derive the prosodic structure in (639a). ALIGN-XP forces a phonological phrase boundary after *Turner* because two nPs have to be aligned. Unlike transitive vPs, PH=PPH does not require the vP to form a phonological phrase since the vP here is not a phase and Spell-Out Domain. Phrasal stress is assigned to *Turner*, as in (639b). This violates ALIGN H-PPH three times, but not ALIGN-H-IP. A representation which violates ALIGN H-IP, but does not violate ALIGN H-PPH is (639c).

(639)   a.   ((A new book about Turner) appeared last year)
        b.   ((A new book about TURNER) appeared last year)
        c.   [(A new book about TURNER) (appeared last year)]_{IP}

The choice depends on the ranking of the head-alignment constraints with respect to each other, which is fairly difficult to establish. For example, Féry and Samek-Lodovici (2006) assume without discussion that ALIGN H-PPH dominates ALIGN H-IP. However, in order to prevent any random unaccented constituents to form a phonological phrase at the right edge, like the two deictic elements in (640), it is necessary to rank ALIGN H-IP higher than ALIGN H-PPH.

(640)   *I met a famous linguist who's written ten books here today.*
        a.   [(I met a famous LINGUIST) (who's written ten BOOKS) (here today)]_{IP}
             ALIGN H-PPH ≫ ALIGN-H-IP
        b.   [(I met a famous LINGUIST) ((who's written ten BOOKS) here today)]_{IP}
             ALIGN-H-IP ≫ ALIGN H-PPH √

The following partial hierarchy can be established:

(641)   ALIGN-XP, PH=PPH ≫ ALIGN H-IP ≫ ALIGN H-PPH

The consequence of the ranking in (641) is that the head-alignment constraints will not interfere with the phrasing derived from the syntax unless an accented phonological phrase can be formed that meets the requirements for right headedness in the intonational phrase, as in (642).

(642)   [(A new book about TURNER) (appeared last YEAR)]$_{IP}$

If the nuclear stress is assigned to *Turner*, marked with big caps in (643), POSTNUC-D will prevent phrasal stress in the postnuclear stretch and the ranking ALIGN H-IP ≫ ALIGN H-PPH will prevent formation of a (deaccented) phonological phrase. In other words, the phrasing derived from the syntax is preserved in this case.

(643)   ((A new book about TURNER) appeared last year)

One possible way to distinguish (643) from (642) is to assign them different focus structures, which are responsible for the different positions of the nuclear stress. The subject-prominent sentence can be represented as a nested focus structure, as in (644a). In this case, *Turner* attracts nuclear stress because STRESS-FOC demands that a focused constituent bear intonational phrase level metrical prominence.[22] The other case is simply a broad focus, as in (644b), and a default prominence pattern is computed with right-peripheral nuclear stress. That is, the last phrasal stress is strengthened at the level of the intonational phrase (cf. section 3.2.3).

(644)   a.   [$_F$ A new book about [$_F$ TURNER] appeared last year]
         b.   [$_F$ A new book about TURNER appeared last YEAR]

The constraint ranking that can be established at this point is given in (645). No ranking has been established yet between ALIGN H-PPH and NONREC$_{PPh}$. ALIGN H-IP must be ranked lower than POSTNUC-D. If it were not, English would not exhibit postnuclear deaccenting and the stress pattern of (643) with an emphatic accent on *Turner* could not be captured. Maybe, POSTNUC-D is undominated in English and other similar languages (but see Katz and Selkirk 2011 and section 3.2.3.2 for a brief discussion of exceptions).

(645)   STRESS-FOC, POSTNUC-D ≫ ALIGN-XP, PH=PPH ≫ ALIGN H-IP ≫ ALIGN H-PPH, NONREC$_{PPh}$

---

[22] The nested focus structure mimics earlier approaches to thetic sentences in terms of focus projection (Selkirk 1984, 1995a; Winkler 1996). On nested foci, see also Neeleman and Szendröi (2004) as well as Féry and Samek-Lodovici (2006). The latter offer an optimality-theoretic account which differs from the one developed here.

The evaluation of the two phrasing options, including extraposition, can be viewed in Figure 4.21. The first two tableaux evaluate the "broad" focus or focus-neutral case, while the third and fourth tableaux present the evaluation of the

Tableau 1 — a new book about Turner appeared last year

	PostNuc-D	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
☞ a. [(a new book about TURNER) (appeared last YEAR)]_IP			*		***	
b. [((a new book about TURNER) appeared last year)]_IP			*		***	*
c. [(a new book about TURNER) (appeared last year)]_IP			*	*!	***	
d. [(a new BOOK appeared last year) (about TURNER)]_IP		*!			***	

Tableau 2 — a new book about Turner appeared last year

	PostNuc-D	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
a. [(a new book about TURNER) (appeared last YEAR)]_IP		*!			***	
b. [((a new book about TURNER) appeared last year)]_IP		*!			***	*
c. [(a new book about TURNER) (appeared last year)]_IP		*!		*	***	
☞ d. [(a new BOOK appeared last year) (about TURNER)]_IP			*		***	

Tableau 3 — [_F a new book about Turner] appeared last year

	PostNuc-D	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
a. [(a new book about TURNER) (appeared last YEAR)]_IP	*!		*	*	***	
☞ b. [((a new book about TURNER) appeared last year)]_IP			*		***	*
c. [(a new book about TURNER) (appeared last year)]_IP			*	*!	***	
d. [(a new BOOK appeared last year) (about TURNER)]_IP		*!			***	

Tableau 4 — [_F a new book about Turner] appeared last year

	PostNuc-D	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
a. [(a new book about TURNER) (appeared last YEAR)]_IP	*!			*	***	
b. [((a new book about TURNER) appeared last year)]_IP		*!			***	*
c. [(a new book about TURNER) (appeared last year)]_IP		*!		*	***	
☞ d. [(a new BOOK appeared last year) (about TURNER)]_IP		*	*		***	

Figure 4.21: Extraposition of PP in thetic sentences.

nested focus or subject-prominent case. Several phrasing and prominence patterns are represented in the candidate set.

As can be seen in the first tableau, ALIGN H-IP prevents the formation of an unaccented phonological phrase at the right edge from material that is not mapped to a phonological phrase by the interface constraints (candidate c), unless that material is also accented or contains phrasal stress (candidate a). In this tableau, candidate (a) is the optimal candidate. In the third tableau, this candidate is excluded by POSTNUC-D.

Extraposition is the result of the ranking PH=PPH ≫ ALIGN-XP in the second and fourth tableau. Note that, in order to force extraposition, it must be assumed that candidate (b), violates PH=PPH even though the whole thetic/unaccusative sentence is contained in one recursive phonological phrase. This is not necessarily a shortcoming of the analysis. If recursive phonological phrases were allowed to save violations of PH=PPH more generally, as in (646b), the account of optional phrasing in (647), in which either ALIGN-XP or PH=PPH is violated, would also not work.

(646)   a.   [v*P (a b) (c)]
            (She lóaned her róllerblades) (to Róbin)
        b.   [v*P ((a b) (c))]
            ((She lóaned her róllerblades) (to Róbin))

(647)   a.   (She lóaned her róllerblades to Róbin)   PH=PPH ≫ ALIGN-XP
        b.   (She lóaned her róllerblades) (to Róbin)   ALIGN-XP ≫ PH=PPH

4.3.3.4 Deaccentuation of relatives in thetic sentences

While the predicate of thetic sentences can be optionally accented, Bolinger (1992) argues that relative clauses may sometimes be completely deaccented even if they are not given in the context.[23] In (648) and (649) everything after the subject can be deaccented. The example in (649b) is embedded in the context of a telephone conversation, uttered after a momentary interruption.

(648)   *What caused all that ruckus?*

        a.   *A BOMB exploded that somebody must have planted somewhere.*

---

23 Newman (1946) has pointed out that short infinitival relatives can go unaccented, as in (ia). They contrast with infinitival clauses like (ib), which have the verb accented. These examples have received some attention in the literature on focus projection, e. g., in Ladd (1980) and Selkirk (1984), among others.

(i)   a.   *I have INSTRUCTIONS to leave.* (i. e., I am to leave instructions)
        b.   *I have instrúctions to LEAVE.* (i. e., I have been instructed to leave)
            Newman (1946: 179)

    b. *A FIGHT broke out that nobody could stop.*
    c. *A DIAMOND was found that everybody was looking for.*
       (Bolinger 1992: 284)

(649) a. *Something the matter?*
     b. *That's odd. A GLASS just broke that I was holding in my hand.*
       (Bolinger 1992: 274)

I was somewhat sceptical about Bolinger's claim with respect to the accentuation of these examples, but one of my study participants pronounced such sentences exactly that way. For her, the relative is also deaccented *in situ*, as can be seen in Figure 4.22. Another study participant who was recorded accented the predicate of the relative clause regardless of its position, as in (650). Other informants, who were not recorded, among them Peter Culicover and Michael Rochemont, also preferred accented relatives.

(650) a. *A* BOMB *exploded that somebody must have* PLANTED *somewhere.*
     b. *A* FIGHT *broke out that nobody could* STOP.
     c. *A* DIAMOND *was found that everybody was* LOOKING *for.*

If the relative clause is completely deaccented, it presumably forms a deaccented phonological phrase, as required by PH=PPH. The head noun is not required to form a phonological phrase, but is prominent enough to do so. The prosodic word *was found* must also be parsed at the phonological phrase level and can be adjoined to the preceding phonological phrase, as in (651a). Movement of the deaccented relative clause to the right results in a prosodic structure in which both the main and the subordinate clause form separate phonological phrases, as in (651b).

(651) a.
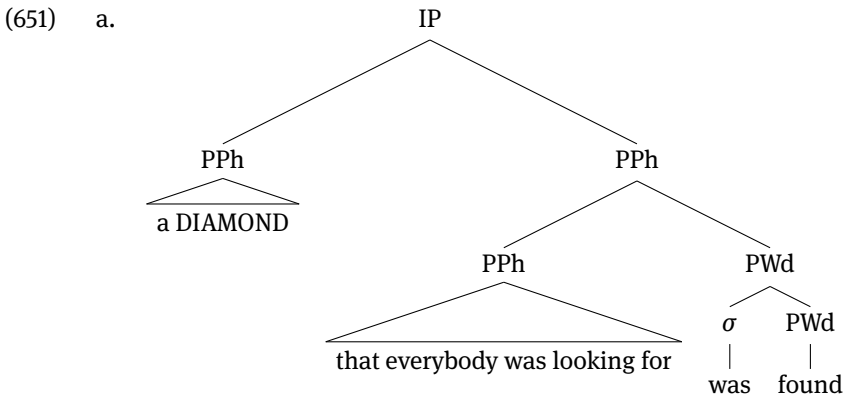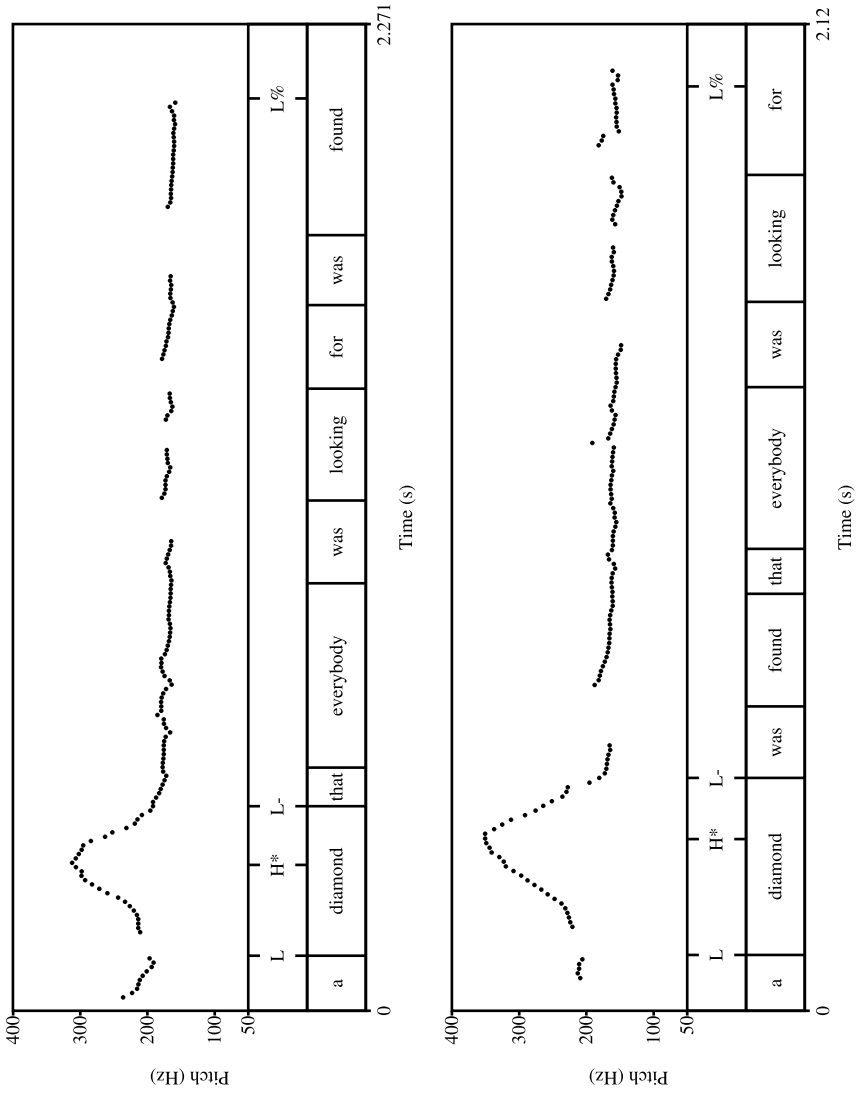
Figure 4.22: Extraposition of a deaccented relative clause.

b.

```
                                    IP
                      _____
                     /                           \
                   PPh                           PPh
              _____              _____
             /              \            /                \
           PWd              PWd      that everybody was looking for
          /    \           /    \
         σ     PWd        σ     PWd
         |      |         |      |
         a   DIAMOND     was   found
```
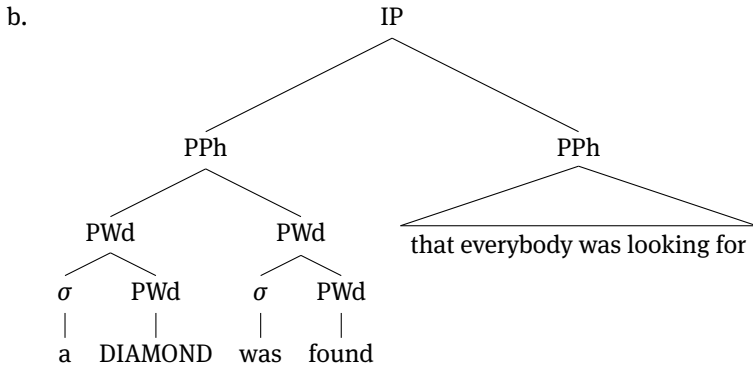
These two prosodic structures both violate ALIGN H-IP. The question is what makes accentuation optional in this case. The relative clause is deaccented although it is not defocused (in the sense that it is not "given" information). Bolinger argues that in these sentences all but the subject NP *a bomb*, *a diamond*, *a fight*, etc can be omitted without jeopardising the communicative event. In other words, the relative clause (and also the matrix predicate) is more or less redundant. The speaker can therefore choose to place the nuclear stress on the noun. Once this decision has been taken, the rest of the sentence must be deaccented. The two different prosodic renditions can be accounted for if they have different focus structures, as suggested in the previous section for the different renditions of thetic sentences. The subject-prominent sentence can be represented as a nested focus structure, as in (652a). In this case, *diamond* attracts nuclear stress because STRESS-FOC demands that a focused constituent bear intonational phrase level metrical prominence. The other case is simply a focus neutral sentence, sometimes analysed as broad focus, as in (652b), and a default prominence pattern is computed with right-peripheral nuclear stress.

(652)   a.   [$_F$ a [$_F$ DIAMOND] that everybody was looking for was found]
        b.   [$_F$ a DIAMOND was found that everybody was LOOKING for]

The evaluation of (651) on the basis of the structure in (653) can be inspected in the first two tableaux in Figure 4.24. Nuclear stress is indicated by capitalisation of the *diamond*, to distinguish it from regular phrasal stress on *looking*, marked with small caps. The latter is ruled out by POSTNUC-D (candidates [b] and [d]). Depending on the ranking of the two interface constraints, the relative clause stays *in situ* or is shifted rightward. Note that candidate (b), represented separately in terms of a bracketed metrical grid in Figure 4.23, does indeed violate ALIGN H-IP. Although the right edge of the intonational phrase is aligned with the recursive phonological phrase, which contains phrasal stress on *looking*, this phonological

```
(    *                                    )  IP
(    *      ) ((              *        )       )  PPh
(    *      ) (    *      ) (    *      ) (*) (    *   )  PWd
a DIAMOND  that everybody   was LOOKING   for   was found
```

Figure 4.23: Metrical grid for candidate (b).

phrase does not contain intonational phrase level metrical prominence. The designated terminal element of the intonational phrase is *diamond*, contained in the left-hand phonological phrase. This candidate also violates ALIGN H-PPH twice because the head of the recursive phonological phrase, *looking*, is separated from the right edge of that phonological phrase by two prosodic words, namely *was found* and the stranded preposition *for*. Stranded Ps occur in their strong form, are footed and are prosodified as prosodic words due to EXH$_{PWd}$ (cf. Itô and Mester 2009b).

(653)   [$_{TP}$ [$_{QP}$ a [$_{nP}$ diamond [$_{CP}$ that everybody was looking for]]] [$_{T'}$ was [$_{vP}$ found]]]

The nested focus *diamond* attracts nuclear stress and leads to complete deaccentuation of postnuclear material. However, I noted above that most speakers I have consulted do not prefer a subject-prominent sentence. If secondary accents are also considered, then the phrasing and accentuation of such examples is as in (654). The accent on *everybody*, which is not the target of STRESS-XP, is presumably due to the fact that it occurs at the left edge of a phonological phrase, i. e., it is an effect of ALIGN(PPh,T*,L). The evaluation of this example can be viewed in the third and fourth tableaux in Figure 4.24. POSTNUC-D is not violated in any of the candidates and ALIGN H-IP takes care that the relative clause contains phrasal stress, which is assigned to *looking*.

(654)   a.   (A díamond) ((that éverybody was lóoking for) was found)
         b.   (A díamond was found) (that éverybody was lóoking for)

Needless to say, only the free ranking of the interface constraints ALIGN-XP and PH=PPH is responsible for extraposition. ALIGN H-IP only plays a role in the accentuation of the relative, as it does in the accentuation of thetic predicates, discussed earlier.

4.3.3.5 Extraposition of focused PPs and relatives

In this section, I examine extraposition of focused constituents and the role ALIGN H-IP plays in this construction. This constraint, which can block extraposition is also a potential trigger for rightward movement. A focused PP or relative can form

[F a [F diamond] that everybody was looking for was found]

	PostNuc-D	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
☞ (a DIAMOND) ((that everybody was looking for) was found) a.			*	*		*
(a DIAMOND) ((that everybody was LOOKING for) was found) b.	*!		*	*	**	*
(a DIAMOND was found) (that everybody was looking for) c.		*!		*	*	
(a DIAMOND was found) (that everybody was LOOKING for) d.	*!	*		*	**	

[F a [F diamond] that everybody was looking for was found]

	PostNuc-D	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
(a DIAMOND) ((that everybody was looking for) was found) a.		*!		*		*
(a DIAMOND) ((that everybody was LOOKING for) was found) b.	*!	*		*	**	*
☞ (a DIAMOND was found) (that everybody was looking for) c.			*	*	*	
(a DIAMOND was found) (that everybody was LOOKING for) d.	*!		*	*	**	

a diamond that everybody was looking for was found

	PostNuc-D	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
(a DIAMOND) ((that everybody was looking for) was found) a.		*		*!		*
☞ (a DIAMOND) ((that everybody was LOOKING for) was found) b.		*			**	*
(a DIAMOND was found) (that everybody was looking for) c.			*!	*	*	
(a DIAMOND was found) (that everybody was LOOKING for) d.			*!		**	

a diamond that everybody was looking for was found

	PostNuc-D	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
(a DIAMOND) ((that everybody was looking for) was found) a.		*!		*		*
(a DIAMOND) ((that everybody was LOOKING for) was found) b.		*!			**	*
(a DIAMOND was found) (that everybody was looking for) c.			*	*!	*	
☞ (a DIAMOND was found) (that everybody was LOOKING for) d.			*		**	

Figure 4.24: Evaluation of examples (651) and (654).

a phonological phrase and contains intonational phrase level metrical promi-
nence. Align H-IP clearly prefers the most prominent phonological phrase to be
aligned with the right edge of the intonational phrase.

Focus structure has played an important role in earlier accounts of extra-
position from NP, for example, in work by Guéron (1980), Rochemont (1986),
Rochemont and Culicover (1990), Huck and Na (1990), Möck (1994) and Drubig
(1997a). Particularly extraposition from subjects often exhibits the accentual pat-
tern of thetic sentences and has a presentational function. In the 80's and 90's,
thetic sentences were important for theories of focus projection, which are theo-
ries of accentuation in presentational sentences (cf., Gussenhoven 1984; Selkirk
1984, 1995a). This may explain why the authors just mentioned virtually all clas-
sify extraposition as a focus construction. The view expressed in these works
is that extraposed PPs or relatives are necessarily focused or part of a broader
presentational focus, be it the whole sentence or just the DP containing the PP
or relative. Nevertheless, the role focus plays in this construction has never been
fully clarified and it is doubtful that a general focus constraint can be formulated
that can be used for an explanation of the data. In fact, chapter 5 deals exclusively
with extraposition of defocused constituents. Here, I will consider extraposition
of focused constituents across defocused sentence-peripheral constituents. The
following cases will be described and analysed in this subsection:

A: the defocused peripheral constituent is contained in a broader focus
B: the defocused peripheral constituent is due to narrow focus on the extraposed
   constituent
C: the defocused peripheral constituent is due to narrow focus on the whole
   complex DP

The first case is illustrated by examples like (655) and (656). The VP is focused, but
left-peripheral VP complements like *on the table* and *into my bag* are often treated
like defocused items if they are present in the discourse setting. At the right edge of
the sentences they are completely deaccented (cf. also Rochemont 1986). If the PP
is extraposed, these VP complements are integrated into the phonological phrase
on the left, where they may be associated with non-prominent accents (e. g., L*
or !H*).

(655)   *What did John do next?*

   a.   *He [F put a review of Turner's paintings on the table].*
   b.   *(He put a revíew on the table) (of Túrner's páintings)*

(656)   *What did Jason do when you met him at the pub?*

a. *He [F slipped a note from Melinda's lover into my bag].*
b. *(He slípped a nóte into my bag) (from Melínda's lóver)*

In (657) and (658), the PP and relative clause, respectively, are focused. The relative clause is also phrased separately, both in its base and extraposed position. Note that the lefthand phonological phrase in (658b/c) only consists of defocused material. Defocused material can be accented in prenuclear position and two or three prosodic words can in principle form a phonological phrase.[24]

(657) *Did he leave a review on the table?*

    a. *He left a review [F of Turner's paintings] on the table.*
    b. *(He léft a revíew on the table) (of Túrner's páintings)*

(658) *Did he leave a review on the table?*

    a. *He left a review [F that someone had written about Mondrian] on the table.*
    b. *(He léft a revíew) (that sómeone had wrítten about Móndrian) on the table.*
    c. *(He léft a revíew on the táble) (that sómeone had written about Móndrian)*

If the whole complex DP is focused, as in (659) and (660), extraposition gives rise to a discontinuous DP focus and the sentence has the prosodic structure of a multiple focus construction. The noun *review* in (659b) and (660c) is associated with an L+H* accent which has a much higher pitch excursion than in the corresponding examples in which the noun is defocused. The intonational difference between a focused relative clause (658c) and a discontinuous DP focus (660c) can be viewed in the two pitch tracks in Figure 4.25. In the former, but not in the latter, the pitch accents in the left-hand phonological phrase are successively downstepped, following the natural declination of the intonational contour.

(659) *What did he leave on the table?*

    a. *He left [F a review of Turner's paintings] on the table.*
    b. *(He left a REVIEW on the table) (of Túrner's PAINTINGS)*

---

24 Cf. also the discussion of this issue in section 3.2.3.2. Another example from my database in which defocused material forms a phonological phrase is (i).

(i)   a. *Did you read a magazine on the train?*
       b. *(I réad a magazíne on the tráin) (which sómeone had léft on the táble)*
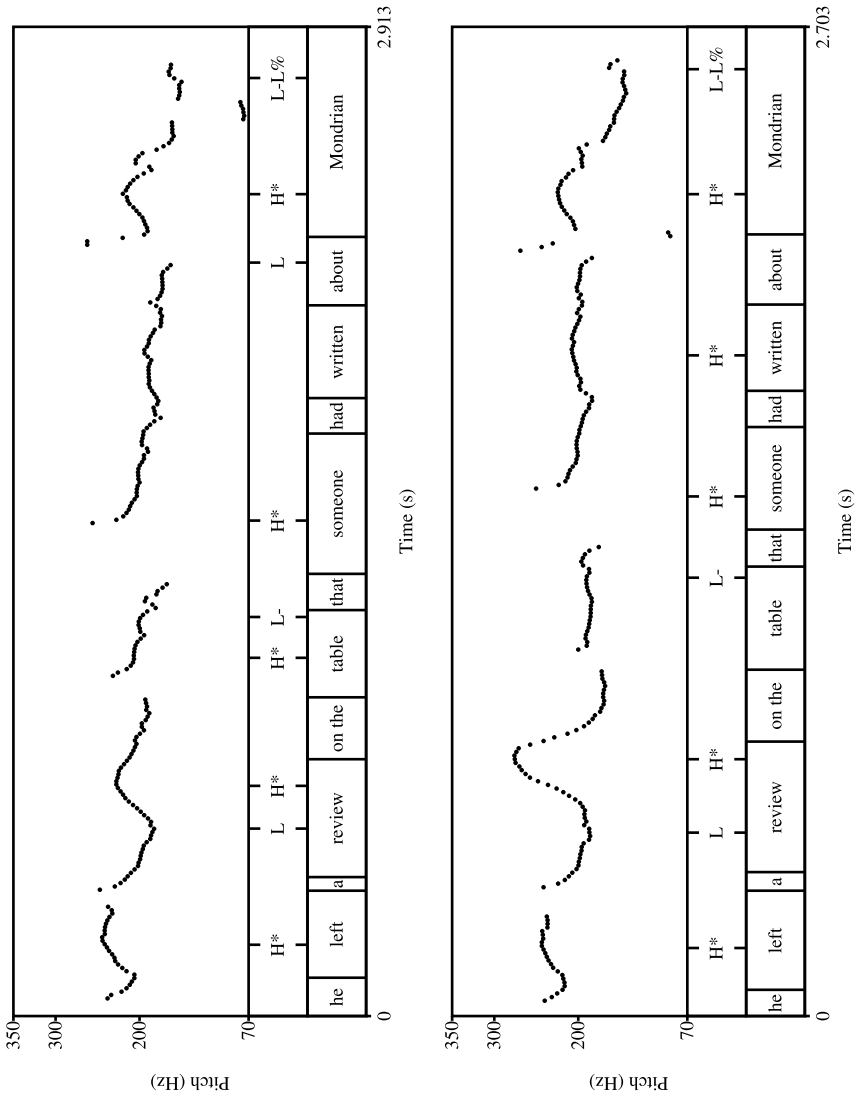
Figure 4.25: Focused relative vs. discontinuous DP focus.

(660)   *What did he leave on the table?*

a.   *He left [F a review that someone had written about Mondrian] on the*
     table.

b.   *(He léft a revíew) (that someone had written about MONDRIAN) on*
     the table

c. *(He léft a REVIEW on the table) (that sómeone had wrítten about MONDRIAN)*

When the PP/relative or the complex DP is focused *in situ*, PostNuc-D (and also D-Given) prohibit any phrasal stress in the postnuclear stretch. All examples with canonical word order mentioned in this section have a deaccented prosodic word at the right edge. Their prosodic structure is similar to the prosodic structure of examples in which deictic elements or unaccented predicates occur at the right edge (cf. section 4.3.2). In the remainder of this section I will evaluate an example containing a relative and one containing a PP. The example with a relative is (658), which has the syntactic structure (661). Some plausible prosodic structures are given in (662).

(661)   he [$_{vP}$ left$_i$ [$_{VP}$ [$_{DP}$ a [$_{nP}$ review [$_{CP}$ that someone had written about Mondrian]]] [$_{V'}$ t$_i$ on the table]]]

(662)   a. [(He léft a revíew) (that sómeone had wrítten about MONDRIAN) {on the table}$_{PWd}$]$_{IP}$
        b. [(He léft a revíew) (that sómeone had wrítten about MONDRIAN) (on the table)]$_{IP}$
        c. [(He léft a revíew) ((that sómeone had wrítten about MONDRIAN) on the table)]$_{IP}$
        d. (He léft a revíew on the táble) (that sómeone had written about MONDRIAN)

The evaluation of this example can be inspected in the tableaux in Figure 4.26. Candidate (a) violates Align-XP twice because the vP headed by *left* and the nP headed by *table* are not aligned. It also violates Ph=PPh because the constituents spelled out in the second cycle do not form a phonological phrase. If the prosodic word *on the table* is parsed into a deaccented phonological phrase, as in candidate (b), it is excluded by Align H-IP.[25] The recursive structure of candidate (c) satisfies Align H-IP and it is the optimal candidate if Align-XP outranks Ph-PPh. If the ranking of these two constraints is reversed, the extraposition candidate (d) is the optimal one. This candidate violates Align-XP only once because the nP headed by *review* is not aligned.

---

25 Note that this candidate would also be excluded by MinBin(PPh) because the right-peripheral phonological phrase contains only one prosodic word, but this constraint would be satisfied if the PP were more complex (e. g., *on the table in the corner*). It is therefore justified to consider the effect of Align H-IP separately.

he left a review [F that someone had written about Mondrian] on the table	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
a. [(he left a review) (that someone had written about MONDRIAN) {on the table}_PWd]_IP	*!*	*			
b. [(he left a review) (that someone had written about MONDRIAN) (on the table)]_IP		*	*!		
c. ☞ (he left a review) ((that someone had written about MONDRIAN) on the table)		*		*	*
d. (he left a review on the table) (that someone had written about MONDRIAN)	*!				

he left a review [F that someone had written about Mondrian] on the table	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
a. [(he left a review) (that someone had written about MONDRIAN) {on the table}_PWd]_IP	*!	**			
b. [(he left a review) (that someone had written about MONDRIAN) (on the table)]_IP	*!		*		
c. (he left a review) ((that someone had written about MONDRIAN) on the table)	*!			*	*
d. ☞ (he left a review on the table) (that someone had written about MONDRIAN)		*			

Figure 4.26: Extraposition of a focused relative.

From the discussion in this section, it cannot be concluded that ALIGN H-IP triggers extraposition. This constraint, which favours focused constituents at the right edge of an intonational phrase because they contain the nuclear stress, has too low a rank in the English constraint hierarchy to have an influence on rightward movement. The optimal candidates both satisfy this constraint: either the focused relative moves rightward forming the head of the intonational phrase or the right-peripheral deaccented PP is integrated in a recursive phonological phrase structure, thereby avoiding a violation of this constraint. The fact that extraposition is optional is solely due to the free ranking of the two interface constraints.

Finally, I evaluate an example in which the right-peripheral deaccented PP is part of a larger VP focus. Cf.:

(656)   *What did Jason do when you met him at the pub?*
    a.   *He [*_F *slipped a note from Melinda's lover into my bag].*
    b.   *(He slípped a nóte) (from Melínda's lóver) into my bag*
    c.   *(He slípped a nóte into my bag) (from Melínda's lóver)*

The evaluation on the basis of the syntactic structure in (663) can be inspected in the tableaux in Figure 4.27. Phrasal stress is marked with small caps and the nuclear accent with big caps. Other accents are not relevant and not indicated.

(663)   He [$_{vP}$ slipped$_i$ [$_{VP}$ [$_{DP}$ a [$_{nP}$ note from [$_{nP}$ Melinda's lover]]] [$_{V'}$ t$_i$ into my bag]]]

Candidate (a) forms one large phonological phrase and has to be broken up because it exceeds the permitted size of phonological phrases, violating MAX(PPH). It also violates ALIGN-XP twice because the nPs headed by *note* and *lover* are not aligned. The phonological phrase in candidate (b) is too large as well, the maximal size being at most three words. Candidate (c) is excluded because the nP headed by *bag* and the vP headed by *slipped* are not aligned. In candidate (d), *into my bag* is mapped to a deaccented phonological phrase and is excluded by ALIGN H-IP. The recursive structure in candidate (e) violates PH=PPH because the whole vP does not form one phonological phrase. It is the optimal candidate if ALIGN-XP dominates PH=PPH. Candidate (f) is the optimal one if the ranking of the interface constraints is reversed. It violates ALIGN-XP because the nP headed by *note* is not aligned.

It now becomes pretty obvious that focus structure plays only a subordinate role in this construction. Only to the extent that focus structure creates an environment in which a sentence-final constituent is deaccented does it facilitate rightward movement. Clearly, the deaccented PP complements in the examples above

he slipped a note from Melinda's lover into my bag	Max(PPh)	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
[(he slipped a note from Melinda's LOVER into my bag]IP a.	*!	**			*	
[(he slipped a note from Melinda's LOVER) {into my bag}PWd]IP b.	*!	**	*			
[(he slipped a NOTE) {from Melinda's LOVER} {into my bag}PWd]IP c.		*!*	*			
[(he slipped a NOTE) (into my bag)]IP d.			*	*!		
☞ [((he slipped a NOTE) (from Melinda's LOVER) into my bag)]IP e.		*			*	*
[(he slipped a NOTE into my bag) (from Melinda's LOVER)]IP f.		*!			*	

he slipped a note from Melinda's lover into my bag	Max(PPh)	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
[(he slipped a note from Melinda's LOVER into my bag]IP a.	*!	**	**		*	
[(he slipped a note from Melinda's LOVER) {into my bag}PWd]IP b.	*!	**	*			
[(he slipped a NOTE) {from Melinda's LOVER} {into my bag}PWd]IP c.		**	*!			
[(he slipped a NOTE) (into my bag)]IP d.			*!	*		
[((he slipped a NOTE) (from Melinda's LOVER) into my bag)]IP e.			*!		*	*
☞ [(he slipped a NOTE into my bag) (from Melinda's LOVER)]IP f.		*			*	

Figure 4.27: Evaluation of example (656).

want to be phrased with the verb that selects them and extraposition achieves just this. But extraposition is not obligatory and the relevant modifiers of the noun can be pronounced *in situ*. The grammar of English allows recursive phonological phrases and Align H-IP can enforce such a structure at the right periphery of an intonational phrase.

4.3.3.6 Extraposition in the postnuclear stretch

Maybe the best examples which demonstrate that Align H-IP does not trigger extraposition are examples in which extraposition occurs in the postnuclear stretch. Even if Huck and Na (1990) and Rochemont and Culicover (1990) argue that the relative clause must be focused or contained in a larger focus, they actually admit that an extraposed PP or relative can be defocused. Concretely, Rochemont and Culicover (1990) argue that either the source DP or the extraposed constituent must be focused. In the following examples it is the noun that is focused.

(664) a. *Is there anyone here that Mary likes?*
       b. *Yeah, a SOLDIER just came in that Mary likes.*
           (Rochemont and Culicover 1990: 64)

(665) a. *Did John get anything that he saw in Paris for his mother?*
       b. *Yeah, John bought a PICTURE for his mother that he saw in Paris.*
           (Rochemont and Culicover 1990: 65)

My own recordings of examples like (664) show that the relative is indeed deaccented regardless of whether it is extraposed or not. This is expected because defocused material cannot be accented in the postnuclear stretch.

The deaccented material after the nuclear stress is normally low and flat. However, if sentences like (664b) are associated with a fall-rise contour, as produced by one of my study participants, the ToBI conventions require postnuclear lexical words to be analysed as being associated with an L* tone, as in the first pitch track in Figure 4.28. This notation does not reflect the more complex phonological structure argued for in this study since it is analysed as one phonological phrase, and also one intonational phrase, by these conventions. But a perceivable temporal disjuncture after *likes* and the optional occurrence of the rise (H-) on *likes*, as in the second pitch track, suggest that at least the matrix predicate forms a separate phonological phrase. In the third pitch track, in which the relative is extraposed, the rise (H-) occurs on the particle *in* and the contour rises successively towards the end of the sentence (H%). In this case, the deaccented relative arguably forms a separate phonological phrase.
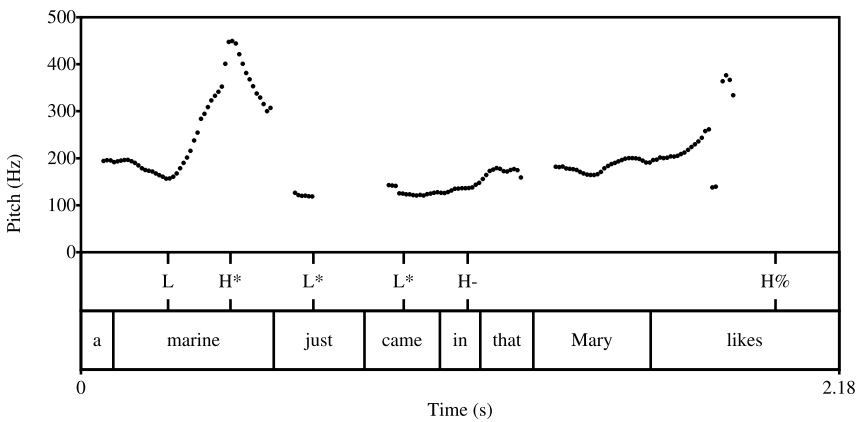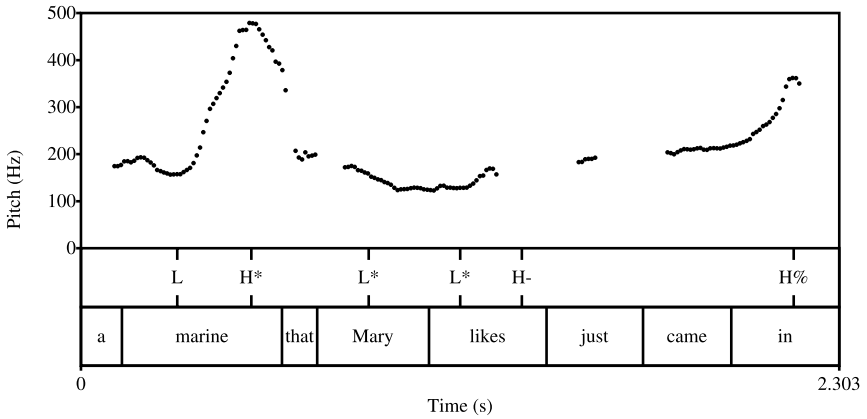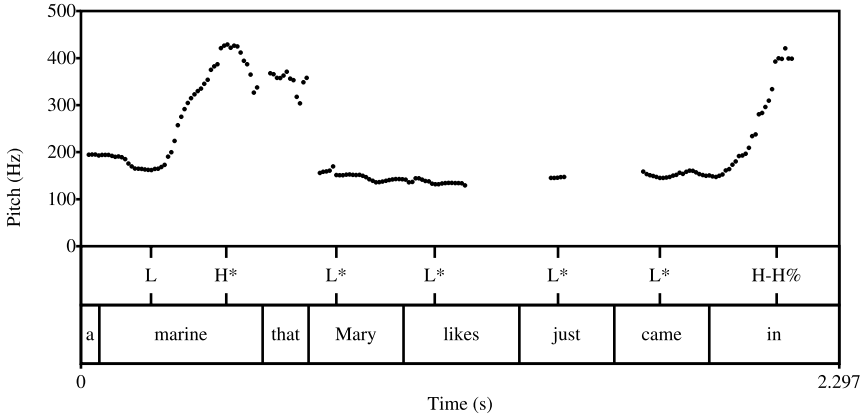
Figure 4.28: Different realisations of the fall-rise contour.

What is interesting about these examples is that a defocused and deaccented relative clause can be extraposed quite freely over another deaccented constituent. However, Bolinger (1992) has effectively refuted the claim that focus is an essential condition for extraposition. The following example, which is modelled after one of his examples, clearly shows that neither the source DP nor the extraposed relative clause has to be focused. Everything after *want* is defocused and deaccented. Yet extraposition is possible and optional in this case, too.[26] Cf. the pitch tracks in Figure 4.29.

(666)   A: *Aren't you going to invite Rupert and Martin?*
        B: *Don't you know they fight all the time.*

   a.   *I don't WANT people who are so quarrelsome in my house.*
   b.   *I don't WANT people in my house who are so quarrelsome.*

Example (666a) has the syntactic structure in (667) and the focus structure in (668). In fact, the whole sentence is focused, but three of its constituents are construable from the context and, therefore, G(ivenness)-marked. Any phrasal stress after the verb is ruled out by PostNuc-D (and also by D-Given).

(667)   I don't $[_{vP}$ want$_i$ $[_{VP}$ $[_{DP}$ D^0 $[_{nP}$ people $[_{CP}$ who are so quarrelsome]]] $[_{V'}$ t$_i$ in my house]]]

(668) $[_F$ $[_G$ I] don't WANT $[_G$ people who are so quarrelsome] $[_G$ in my house]]

Arguably, the relative clause forms a deaccented phonological phrase to which the deaccented prosodic word *in my house* is adjoined, as in (669a). This representation incurs one violation of Align H-IP because the head of the intonational phrase, the left-peripheral phonological phrase, is separated from the right edge by one (recursive) deaccented phonological phrase. The alternative representation (669b), in which the PP *in my house* forms a separate phonological phrase, incurs two violations of Align H-IP. If the relative clause shifts to the right, the relative and the vP can form separate phonological phrases, as in (669c).

(669)   a.   [(I don't WANT people) ((who are so quarrelsome) in my house)]$_{IP}$ √
        b.   [(I don't WANT people) (who are so quarrelsome) (in my house)]$_{IP}$
        c.   [(I don't WANT people in my house) (who are so quarrelsome)]$_{IP}$ √

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26 Extraposition in the postnuclear stretch does not affect only relative clauses. Defocussed PPs also move, as in (i). Everything after the verb is deaccented. The whole DP *a mail on this matter* is recoverable from the context and so is *last week*.

(i)   a.   *Why didn't you inform me last week about the publication of the Secret Service report?*
      b.   *I díd sénd you a mail last week on this matter. Don't tell me you haven't received it!*
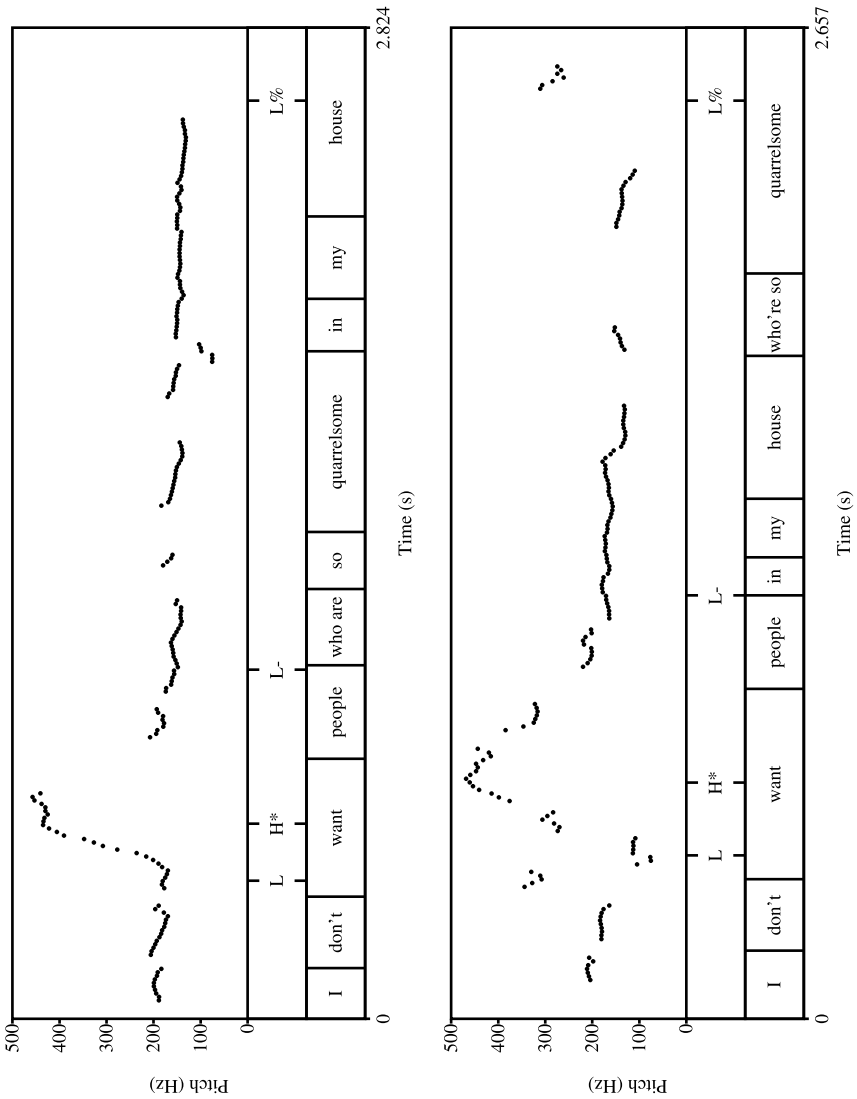
Figure 4.29: Extraposition of a defocused relative clause.

The evaluation of this example can be inspected in the tableaux in Figure 4.30. ALIGN H-IP can only enforce a recursive phonological structure (candidate a vs. b in the first tableau), but can never trigger extraposition as the phonological phrase that contains the prominent verb is never rightmost. The trigger can only be the two interface constraints, as in all examples discussed in this chapter.

[_F I don't want [_G people who are so quarrelsome] [_G in my house]]	Align-XP	Ph=PPh	Align H-IP	Align H-PPh	NonRec
☞ [(I don't WANT people) ((who are so quarrelsome) in my house)]_IP a.		*	*	*	*
[(I don't WANT people) (who are so quarrelsome) (in my house)]_IP b.		*	**!	*	
[(I don't WANT people in my house) (who are so quarrelsome)]_IP c.	*!		*	**	
[(I don't WANT people) (in my house) (who are so quarrelsome)]_IP d.		*	**!	*	

[_F I don't want [_G people who are so quarrelsome] [_G in my house]]	Ph=PPh	Align-XP	Align H-IP	Align H-PPh	NonRec
[(I don't WANT people) ((who are so quarrelsome) in my house)]_IP a.	*!		*	*	*
[(I don't WANT people) (who are so quarrelsome) (in my house)]_IP b.	*!		**	*	
☞ [(I don't WANT people in my house) (who are so quarrelsome)]_IP c.		*	*	**	
[(I don't WANT people) (in my house) (who are so quarrelsome)]_IP d.	*!		**	*	

Figure 4.30: Evaluation of example (666).

4.4 Weight effects

4.4.1 Performance or competence?

So far this study has not taken into account the relative weight of the extraposed constituent. The account relied on grammaticality judgements and weight does not seem to be a crucial issue in this construction. But extraposition of non-heavy PPs and/or non-heavy relative clauses is significantly rarer than canonical word order. In the following examples from news reports, collected from BBC Online, the extraposed PPs are all relatively heavy, though not excessively so. Two of them contain a clausal constituent, which has sometimes been regarded as an additional factor in the computation of weight.[27]

(670)   *Reports are coming in of what appears to have been a second explosion.* (14/09/2005)

(671)   *The aid agency said real advances had been made on aid and debt relief, but opportunities were being missed on fairer trade and arms dealing.* (11/03/2006)

(672)   *Microsoft said the six versions (of Vista) were designed to match the demands different users have for its software and sound. No details have been given about the pricing of the separate versions.* (22/03/2006)

(673)   *The BBC's Mike Wooldridge says nothing is yet known of how the latest executions were carried out.* (15/01/2007)

(674)   *As night falls, hopes are fading of finding other survivors.* (22/06/2008)

Examples in which the PP contains one noun only do, however, occur in news report, as the following example illustrates.

(675)   *Gordon Brown admits mistakes were made over Iraq and that the issue is divisive for the nation.* (26/05/07)

The role of constituent weight has so far been explored for heavy NP shift, particularly by Hawkins (1994), Arnold et al. (2000) and Wasow (1997, 2002), but detailed investigations for extraposition from NP have also been undertaken, for example, by Francis (2010) and Francis and Michaelis (2014). I will concentrate here on Francis (2010), who has studied extraposition of relative clauses from subjects in the ICE-GB corpus. The main result of her investigation is that extraposed relatives are significantly longer than the VP they move across and she did not find

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27 Cf. Wasow (2002: 16–23) for an overview and discussion.

any examples in which the VP was more than 1.3 times longer than the relative. Her findings are summarised in the following quote, where RC and RCE abbreviate relative clause and relative clause extraposition, respectively.

Although RCE was relatively infrequent overall, at only about 15 % of the sentences with subject-modifying RCs, extraposition was strongly preferred in cases where the VP length (extraposition distance) was one or two words or where the RC was at least four times longer than the VP. In contrast, extraposition happened in only about 2 % of cases in which the RC was the same length or shorter than the VP. Furthermore, in sentences where extraposition occurred, the RC was almost always longer than the VP and was more than three times longer on average. Conversely, in sentences with canonical structure, the VP was about 1.5 times longer than the RC on average. (Francis 2010: 65–66)

The same study also reports two experiments. One of them is an acceptability experiment, in which participants were presented with relative clauses of varying length (4, 8, 15 words) while the length of the VP was kept constant at 5 words. The participants were asked to rate the acceptability of both extraposed and canonical structures on a scale from 1 (low acceptability) to 9 (high acceptability). The mean acceptability rating of extraposed relatives was roughly the same for all three degrees of length (light 6.33, medium 6.67 and heavy 6.41), compared to canonical structures (light 8.05, medium 8.09 and heavy 6.69). The fact that acceptability rating remained constant for varying lengths of extraposed relatives, roughly equalling the acceptability of heavy non-extraposed ones, does not suggest to me that the construction is suboptimal. In other words, the grammaticality status of this constructions is not affected by the findings reported in this experiment. This is also Francis' conclusion. The slightly lower acceptability rating, she attributes to a frequency-based preference for adjacency between the head noun and its modifying relative clause.

Since weight of the extraposed constituent is statistically relevant without affecting grammaticality, I think it should be considered an independent, isolable factor that affects this construction. For constructions like heavy NP shift and presentational-*there* constructions, it is a categorical constraint, for extraposition from NP a *tendency*. In what follows I will try to integrate the weight factor into my phonological account of extraposition in terms of partially ordered grammars. To this end, the analysis developed so far in this chapter will be supplemented with a few additional constraints and ranking statements. The account is tentative and the goal a modest one. While it does make statistical predictions, the verification of these predictions requires additional extensive empirical investigations of intonational data, which will remain a future task.

The account relies on the fact that weight and relative weight can be modelled phonologically. Weight has been studied extensively in the domain of the syllable and its effect on word stress is quite well understood now. When it comes to phonological phrasing, weight effects are still poorly understood, though some significant advances have been made for Italian (cf. Ghini 1993). It should be noted that Francis counted all words including function words. A reformulation of her findings in phonological terms is not possible because lexical categories should be weighted differently from functional categories. Only the former form prosodic words on their own. Furthermore, she examined the weight of relative clauses with respect to the VP that was moved across, while phonological weight is a matter of adjacent phonological constituents. We have seen in section 4.3.1.3 that the phonological phrase preceding an extraposed constituent typically includes the subject (cf. also Truckenbrodt 1995a).

I also follow Anttila's (2007), who argues that tendencies observed in grammatical phenomena are not necessarily due to extrinsic factors (i. e., performance factors), but are often rooted in the grammatical system itself. For example, the tendency for moving a constituent rightward only if it is sufficiently heavy may well be rooted in the set of constraints and their ranking. This does not mean that performance factors do not play a role in weight-sensitive constructions like heavy NP shift and extraposition. In fact, all the works cited above consider weight effects to be performance factors. It is claimed that rightward movement facilitates processing and/or production. Certainly, an important challenge is to separate performance-related effects from competence-related ones. The account below is an attempt to show that weight-effects can be modelled phonologically and that this dimension should not be ignored. The fact that phonological issues have largely been ignored in the literature is certainly due to the fact that the data is not available.

Before attempting to formulate relative weight effects in phonological terms, I would like to mention that insight gained from corpus studies, which generally contain a large percentage of written texts, can be as significant as spoken language for phonological analysis. Fodor (2002a, 2002b) has convincingly demonstrated that, when reading texts, speakers project silent intonational contours on the sentences that are being processed. In other words, we also hear written sentences even if they are not uttered. Therefore, corpora can be useful for phonological analysis even if the sentences are not recorded or annotated phonologically. Francis' statistical evaluations need not be interpreted to be exclusively performance-related, as she does herself, but they are partly also phonological.

My tentative approach to weight effects on extraposition will be developed on the basis of extraposition of NP from object in sentences like (676). In these two sentences, the result of rightward movement are sequences of two phonological

phrases of different weight. Though I will not be able to compare my results directly with Francis' statistics, which are based on extraposition of relatives from subject NPs, an account based on (676) allows the inclusion into the overall picture of a competing construction, namely heavy NP shift, which is a natural alternative to (676). If heavy NP shift is also phonologically conditioned, at least in focus-neutral cases, then the grammar should be able to say something about this construction as well. Furthermore, an analysis of heavy NP shift will allow me to formulate weight effects in phonological terms. This is the goal of the next section.

(676)   a.   *(He sold a páinting at Sótheby's) (by Túrner)*
        b.   *(He sold a cópy at Sótheby's) (of Túrner's Wárkworth Cástle)*

4.4.2 Relative weight

Relative weight is best illustrated with a construction that is categorically, not just statistically subject to such a constraint, namely heavy NP shift. As can be seen in (677), an object that forms just one prosodic word cannot be moved across an accented PP in focus-neutral contexts. But the heavier the object, the more acceptable the result.

(677)   A: *After the president of the bank returned from his holiday in Greece, what did he do?*
        B: *Excited about Greece and its cultural heritage,*
             (i)   *★(he dónated to a muséum) (a váse)*
             (ii)   *(he dónated to a muséum) (a Minóan váse)*
             (iii) *(he dónated to a múseum) (a táll Minóan váse)*
             (iv)   *(he dónated to a múseum) (an ínváluable Minóan váse)*
             (v)   *(he dónated to a muséum) (a váse from the Geométric périod)*

Most accounts of heavy NP shift take for granted some version of the Principle of End Weight. A definition can be found in Wasow (2002), reproduced in (678), which is a good translation of Behaghel's *Gesetz der wachsenden Glieder* ('Law of increasing constituents'), proposed almost a century earlier.

(678)   Principle of End Weight (Wasow 2002: 3)
        Phrases are presented in order of increasing weight.

(679)   Gesetz der wachsenden Glieder (Behaghel 1909: 139)
        Von zwei Satzgliedern geht, wenn möglich, das kürzere dem längeren voraus.

The problem with such a principle is how to measure weight. What should be counted? Any morphosyntactic word, or rather not all of them? The number of brackets making up a phrase? If such a principle were to be translated into phonological terms, it should refer to phonological constituents. Since the closest correspondence to syntactic phrases are phonological phrases, the immediate constituents of a phonological phrase should be counted, namely phonological words. There is hardly any alternative in this case. A phonological version of the Principle of End Weight has already been proposed in unpublished work by Selkirk. Essentially following work by Ghini (1993) on the role of weight on phonological phrasing in Italian, she proposes the constraint in (680).

(680) WEIGHT INCREASE (Selkirk 2001)
       In a sequence $\alpha\beta$ of prosodic constituents, $W(\beta) \geq W(\alpha)$.

WEIGHT INCREASE (WI) states that in a sequence of two prosodic constituents, the weight of the second constituent must be equal or greater than that of the preceding one. If the prosodic constituents are phonological phrases and the weight of phonological phrases is measured in terms of prosodic words, then (681b) and (681c) satisfy this constraint, but not (681a).[28,29]

(681) a. (PWd PWd)$_{PPh}$ (PWd)$_{PPh}$
       b. (PWd PWd)$_{PPh}$ (PWd PWd)$_{PPh}$ √
       c. (PWd PWd)$_{PPh}$ (PWd PWd PWd)$_{PPh}$ √

Heavy NP shift does not occur automatically, that is, whenever the NP is as heavy as the preceding material. The construction is still not favoured unless the NP is significantly more complex.[30] So there must be a constraint that militates against rightward movement, namely one that prefers 'canonical word order'. There are

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28 For a similar constraint see also Shiobara (2004). Shiobara formulates it in terms of intonational phrases and also suggests that prosodic words should be counted. However, her prosodic hierarchy does not contain phonological phrases. It should be noted that heavy NP shift may indeed result in mapping the heavy NP onto a separate IP, preceded by a continuation rise (L-H%). This occurs even if the NP is not very complex. This is what I find in my own recorded data, not in Shiobara's dissertation. However, mapping a heavy NP to a separate IP is only an option.

29 Another phonological factor contributing to weight is duration. The heavy NP in the last three examples of (677) are made up of three prosodic words, while the phonological phrase preceding them contains two. But the words are also of different length (*tall* vs. *invaluable*) and the last phonological phrase contains three clitical function words, while the others just one. I will ignore duration in what follows, although a final phonological account would have to take this factor into account.

30 Excessive heaviness may lead to parsing problems of the constituent following the NP and is presumably outside the domain of phonological knowledge.

a number of proposals in the literature. One is proposed by Selkirk (2001) and can be thought of as a faithfulness constraint trying to preserve the shape of a core syntactic construction. Erteschik-Shir (2005a, 2005b) proposes a similar constraint claiming that it is a parsing constraint. What is clear, however, is that such a constraint is only required for morphologically and/or syntactically unmarked objects. PPs are not affected, as they alternate in order much more easily. This can be seen in the following examples, featuring PPs of variable complexity.

(682)   *What did Jason do last year?*

    a.   *(He wórked on ánimals) (with Melínda)*
    b.   *(He wórked with Melínda) (on ánimals)*
    c.   *(He wórked on mángroves in Pánama) (with Melínda)*
    d.   *(He wórked with Melínda) (on mángroves in Pánama)*

(683)   *What happened in the Commons last week?*

    a.   *(The Líberal Démocrats) (vóted with Lábour) (for a reféndum)*
    b.   *(The Líberal Démocrats) (vóted for a reféndum) (with Lábour)*
    c.   *(The Líberal Démocrats) (vóted with Lábour) (for a bán on húnting)*
    d.   *(The Líberal Démocrats) (vóted for a bán on húnting) (with Lábour)*

Instead of assuming a constraint that facilitates parsing of morphologically unmarked objects, I am going to link rigidity in word order with another property of English verb phrases, which Haider (2010) calls "compactness." Not only reordering of objects with PP complements or adverbials is prohibited, but adverbs are also prohibited between the verb and an object even if a suitable adjunction site is available, as shown in (684). The traditional explanation in terms of an adjacency condition on case assignment has long been abandoned in the literature as accusative case is nowadays valuated by transitive v*. Nevertheless, a convincing alternative explanation of the adjacency effect has not yet emerged. I therefore agree with Haider that the compactness of the VP and the resistance against scrambling in head-initial structures are two sides of the same coin and should be captured by the same mechanism.

(684)   a.   *$[_{vP}$ read$_i$ $[_{VP}$ aloud $[_{VP}$ t$_i$ the letter]]
    b. $[_{vP}$ speak$_i$ $[_{VP}$ loud $[_{VP}$ t$_i$ to grandma]]

I am going to assume the constraint in (685), which captures the object vs. PP asymmetry.[31] It also captures the "case adjacency" restriction. The restriction to

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31 Cf. Anttila (2008) for a similar constraint requiring goals to be parsed with their head. But a goal in an English double object construction is just a structural argument.

an adjacent lexical verb, not to a selecting one, is required for ECM constructions, in which the subject of an infinitival clause raises into the matrix VP. The ECM subject exhibits the same adjacency effect, as can be seen in (686).

(685)   PARSE-OBJ: Structural arguments must be parsed prosodically with an adjacent lexical verb.

(686)   a. $[_{vP}$ want$_i$ $[_{VP}$ Mary$_j$ t$_i$ $[_{TP}$ t$_j$ to visit him]]]
        b.   *$[_{vP}$ want$_i$ $[_{VP}$ desperately $[_{VP}$ Mary$_j$ t$_i$ $[_{TP}$ t$_j$ to visit him]]]]

In order to capture the obligatory weight effect of heavy NP shift and the optionality of rightward movement, WEIGHT INCREASE must be freely ranked with PARSE-OBJ, as in (687). Only if the object is at least as heavy as the preceding phonological phrase is heavy NP shift possible. The same holds for subjects of ECM constructions, illustrated in (688).

(687)   a.   *(He donated a Minoan vase) (to a museum)*   PARSE-OBJ ≫ WI
        b.   *(He donated to a museum) (a Minoan vase)*   WI ≫ PARSE-OBJ

(688)   *Tell me something about Mary's opinions.*

        a.   *(She believes to be crazy) (her next-door neighbour)*
        b.   *(She believes to be crazy) (her friend from the mountains of Montana)*

Note that PARSE-OBJ and WEIGHT INCREASE must be ranked higher than the interface constraints. If they were ranked lower, only heavy NP shift would be optimal. The evaluation of (687) can be inspected in the tableaux in Figure 4.31. Candidate (a) is too large for a phonological phrase and can be ruled out by MAX(PPH), which prohibits phonological phrases with more than three prosodic words at a normal speech rate. The interface constraints do not have any effect on the evaluation and are therefore included in the tableaux as same-ranked. The ranking

he donated a Minoan vase to a museum	Max(PPh)	Parse-OBJ	WI	Align-XP	Ph=PPh
(he donated a Minoan vase to a museum) a.	*!			*	
☞ (he donated a Minoan vase) (to a museum) b.			*		*
(he donated to a museum) (a Minoan vase) c.		*!			

he donated a Minoan vase to a museum	Max(PPh)	WI	Parse-OBJ	Align-XP	Ph=PPh
(he donated a Minoan vase to a museum) a.	*!			*	
(he donated a Minoan vase) (to a museum) b.		*!			*
☞ (he donated to a museum) (a Minoan vase) c.			*		

Figure 4.31: Heavy NP shift.

Parse-OBJ ≫ Weight Increase favours canonical word order, whereas Weight Increase ≫ Parse-OBJ favours heavy NP shift.

(689)   Ranking: Parse-OBJ, WI ≫ Align-XP, Ph=PPh

4.4.3 Weight, extraposition, and heavy NP shift

Turning to extraposition, we noted above that weight effects can be observed as a statistical tendency. But we also noted that such a tendency is not exclusively due to extrinsic conditions but can be rooted in the grammatical system itself. On the other hand, extraposition of NP from object directly competes with heavy NP shift whenever the resulting prosodic structure observes weight increase. If the approach pursued here is correct that both constructions can be conditioned phonologically, then the optional choice between the two constructions should also emerge from an optimality-theoretic grammar that allows variable rankings of constraints.

The fairly high degree of variability observed in this part of the grammar is therefore partly due to the variability we find in the ranking possibilities. In Antilla's work, to which I subscribe here, this is captured in terms of partially ordered grammars. Recall from section 3.2.2.3 that a partially ordered grammar is one in which not all constraints are ranked with respect to each other. For example, a grammar that contains the constraints A, B, C and in which the rankings in (690) are established, translates as the two total rankings or tableaux in (691). In this approach to variability, a candidate is grammatical if it is predicted by some tableau.

(690)   Grammar: A ≫ B, A ≫ C

(691)   Total rankings (tableaux)

       a.   A ≫ B, B ≫ C, A ≫ C
       b.   A ≫ B, C ≫ B, A ≫ C

I will approach weight-sensitivity by establishing two partially ordered grammars. One grammar allows extraposition of non-complex constituents, while another grammar prohibits extraposition of such constituents. A grammar with a tendency towards weight-sensitivity should contain ingredients from both grammars. In other words, the final grammar must contain less ranking information because it is more variable. Increased variability will also ensue from the inclusion of the results of the previous section on heavy NP shift.

In order to capture the fact that extraposition can be weight-sensitive, we need a constraint that interacts with Weight Increase. In addition to Parse-OBJ, I pro-

pose the constraint in (692), which militates against extraposition. Nominal complement (NComp) in the definition of the constraint includes both complements and adjuncts of nouns here. The constraint simply states that a nominal complement should be contained in the same phonological phrase with the noun. In what follows, I will restrict the discussion to extraposition of PP from object because I want to integrate the results of the previous section.

(692)   Parse-NComp: Nominal complements are parsed prosodically with the noun.

The first grammar to be established is a slight amendment of the weight-insensitive one developed earlier in this chapter. It can be extended by simply ranking Parse-NComp and Weight Increase lower than Align-XP and Ph=PPh, so that their effect is neutralised by the latter. Align-XP and Ph=PPh still decide whether extraposition occurs or not. The partially ordered grammar in (693) translates as four tableaux or total rankings, respectively. Only the ranking of Align-XP and Ph=PPh is relevant for extraposition in this grammar. Note that it does not derive heavy NP shift, which is blocked by Parse-OBJ (cf. the two tableaux in Figure 4.32).[32] In this grammar, Weight Increase cannot be ranked higher than Parse-OBJ due to transitivity. In other words, this is a grammar that allows extraposition of non-heavy PPs, but prohibits heavy NP shift.

(693)   Grammar (weight-insensitive extraposition)

    a.   Max(PPh) ≫ Parse-OBJ
    b.   Parse-OBJ ≫ Align-XP
    c.   Parse-OBJ ≫ Ph=PPh
    d.   Align-XP ≫ Parse-NComp
    e.   Ph=PPh ≫ Parse-NComp
    f.   Align-XP ≫ WI
    g.   Ph=PPh ≫ WI

In order to capture weight effects it is sufficient to rank Parse-NComp higher than Align-XP and Ph=PPh. That is, Parse-NComp will block extraposition under certain conditions, which is otherwise triggered by the ranking Ph=PPh ≫ Align-XP in the weight-insensitive grammar. As will be shown below, the partially ordered grammar in (694) does capture weight effects, but only indirectly. Weight Increase is only ranked with respect to Parse-OBJ and, due to transitivity, with

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32 I assume throughout that Parse-OBJ is observed if only part of the object is extraposed. So candidate (c) violates Parse-NComp, but not Parse-OBJ.

he sold a painting by Turner at Sotheby's	Max(PPh)	Parse-OBJ	Align-XP	Ph=PPh	Parse-NComp	WI
a. (he sold a painting by Turner at Sotheby's)	*!					
☞ b. (he sold a painting by Turner) (at Sotheby's)			**	*		*
c. (he sold a painting at Sotheby's) (by Turner)			*!		*	*
d. (he sold at Sotheby's) (a painting by Turner)		*!				

he sold a painting by Turner at Sotheby's	Max(PPh)	Parse-OBJ	Ph=PPh	Align-XP	Parse-NComp	WI
a. (he sold a painting by Turner at Sotheby's)	*!					
b. (he sold a painting by Turner) (at Sotheby's)			*!	**		*
☞ c. (he sold a painting at Sotheby's) (by Turner)				*	*	*
d. (he sold at Sotheby's) (a painting by Turner)		*!				

Figure 4.32: Extraposition of a non-heavy PP.

respect to MAX(PPH). That is, it is not ranked with respect to any of the other constraints. If it had a fixed rank, higher than the interface constraints ALIGN-XP and PH=PPH, we would expect weight effects to play a much more pervasive role in the phonology of English, not only in this construction but also in phonological phrasing. Also note that this grammar still prohibits heavy NP shift because PARSE-OBJ dominates WEIGHT INCREASE.

(694) Grammar (weight-sensitive extraposition)

    a.   Max(PPh) ≫ Parse-OBJ

    b.   Parse-OBJ ≫ WI

    c.   Parse-OBJ ≫ Parse-NComp

    d.   Parse-OBJ ≫ Align-XP

    e.   Parse-OBJ ≫ Ph=PPh

    f.   Parse-NComp ≫ Align-XP

    g.   Parse-NComp ≫ Ph=PPh

The grammar in (694) can make extraposition obligatory if the phrasing induced by the position of the nominal complement/adjunct respects WEIGHT INCREASE. These rankings also block extraposition of a non-complex constituent if there is no improvement in the phonological structure that would have resulted from extraposition.

    Let us first consider an example with a heavy PP complement like the one in (695).[33] The PP is heavy enough to give rise to a balanced phrasing that respects WEIGHT INCREASE upon extraposition.

(695)   *Let me tell you something about John.*

    a.   *(He sóld a cópy) (of Túrner's Wárkworth Cástle) (at Sótheby's)*

    b.   *(He sóld a cópy at Sótheby's) (of Túrner's Wárkworth Cástle)*

Consider the three tableaux in Figure 4.33. In the first tableau, WEIGHT INCREASE is ranked higher than ALIGN-XP and PH=PPH. In the second and third tableau it is ranked lower than either ALIGN-XP or PH=PPH. All three options are total orders of the grammar in (695). The three tableaux contain the same set of candidates: three candidates with different phrasing for the canonical word order, one candidate in which the PP is extraposed and one candidate in which the heavy NP has been displaced.

    In the first tableau, candidates (a) and (b) are ruled out because they contain a phonological phrase that is too large.[34] Candidate (c) does not violate MAX(PPH), but does violate WEIGHT INCREASE. While the first two phonological phrases of this candidate respect WEIGHT INCREASE, the second and third constitute a decrease in weight. Note that PARSE-NCOMP is violated whenever the PP complement is not phrased with the noun (candidates c and d). So the extraposition candidate (d) is the optimal one if WEIGHT INCREASE is ranked higher than ALIGN-XP

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34 Note that all candidates violate ALIGN-XP at least once because *Turner* is not aligned with a phonological phrase in any of the candidates.

he sold a copy of Turner's Warkworth Castle at Sotheby's	Max(PPh)	Parse-OBJ	Parse-NComp	WI	Align-XP	Ph=PPh	WI
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) a.	*!				***		
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) b.	*!			*	*	*	
(he sold a copy) (of Turner's Warkworth Castle) (at Sotheby's) c.			*	*	*	*	
☞ (he sold a copy at Sotheby's) (of Turner's Warkworth Castle) d.		*!	*		**		
(he sold at Sotheby's) (a copy of Turner's Warkworth Castle) e.					*		

he sold a copy of Turner's Warkworth Castle at Sotheby's	Max(PPh)	Parse-OBJ	Parse-NComp	Align-XP	Ph=PPh	WI
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) a.	*!			***		
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) b.	*!			*	*	*
☞ (he sold a copy) (of Turner's Warkworth Castle) (at Sotheby's) c.			*	*	*	*
(he sold a copy at Sotheby's) (of Turner's Warkworth Castle) d.			*	**!		
(he sold at Sotheby's) (a copy of Turner's Warkworth Castle) e.		*!		*		

he sold a copy of Turner's Warkworth Castle at Sotheby's	Max(PPh)	Parse-OBJ	Parse-NComp	Ph=PPh	Align-XP	WI
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) a.	*!				***	
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) b.	*!			*	*	*
(he sold a copy) (of Turner's Warkworth Castle) (at Sotheby's) c.			*	*!	*	*
☞ (he sold a copy at Sotheby's) (of Turner's Warkworth Castle) d.			*		**	
(he sold at Sotheby's) (a copy of Turner's Warkworth Castle) e.		*!			*	

Figure 4.33: Taking into account heaviness.

and PH=PPH. Whether it is ranked higher or lower than PARSE-NCOMP is irrelevant here. Heavy NP shift (candidate e) would also result in a structure that obeys WEIGHT INCREASE, but it is blocked in this grammar. If WEIGHT INCREASE is ranked

lower than either Align-XP or Ph=PPh, as in the second and third tableau, either the canonical structure emerges as the optimal one (candidate c) or extraposition is enforced by Ph=PPh.

The grammar in (694) also blocks extraposition of non-heavy PPs, like (696), in which the extraposed PP does not meet the requirements of Weight Increase. As can be seen in the tableaux in Figure 4.34, Parse-NComp blocks extraposition

he sold a painting by Turner at Sotheby's	Max(PPh)	Parse-OBJ	WI	Parse-NComp	Align-XP	Ph=PPh
(he sold a painting by Turner at Sotheby's) a.	*!					
☞ (he sold a painting by Turner) (at Sotheby's) b.			*		**	*
(he sold a painting at Sotheby's) (by Turner) c.			*	*!	*	
(he sold at Sotheby's) (a painting by Turner) d.		*!				

he sold a painting by Turner at Sotheby's	Max(PPh)	Parse-OBJ	Parse-NComp	WI	Align-XP	Ph=PPh
(he sold a painting by Turner at Sotheby's) a.	*!					
☞ (he sold a painting by Turner) (at Sotheby's) b.				*	**	*
(he sold a painting at Sotheby's) (by Turner) c.			*!	*	*	
(he sold at Sotheby's) (a painting by Turner) d.		*!				

Figure 4.34: Blocking extraposition of a non-heavy PP.

regardless of whether it is ranked above or below Weight Increase because both the canonical word order and the scrambled order have a phonological structure that violates Weight Increase. Heavy NP shift would give rise to an improved phonological structure, but it is blocked by Parse-OBJ.

(696)　*(He sold a painting at Sotheby's) (by Turner)*

In sum, the partially ordered grammar in (694) allows extraposition of a more complex PP iff the resulting structure respects a phonological constraint, namely Weight Increase. It blocks extraposition of non-complex PPs as well as heavy NP shift. As mentioned above, a grammar that is to capture a tendency for weight-sensitivity, must include ingredients from both grammars described so far in this section. It contains a subset of the rankings of both grammars, namely those rankings that they share. The grammar we arrive at is (697).

(697)　Grammar (extraposition)
　　　a.　Max(PPh) ≫ Parse-OBJ
　　　b.　Parse-OBJ ≫ WI
　　　c.　Parse-OBJ ≫ Parse-NComp
　　　d.　Parse-OBJ ≫ Align-XP
　　　e.　Parse-OBJ ≫ Ph=PPh

Now we can combine the results of the previous section on heavy NP shift with the grammar of extraposition in (697). A grammar that allows optional heavy NP shift has the rankings in (698). Crucially, Weight Increase is not ranked with respect to Parse-OBJ, which derives the two word orders in (699).

(698)　Grammar (heavy NP shift)
　　　a.　Max(PPh) ≫ Parse-OBJ
　　　b.　Max(PPh) ≫ WI
　　　c.　Parse-OBJ ≫ Align-XP
　　　d.　Parse-OBJ ≫ Ph=PPh

(699)　a.　*(He donated a Minoan vase) (to a museum)*　　Parse-OBJ ≫ WI
　　　b.　*(He donated to a museum) (a Minoan vase)*　　WI ≫ Parse-OBJ

The grammar in (698) does not, however, take into account that the object may contain a noun with an extraposable NComp. So what rank does Parse-NComp have in a heavy NP shift only grammar, i. e., in a grammar that allows heavy NP shift, but not extraposition of NComp? It is necessarily Parse-NComp≫Parse-OBJ. This ranking will prefer a continuous object to a discontinuous one. Consider again three of the candidates from Figure 4.33, repeated in (700). Both (700a)

and (700b) violate Parse-NComp regardless of the position of the PP. Only (700c) allows the object to form one phonological phrase. As can be seen in the two tableaux in Figure 4.35, ranking Weight Increase above or below Parse-NComp,

he sold a copy of Turner's Warkworth Castle at Sotheby's	Max(PPh)	WI	Parse-NComp	Parse-OBJ	Align-XP	Ph=PPh
(he sold a copy of Turner's Warkworth Castle at Sotheby's) a.	*!				***	
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) b.	*!	*			*	*
(he sold a copy) (of Turner's Warkworth Castle) (at Sotheby's) c.		*!	*		*	*
(he sold a copy) (of Turner's Warkworth Castle) d.			*!		**	
☞ (he sold at Sotheby's) (a copy of Turner's Warkworth Castle) e.				*	*	

he sold a copy of Turner's Warkworth Castle at Sotheby's	Max(PPh)	Parse-NComp	WI	Parse-OBJ	Align-XP	Ph=PPh
(he sold a copy of Turner's Warkworth Castle at Sotheby's) a.	*!				***	
(he sold a copy of Turner's Warkworth Castle) (at Sotheby's) b.	*!		*		*	*
(he sold a copy) (of Turner's Warkworth Castle) (at Sotheby's) c.		*!	*		*	*
(he sold a copy) (of Turner's Warkworth Castle) d.		*!			**	
☞ (he sold at Sotheby's) (a copy of Turner's Warkworth Castle) e.				*	*	

Figure 4.35: Heavy NP shift preferred.

has no effect on the outcome. The grammar of heavy NP shift should therefore be amended to include the ranking Parse-NComp ≫ Parse-OBJ, while Weight Increase remains only ranked with respect to Max(PPh).

(700) a. *(He sold a copy) (of Turner's Warkworth Castle) (at Sotheby's)*
       b. *(He sold a copy at Sotheby's) (of Turner's Warkworth Castle)*
       c. *(He sold at Sotheby's) (a copy of Turner's Warkworth Castle)*

(701) Revised Grammar (heavy NP shift)

       a. Max(PPh) ≫ Parse-OBJ
       b. Max(PPh) ≫ WI
       c. Max(PPh) ≫ Parse-NComp
       d. Parse-NComp ≫ Parse-OBJ
       e. Parse-OBJ ≫ Align-XP
       f. Parse-OBJ ≫ Ph=PPh

Let us now make the final move and construct the grammar that allows extraposition and heavy NP shift. A grammar of English which captures extraposition's tendency to weight-sensitivity, but categorically demands weight-sensitivity for heavy NP shift, will share the rankings of (697) and (701). The final grammar is (702).

(702) Final grammar (extraposition and heavy NP shift)

       a. Max(PPh) ≫ Parse-OBJ
       b. Max(PPh) ≫ WI
       c. Max(PPh) ≫ Parse-NComp
       d. Parse-OBJ ≫ Align-XP
       e. Parse-OBJ ≫ Ph=PPh

The main feature of the grammar in (702) is that Weight Increase and Parse-NComp are only ranked with respect to Max(PPh). Therefore, this grammar translates into a fairly large number of tableaux. Such partially ordered grammars, however, make clear predictions about the probability of occurrence of an optimal candidate. Anttila (2007) and Anttila & Cho (1998) propose the following interpretation of such a grammar:

(703) a. A candidate is predicted iff it wins in some tableau.
       b. If a candidate wins in *n* tableaux and *t* is the total number of tableaux, then the candidate's probability of occurrence is *n/t*.

I will now work out the predictions of the grammar in (702) for the phenomena considered here, namely extraposition of non-heavy and heavy PPs as well as for

heavy NP shift. These predictions only concern the phonological effects on extraposition and remain to be verified. If extrinsic constraints on production and processing also play the important role that most linguists working on this issue have claimed they do, then the probability of extraposition and/or heavy NP shift will be lower than what the grammar in (702) predicts.

The first case is (704), containing a non-heavy PP nominal complement/adjunct.

(704) a. *(He sold a painting by Turner) (at Sotheby's)* CWO
     b. *(He sold a painting at Sotheby's) (by Turner)* EX
     c. *(He sold at Sotheby's) (a painting by Turner)* HNPS

Extraposition is the result of the rankings in (705). Only rankings with active constraints in the tableaux have been counted, which are delimited by #. The full set of tableaux are not included here because the most important rankings have already been presented above.

(705) a. MAX(PPH) ≫ PARSE-OBJ ≫ WI ≫ PH=PPH #
     b. MAX(PPH) ≫ PARSE-OBJ ≫ PH=PPH #

Heavy NP shift is the result of the rankings in (706).

(706) a. MAX(PPH) ≫ WI #
     b. MAX(PPH) ≫ PARSE-NCOMP ≫ WI #

Canonical word order is the result of the rankings in (707).

(707) a. MAX(PPH) ≫ PARSE-OBJ ≫ WI ≫ PARSE-NCOMP #
     b. MAX(PPH) ≫ PARSE-OBJ ≫ PARSE-NCOMP #
     c. MAX(PPH) ≫ PARSE-NCOMP ≫ PARSE-OBJ #
     d. MAX(PPH) ≫ PARSE-OBJ ≫ ALIGN-XP #

The total number of tableaux with active rankings is 8. Extraposition and heavy NP shift is optimal in 2 tableaux, while canonical word order is optimal in 4 tableaux. The probability of extraposition and heavy NP shift is 1/4 each, while the probability of canonical word order is 1/2. This is still a very high probability for rightward movement, namely 50 %, but if performance factors also play a role then the probability of rightward movement will be lower.

The second case is (708), containing a heavier PP nominal complement/adjunct.

(708) a. *(He sold a copy) (of Turner's Warkworth Castle) (at Sotheby's)* CWO
     b. *(He sold a copy at Sotheby's) (of Turner's Warkworth Castle)* EX

    c.   *(He sold at Sotheby's) (a copy of Turner's Warkworth Castle)*   HNPS

Extraposition is the result of the rankings in (709).

(709)   a.   Max(PPh) ≫ WI ≫ Parse-Obj #
           b.   Max(PPh) ≫ Parse-Obj ≫ WI #
           c.   Max(PPh) ≫ Parse-Obj ≫ Parse-NComp ≫ WI #
           d.   *Max(PPh) ≫ Parse-Obj ≫ Parse-NComp ≫ Ph=PPh #*

Heavy NP shift is the result of the rankings in (710). The role of Weight Increase strongly diminishes because high ranked Max(PPh) and Parse-NComp can only be satisfied if the whole object is moved to the right and mapped to one phonological phrase.[35]

(710)   a.   Max(PPh) ≫ WI ≫ Parse-NComp #
           b.   Max(PPh) ≫ Parse-NComp #

Canonical word order is the result of the rankings in (711).

(711)   a.   Max(PPh) ≫ Parse-Obj ≫ Parse-NComp ≫ Align-XP #
           b.   Max(PPh) ≫ Parse-Obj ≫ Align-XP #

The total number of tableaux with active rankings is 8 again. Extraposition is optimal in 4 tableaux, heavy NP shift is optimal in 2 tableaux, and canonical word order is also optimal in 2 tableaux. The probability of extraposition is 1/2, while the probability of heavy NP shift and canonical word order is 1/4 each. This is also a very high probability for rightward movement, namely 75 %, but the interesting result of this section is that the account predicts an increase in the probability of extraposition. The more complex PP is predicted to move rightward twice as often than the non-heavy PP, while heavy NP shift remains stable.

    As a concluding remark I only want to add that, even if the statistical data is missing, this section amends some of the shortcomings of the account in earlier sections of this chapter. On the statistical side, it is an improvement on that account because the free ranking of just two constraints, namely Align-XP and Ph=PPh, predicts a probability of 50 % for extraposition alone, regardless of whether the nominal complement/adjunct is heavy or not. Taking into account weight effects, it diminishes the probability of extraposition of non-heavy PPs to

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35 Recall from chapter 3, section 3.2.2.2, that Max(PPh) still has to be refined. Given the definition provided there, Max(PPh) should still be violated by the shifted object *a copy of Turner's Warkworth Castle* unless this phonological phrase has a recursive phonological structure. Nevertheless, it does not have to be broken up into two phonological phrases.

25 %, without actually sacrificing the earlier analysis. Extraposition is still the result of Pʜ=PPʜ dominating Aʟɪɢɴ-XP, as can be seen in (705), i. e., the pressure for vP to form one PPh by removal and separate phrasing of the PP. The analysis also deals with the competing heavy NP shift construction. The addition of constraints that militate against the separation of the object from the verb and the PP from the noun increases the number of rankings that opt for canonical word order, as can be seen in (707), with Aʟɪɢɴ-XP ≫ Pʜ=PPʜ being just one of them. For heavier PPs, this ranking is still the only determinant of canonical word order, as can be seen in (711).

4.5 Conclusion

The goal of this chapter was to explore whether phonological triggers can be established for extraposition in English. Inspired by Truckenbrodt (1995a), this chapter focused on phonological phrasing rather than on accentuation and focus structure, without neglecting the latter. By comparing the phonological structure of the canonical word order with that of the scrambled order a clear prosodic pattern for extraposition constructions emerges. Key examples are repeated here:

(712) a. *(You'll fínd a revíew of Túrner) (in your ín-tray)*
      b. *(You'll fínd a revíew in your ín-tray) (of Túrner)*

(713) a. *(Píctures of every térrorist) (will be distríbuted)*
      b. *(Píctures will be distríbuted) (of évery térrorist)*

(714) a. *(A néw bóok about Túrner) (appéared lást yéar)*
      b. *(A néw bóok appeared last year) (about Túrner)*

(715) a. *(I búmped into a wíndow) (that sómeone had ópened) (in the dárk)*
      b. *(I búmped into a wíndow in the dark) (that sómeone had ópened)*

(716) a. *(I recéived some létters) ((that are of ínterest) this morning)*
      b. *(I recéived some létters this morning) (that are of ínterest)*

(717) a. *(A díamond) ((that éverybody was lóoking for) was found)*
      b. *(A díamond was found) (that éverybody was lóoking for)*

(718) a. *(I don't WANT people) ((who are so quarrelsome) in my house)*
      b. *(I don't WANT people in my house) (who are so quarrelsome)*

The prosodic pattern resulting from extraposition of a PP or relative clause is the optimal from the perspective of the syntax-phonology correspondence. Removal of a PP or relative clause from within NP allows syntactic phases like transitive vP and clauses containing unaccusative or passivised verbs to be contained in

one phonological phrase. This is clearly not possible in the examples with canonical word order, in which right-peripheral constituents, be they verb phrases or constituents of a verb phrase, have to be phrased separately or, if deaccented, have to be included in a recursive phonological phrase with constituents they are neither syntactically nor semantically related. Extraposition, therefore, optimises the syntactic structure – phonological structure correspondence, in the sense that each syntactic phase corresponds to one phonological phrase.

Technically, two interface constraints are responsible for the mapping between the two grammatical structures, namely ALIGN-XP and PH=PPH. These are freely ranked and independently needed for an account of optional phrasing in English. In this account it is the ranking PH=PPH ≫ ALIGN-XP that drives extraposition and the syntactic phase – phonological phrase correspondence.

In the introduction I also asked what improves from the phonological perspective if rightward movement occurs. This question is a legitimate one, particularly for those cases of extraposition in which a light deaccented or defocused constituent occurs at the right edge and which the psycholinguistic literature has identified as particularly favourable for extraposition. Following suggestions by Hartmann (2013), I examined the prosodic structure of such constructions in order to determine whether constraints on prosodic domination play a role here. It turned out that the recursive phonological structure based on the canonical word order can be enforced by ALIGN-XP, i. e., it is not necessarily the result of exhaustive parsing at the phonological phrase level. Nevertheless, rightward movement in these cases does lead to optimisation of the phonological structure since recursive phonological structures are thereby avoided.

In a next step, I examined the role of the head-alignment constraints in these constructions, particularly, the role of ALIGN H-IP. I argued that it can block extraposition across a prominent constituent at the right edge. It also plays a role in the accentuation and phrasing of thetic sentences. But due to the fairly low rank of the head-alignment constraints in the English constraint hierarchy, ALIGN H-IP does not force constituents to move to the right even if they contain focused material. Extraposition remains optional regardless of the focus structure of the sentence.

The last section discusses the role of weight by focusing on extraposition from objects. It also takes into account the competing heavy NP shift construction. This section extends the analysis developed in previous sections by introducing a number of additional constraints that opt against separation of heads from their complements. Nevertheless, the account remains tentative guiding the way for future research in this area.

5 Defocused and light PPs

5.1 Preliminary remarks

This chapter deals with two types of PP extraposition, illustrated in (719) and (720). In both examples a defocused constituent is moved rightward. In the former case it is a PP containing a nominal constituent or demonstrative pronoun,[1] in the latter it is a phonologically deficient P+D string (i. e., a clitic cluster). The latter will be referred to as "light" PPs.

(719) *In an effort to protect the environment, the EU has decided to ban cars older than five years from European roads.*

    a.   *All member states will sign a declaration **on this matter** in May.*

    b.   *All member states will sign a declaration in May **on this matter**.*

(720) *Pinker's new book is really amazing.*

    a.   *I read a review **of it** today in Time magazine.*

    b.   *I read a review today **of it** in Time magazine.*

    c.   *I read a review today in Time magazine **of it**.*

Extraposition is also possible from subjects and it is optional. Cf.:

(721) *I haven't checked the wording of today's programme, but I don't think*

    a.   *any mistakes on that have been made.*

    b.   *any mistakes have been made on that.*

(722) *Philip Roth's new book hit the stands about a fortnight ago.*

    a.   *Strangely, no review of it has yet appeared.*

    b.   *Strangely, no review has yet appeared of it.*

Theses examples are striking because they illustrate a phenomenon that contradicts received wisdom, namely, that it is focused or heavy constituents that prefer to occur at the right edge. But extraposition of defocused and light PPs is very natural and frequent.

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1 Demonstrative pronouns behave more like lexical categories in that they have word stress and, syntactically, they can be distinguished from regular determiners. In Romanian, for example, they co-occur with articles within a nominal constituent, as in (i). They are also assigned phrasal stress in DP-final position.

(i)   *băiat-ul acela*
       boy-the that
       'that boy'

I argued in section 2.2.1 that a topic analysis can be excluded for these constructions. Languages often have a means to distinguish topics from defocused material. Topics often occur in sentence-initial position, are phonologically more prominent and in several languages they are marked morphologically (e. g. Japanese and Korean). Contrasting with topics, defocused constituents are often scrambled locally. For example, in Korean defocused NPs are scrambled, but they are not marked as topics (Choe 1995). Some Romance languages, like Catalan and Italian, resort to (clitic-)right dislocation (Vallduví 1992; Samek-Lodovici 2006; López 2010). Others, like Spanish and Romanian, resort to local VP-internal leftward scrambling (Zubizarreta 1998; Göbbel 2003a, 2003b; Winkler and Göbbel 2002). Such local displacement is largely a consequence of the interaction of prosody with syntactic structure, as argued by virtually all of the studies on Romance just cited. English examples like (719) and (721) are also cases of local scrambling, while examples like (720) and (722) are reminiscent of the variable positions of weak pronouns in some Germanic languages (e. g. German).

The goal of this chapter is to discuss the prosodic properties of these constructions and to determine to what extent prosodic aspects can be made responsible for the displacement. I will show that defocused lexical constituents can be accommodated under an extension of the analysis of PP extraposition proposed in chapter 4, where it is argued that phonological interface constraints, which are independently needed for prosodic phrasing, can also trigger extraposition in neutral contexts. Light PPs, on the other hand, will have to be treated separately. By comparing the prosodic structure of these PPs *in situ* and in extraposed position, I will argue that rhythmic considerations can be the cause for rightward displacement, but only in a subset of cases.

5.2 Extraposition of defocused PPs

Extraposition of defocused lexical constituents is fairly common. Examples can be found in all the media that I have inspected: the Internet (723), the British National Corpus (724), formal written texts (725) and podcasts (726).

(723)   *The New York Times has an outstanding editorial this morning **on this matter**.*[2]

(724)   *When the Archbishop of Canterbury made a strong statement last autumn **on this subject**, voicing his concern for our reckless disregard for nature,*

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[2] http://www.preemptivekarma.com/archives/2006/01/a_sign_on_the_r.html, accessed 1 January 2010.

> *The Times ran an editorial entitled "The Greening of the Archbishop". [ABV 368]*

(725) *It is interesting to note that the development of the subject of determinants was carried on mainly in the periodicals for about a century before a separate treatise appeared **on this subject**.*[3]

(726) *... and I think mistakes were MADE **on that**.*[4]

Let me turn to the phonological properties of this construction. The examples in (727) and (728) show that a phonological phrase boundary may occur after the defocused PP. The same pattern was observed in (focus) neutral cases in section 4.3.1. The phonological phrase boundary is due to ALIGN-XP. Once extraposed, the PP is integrated into the phonological phrase containing the whole sentence or verb phrase, respectively. Figure 5.1 shows typical pitch tracks for (727).[5]

(727) *Although they have come to a deal now, they have a practical problem: They can't get into the offices where you need to go and put the paperwork together, print out the copies, and get it ready for a vote. Of course, the House isn't around to vote on it.*

    a. *(So a vóte on that deal) (will be deláyed)*

    b. *(So a vóte will be deláyed on that deal)*

(728) *The NHS is facing increasing financial problems.*

    a. *(But Tóny Bláir) (made a propósal on this subject) (in Máy)*

    b. *(But Tóny Bláir) (made a propósal in Máy on this subject)*

If the PP moves rightward, it cannot form a separate (deaccented) phonological phrase. The representations in (729) are ruled out by ALIGN H-IP. An alternative phonological representation is a recursive phonological phrase structure, as in (730).

(729) a. [(So a vóte will be deláyed) (on that deal)]$_{IP}$

    b. [(But Tóny Bláir) (made a propósal in Máy) (on this subject)]$_{IP}$

(730) a. ((So a vóte will be deláyed) on that deal)

    b. (But Tóny Bláir) ((made a propósal in Máy) on this subject)

Note that the canonical word order has an alternative phonological representation. The defocused PP is not necessarily aligned with a phonological phrase

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3 G. A. Miller. 2007. *Historical Introduction to Mathematical Literature*, Mac Donnell Press, p. 193.

4 Former Lib. Dem. Leader C. Kennedy, BBC Radio 4 podcast, 4 January 2006.

5 Example (727) is based on a CNN transcript, which contained only the extraposed variant. [http://archives.cnn.com/TRANSCRIPTS/0110/18/ltm.01.html].
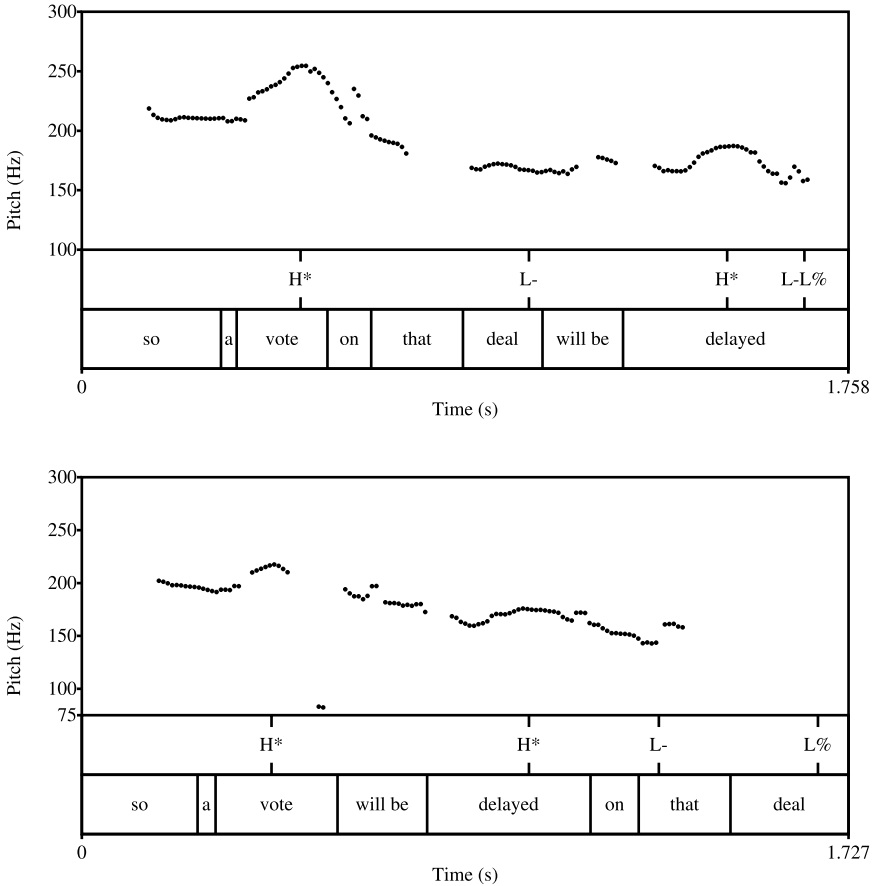
Figure 5.1: Pitch tracks for examples (727a) and (727b).

boundary. The verb phrase can also be realised as a "flat hat" or a series of downstepped H⋆ accents. The accentual pattern of three examples is shown below. Sample pitch tracks can be viewed in Figure 5.2.

(731)   *(But Tóny Bláir) (made a propósal on this súbject in Máy)*

(732)   *In an effort to protect the environment, the EU has decided to ban cars older than five years from European roads.*
         (All mémber states) (will sign a declarátion on this mátter in Máy)

(733)   *I haven't checked the wording of today's programme, but I don't think (any mistákes on thát have been máde)*
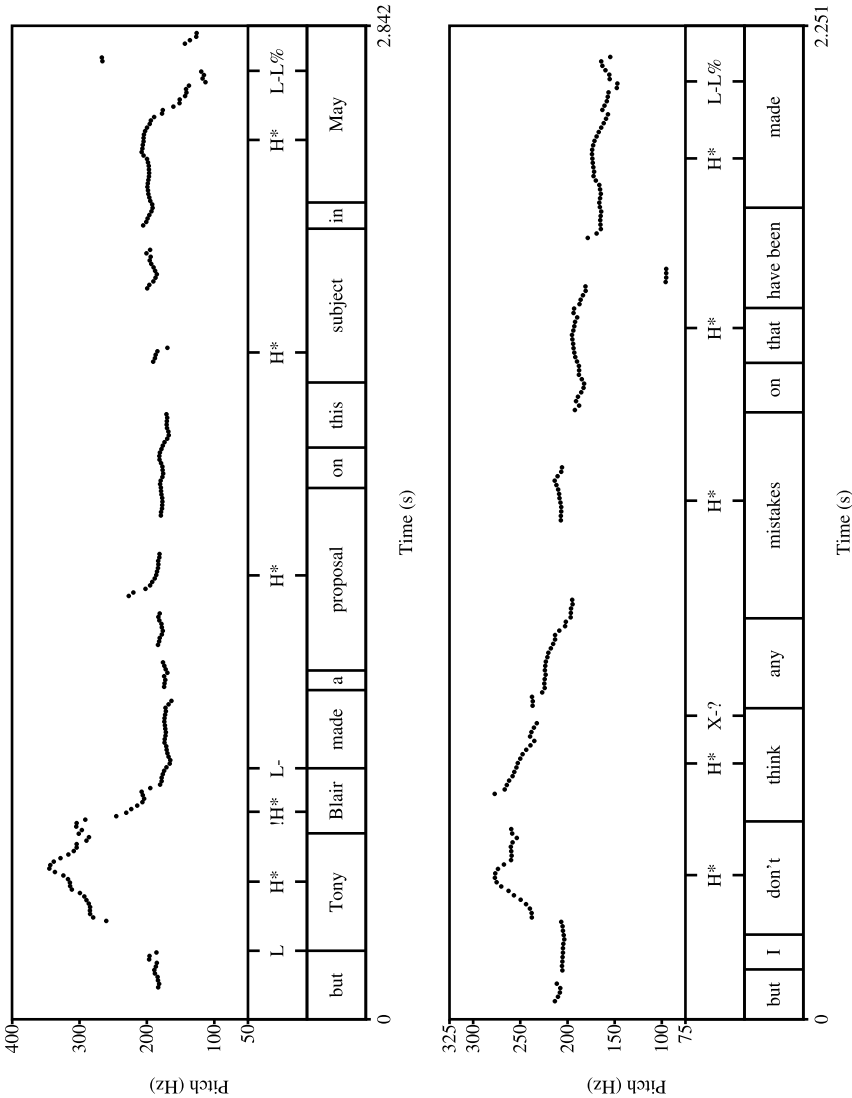
Figure 5.2: Pitch tracks of examples (731) and (733).

In focus-neutral contexts, a complex noun phrase (i. e., an nP that contains an-other nP) has to be aligned with a phonological phrase boundary. This is due to the fact that both coinciding nPs require right alignment. Defocusing, on the other hand, often leads to restructuring of phonological phrases. That is, two phono-logical phrases are merged into one (cf. section 4.3.3.2). I interpret such a restruc-turing process as a relaxation of the alignment requirement on defocused XPs.

Hence, in *proposal on this subject*, *declaration on this matter* and *mistakes on that*, the embedded nPs are exempt from alignment, but not the nPs that require phrasal stress, those headed by *proposal*, *declaration* and *mistakes*. ALIGN-XP applies only once to these examples.

Another clearly observable property of the examples (731), (732) and (733) is that the defocused nouns and demonstrative are accented. It seems that the unexpected pitch accent on *subject*, *matter* and *that* is due to rhythmic considerations, particularly the avoidance of placing stresses too far apart. In section 3.2.3.2, I introduced the constraint in (734) in order to handle similar cases, following a proposal by Hayes (1984). It is responsible for accentual prominences on constituents that are not at one of the edges of a phonological phrase. QSC seems to override D-GIVEN in prenuclear position, but not in post-nuclear position. The pitch accents occur on words which already have lexical stress.

(734)   QUADRISYLLABIC CONSTRAINT
         Pitch accents within a phonological phrase are spaced close to four syllables apart.

In the remainder of this section I will develop a phonological solution for rightward movement of defocused PPs. One possible 'trigger' was suggested to me by Peter Culicover (p. c). He suggested that the PP is forced out of the nP because the accent in English wants to be rightmost in nP. However, his suggestion cannot be adopted here because there is no constraint that requires an accent at the right edge of an NP. For example, ALIGN H-PPH requires a prominent constituent at the right edge of a phonological phrase, not at the right edge of an NP or any other lexical XP. XP and phonological phrase boundaries may, but need not, coincide. ALIGN H-PPH is a phonological well-formedness constraint not an interface constraint. Another candidate would be STRESS-XP. Due to the head-initial structure of XP in English, phrasal stress is normally assigned rightmost in XP, but this is clearly not a requirement of this constraint. In the example (728) above, phrasal stress is assigned to *subject*, as shown in (735a). D-GIVEN forces phrasal stress to default on *proposal*, as in (735b). The nP headed by *proposal* satisfies STRESS-XP in both (a) and (b) since it contains a constituent which has phrasal stress. Note that destressing is only possible if *subject* is followed by a phonological phrase boundary.[6]

(735)   a.   He made a [_{nP} proposal on this SUBJECT] in MAY.

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6 I will follow the convention from previous chapters and indicate phrasal stress with small caps and the nuclear accent with big caps, whenever such a distinction is desirable or necessary.

b. He made a [$_{nP}$ PROPOSAL on this subject] in MAY. √
    (He made a PROPOSAL on this subject) (in MAY)

Given the wide-spread view that focal elements come last, the question certainly is
why defocused constituents should be able to move rightwards after all. In the ex-
amples just mentioned, the defocused constituent ends up in a position adjacent
to the metrically most prominent word (i. e., the one carrying intonational phrase
level metrical prominence). This is blocked if the extraposed constituent is not
defocused, as in (736). Extraposition in this case gives rise to a prosodic structure
in which a phonological phrase that is not the head of the intonational phrase
is not rightmost, in violation of ALIGN H-IP (cf. the discussion in section 4.3.3.1).
However, if the extraposed constituent is defocused movement is possible.

(736) a. [(a stéamer from the Cúnard Line) (sánk QUICKLY)]$_{IP}$
       b. *[(a stéamer) (sánk QUICKLY) (from the Cúnard Line)]$_{IP}$

In order to explain why defocused constituents move rightwards, I will exploit the
idea that prosody can facilitate parsing of information structure. I think that the
reason for rightward shift is the fact that a defocused constituent can be identified
as such much more readily if it occurs in the postnuclear stretch. In prenuclear
position defocused constituents are not necessarily deaccented in English and re-
lated languages, as we have seen on several occasions so far. Tone-alignment as
well as rhythmic constraints will require certain constituents to be accented, with
the result that defocused material is often associated with pitch accents. In post-
nuclear position, defocused material is never accented. And only if defocused ma-
terial is also completely deaccented is it also perceived by the hearer as defocused
without any difficulties. Therefore, there is no reason for not moving defocused
constituents into the postnuclear stretch.

Technically, the constraint D-GIVEN is often violated in prenuclear position,
but not in postnuclear position. The particular formulation of D-GIVEN adopted in
this study is repeated in (737). In order to capture the asymmetry between prenu-
clear and postnuclear accentuation, I introduced and systematically used the con-
straint in (738), which is ranked higher than D-GIVEN.

(737) D-GIVEN: A given constituent is not accented.

(738) POSTNUC-D: No pitch accents are realised in the postnuclear stretch.

Note that the constraint D-GIVEN has only played a minor role in this study. Its ef-
fects are often stifled by other constraints. In (735), it leads to deaccentuation only
if *subject* is at the right edge of a phonological phrase. If it is not at the right edge,
rhythmic factors (i. e., the QSC) force some accentual prominence on it. I would

like to suggest that it is exactly this constraint that plays a crucial role in movement of deaccented PPs. Furthermore, it interacts with another force which prefers focused constituents at the right edge of a sentence. This force can be identified with the requirement that focused constituents be aligned with the right edge of an intonational phrase, namely ALIGN-FOC in (739), introduced in chapter 3, section 3.2.4. If these two constraints are linked in a relation of free ranking, optional extraposition of defocused PPs can be captured straightforwardly because either a deaccented or a focused constituent will occur at the right edge of an intonational phrase.

(739)　ALIGN-FOC (FOC, R; IP, R)
　　　　Each focused constituent is right-aligned with an IP boundary.

Note that we now have two pairs of constraints in a relation of free ranking: the interface constraints ALIGN-XP and PH=PPH as well as D-GIVEN and ALIGN-FOC. Free ranking of the interface constraints was motivated by the optionality of phrasing in more complex VPs and it was identified as the major cause of extraposition in chapter 4. In the case of PP extraposition in focus neutral contexts, I exploited the fact that the nP was complex, in the sense that two coinciding nP boundaries required alignment with a phonological phrase boundary. In the cases under discussion here, the nPs are still complex syntactically but the alignment requirement is relaxed for defocused nPs. So the same mechanism will not be responsible for extraposition. And it shouldn't, if my proposal is correct that it is the preference for given constituents to escape accentuation that is the true cause for rightward movement.

In the remainder of this section, I am going to evaluate the examples in (740). The phonological representation of (740c) is enforced by ALIGN H-IP, ranked higher than ALIGN H-PPh.

(740)　*The NHS is facing increasing financial problems.*

　　　a.　*(But Tóny Bláir) (made a propósal on this subject) (in Máy)*
　　　b.　*(But Tóny Bláir) (made a propósal on this subjéct in Máy)*
　　　c.　*(But Tóny Bláir) ((made a propósal in Máy) on this subject)*
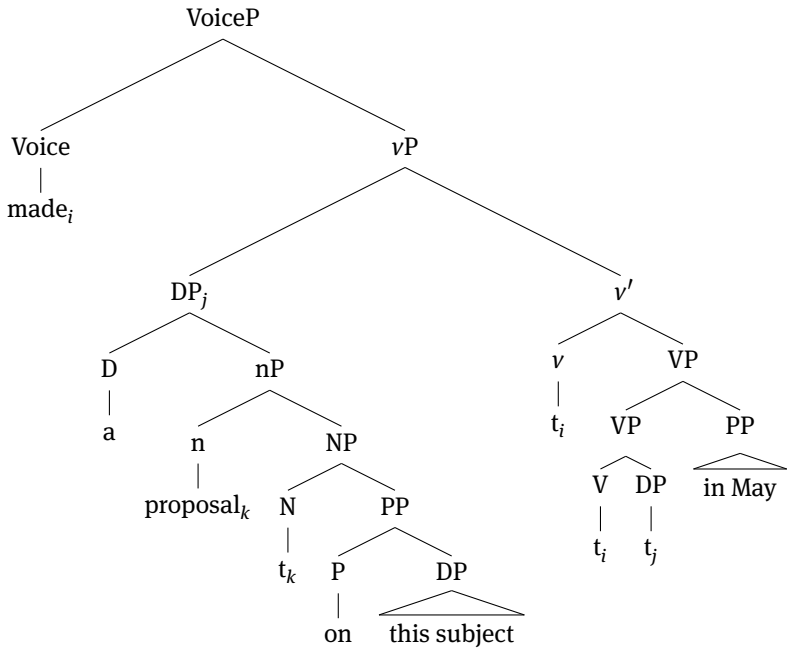
The focus structure of this example is as in (741). The subject is presumably the topic of the sentence. The focus is the VoiceP, but it contains a givenness-marked constituent, interpreted by D-GIVEN in the phonology.

(741)　[$_{Top}$ Tony Blair] [$_F$ made a proposal [$_G$ on this subject] in May]
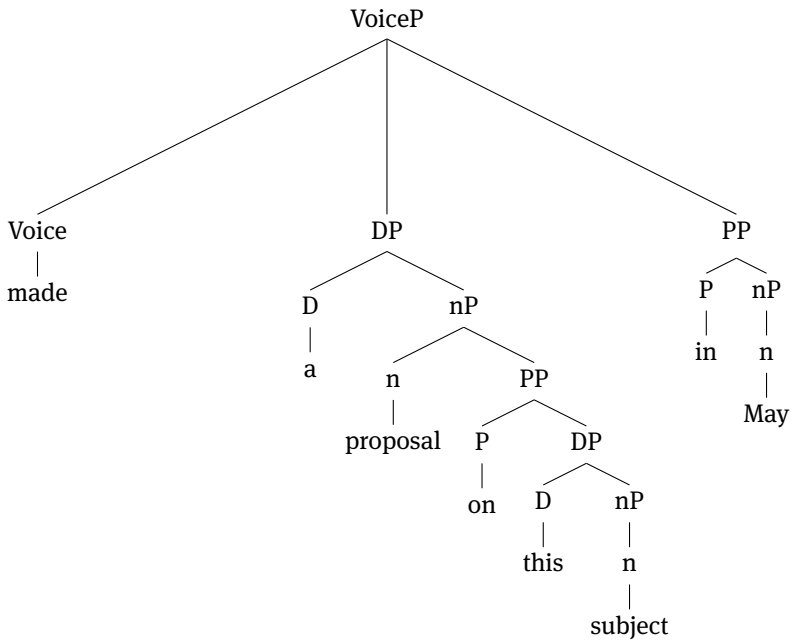
This verbal phrase has the syntactic structure in (742). After Spell-Out it is stripped of any empty categories and their projections and we get the PF representation
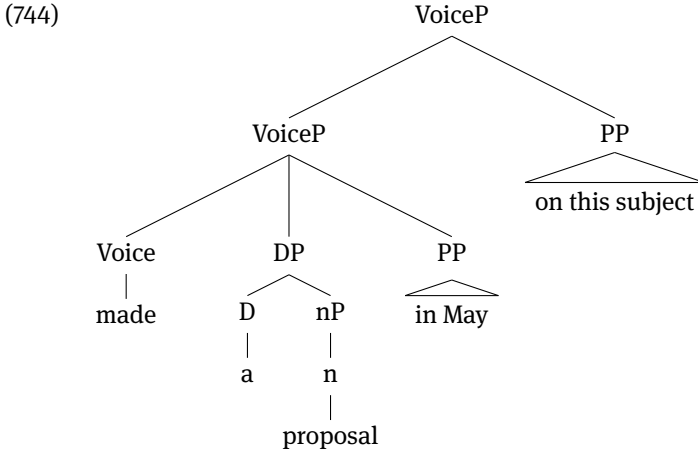
in (743). Extraposition of the PP is associated with the PF representation in (744).

(742)

```
                        VoiceP
              ┌───────────┴───────────┐
           Voice                      vP
             │             ┌──────────┴──────────┐
          madeᵢ          DPⱼ                      v′
                    ┌─────┴─────┐           ┌──────┴──────┐
                    D           nP          v            VP
                    │       ┌───┴───┐       │        ┌────┴────┐
                    a       n       NP      tᵢ       VP       PP
                            │    ┌──┴──┐            ┌─┴─┐    ∆
                       proposalₖ N    PP           V  DP   in May
                                 │  ┌──┴──┐        │   │
                                 tₖ P    DP        tᵢ  tⱼ
                                    │     ∆
                                    on  this subject
```

(743)

```
                              VoiceP
          ┌──────────────────────┼──────────────────────┐
        Voice                    DP                      PP
          │              ┌───────┴───────┐           ┌───┴───┐
        made             D               nP          P       nP
                         │          ┌────┴────┐      │        │
                         a          n         PP     in       n
                                    │      ┌──┴──┐            │
                                 proposal  P    DP           May
                                           │  ┌──┴──┐
                                           on D     nP
                                              │      │
                                             this    n
                                                     │
                                                  subject
```

(744)

```
                          VoiceP
                 ┌──────────┴──────────┐
              VoiceP                   PP
         ┌──────┼──────┐            ┌──┴──┐
      Voice    DP      PP        on this subject
        │    ┌──┴──┐   │
      made   D   nP  in May
             │    │
             a    n
                  │
               proposal
```

I now turn to the candidates to be evaluated. The candidate in (745) violates Ph=PPh because the whole VoiceP does not correspond to one phonological phrase. It also violates Align H-PPh because the lefthand phonological phrase does not have its head at the right edge. It violates Stress-XP because the nP headed by *subject* has no phrasal stress. Align-Foc is satisfied because the focused constituent (i. e. VoiceP) is aligned with the right edge of the intonational phrase.

(745)   [(made a proposal on this subject) (in MAY)]_IP
         Ph=PPh*, Align H-PPh*, Stress-XP*

Placement of phrasal stress on *subject* instead, as in candidate (746), violates D-Given. Ph=PPh is also violated in this case.

(746)   [(made a proposal on this subject) (in MAY)]_IP
         D-Given*, Ph=PPh*

If VoiceP forms one phonological phrase, as in (747), Align-XP is violated only once because defocusing of *subject* exempts it from alignment. However, the nP headed by *proposal* must be aligned because *proposal* is not defocused. D-Given is violated if *subject* carries a rhythmic accent, demanded by QSC. Deaccenting *subject*, as in candidate (748), would violate this constraint, as it would Stress-XP.

(747)   [(made a proposal on this súbject in MAY)]_IP
         Align-XP*, D-Given*

(748)   [(made a PROPOSAL on this subject in MAY)]_IP
        ALIGN-XP*, QSC*, STRESS-XP*

If the defocused PP is extraposed, ALIGN-FOC is always violated because the focused constituent is no longer aligned with the right edge of the intonational phrase. Several prosodic representations can be generated for the scrambled variant. If a recursive phonological phrase is generated, as in (749), ALIGN-XP is violated only once for the nP headed by *proposal*, but this candidate violates NONREC_{PPh}, ALIGN H-PPH and STRESS-XP.

(749)   [((made a PROPOSAL in MAY) on this subject)]_IP
        ALIGN-FOC*, ALIGN-XP*, ALIGN H-PPH*, STRESS-XP*, NONREC*

If the defocused PP forms a deaccented phonological phrase, as in (750), ALIGN H-PPH is satisfied but higher ranked ALIGN H-IP is violated instead. The righthand phonological phrase is also not binary.

(750)   [(made a PROPOSAL in MAY) (on this subject)]_IP
        ALIGN-FOC*, ALIGN-XP*, STRESS-XP*, ALIGN H-IP*

Finally, placement of phrasal stress on *subject*, as in (751), violates POSTNUC-D and also D-GIVEN. ALIGN H-IP is also violated because the most prominent phonological phrase is the one on the left. In fact, the lefthand phonological phrase contains the focus and the constituent with nuclear stress (i.e., the constituent with intonational phrase level metrical prominence) must be contained within it, as required by STRESS-FOC (cf. section 3.2.3.2).

(751)   [(made a PROPOSAL in MAY) (on this SUBJECT)]_IP
        ALIGN-FOC*, ALIGN-XP*, ALIGN H-IP*, POSTNUC-D*, D-GIVEN*

What about the ranking of these constraints. In section 3.2.3.2, I established the ranking in (752). Particularly, phrase initial accents and rhythmic accents are not suppressed by D-GIVEN.

(752)   STRESS-FOC, POSTNUC-D ≫ ALIGN(PPh,T*,L), QSC ≫ D-GIVEN ≫
        STRESS-XP

I also argued in the previous chapter that the head-alignment constraints are ranked lower than ALIGN-XP and PH=PPH since they do not interfere with phonological phrasing. Furthermore, the ranking ALIGN H-IP ≫ ALIGN H-PPH enforces encliticisation to a phonological phrase of deaccented material at the right edge of an intonational phrase.

(753)   ALIGN-XP, PH=PPH ≫ ALIGN H-IP ≫ ALIGN H-PPH

Where in the hierarchy are ALIGN-FOC and D-GIVEN, which form a tie? The fact that the defocused DP is deaccented if aligned with a phonological phrase boundary, as in (745), suggests that D-GIVEN is ranked higher than ALIGN H-PPH. In the set of examples examined in this section, this is systematically the case. But we have also seen examples in which a whole defocused string forms a phonological phrase, particularly if the focus comes late. My database contains several examples in which the final word of the defocused phonological phrase is accented. One example is (754), discussed in section 4.3.3.5. Heavy NP shift is not different: in (755) *Sotheby* may exhibit either the sequence of tones H⋆L- or L⋆H-.

(754)   *Did he leave a review on the table?*

  a.   *(He léft a revíew) ((that sómeone had wrítten about Móndrian) on the table)*

  b.   *(He léft a revíew on the táble) (that sómeone had written about Móndrian)*

(755)   a.   *What did Jason sell at Sotheby's yesterday?*

  b.   *(He sóld at Sótheby's)(a páinting by Túrner)*

These data suggest that D-GIVEN can also form a tie with ALIGN H-PPH. The proximity of these two constraints in fact suggest that D-GIVEN is ranked closer to ALIGN H-PPH than ALIGN H-IP. Since in the data examined in this section the defocused PP is always deaccented at the right edge of the phonological phrase, I will adopt the ranking in (756).

(756)   ALIGN H-IP ≫ D-GIVEN, ALIGN-FOC ≫ ALIGN H-PPH

I have no evidence for the ranking of QSC with respect to the interface constraints ALIGN-XP and PH=PPH, but it must be ranked higher than D-GIVEN. I have also no evidence for the ranking of ALIGN H-PPH, STRESS-XP and NONREC$_{PPh}$ with respect to each other. Putting these rankings statements together, we get the hierarchy in (757).

(757)   STRESS-FOC, POSTNUC-D ≫ ALIGN(PPh,T⋆,L), QSC ≫ ALIGN-XP, PH=PPH ≫ ALIGN H-IP ≫ D-GIVEN, ALIGN-FOC ≫ ALIGN H-PPH, STRESS-XP, NON-REC$_{PPh}$

Th evaluation of the candidates has to take into account the fact that there are two pairs of constraints in a free ranking relation. One part of the evaluation can be inspected in the tableaux in Figure 5.3. In these tableaux, ALIGN-XP dominates

[F made a proposal [G on this subject] in May]	PostNuc-D	QSC	Align-XP	Ph=PPh	Align H-IP	Align-Foc	D-Given	Align H-PPh	NonRec	Stress-XP
☞ [(made a PROPOSAL on this subject) (in MAY)]IP a.				*				*		*
[(made a proposal on this SUBJECT) (in MAY)]IP b.			*!	*			*!			
[(made a PROPOSAL on this subject in MAY)]IP c.		*!	*				*			*
[(made a PROPOSAL on this subject in MAY)]IP d.			*!					*	*	*
[((made a PROPOSAL in MAY) on this subject)]IP e.			*!		*	*			*	*
[(made a PROPOSAL in MAY) (on this subject)]IP f.			*		*	*				*
[(made a PROPOSAL in MAY) (on this SUBJECT)]IP g.	*!		*		*	*	*			

[F made a proposal [G on this subject] in May]	PostNuc-D	QSC	Align-XP	Ph=PPh	Align H-IP	D-Given	Align-Foc	Align H-PPh	NonRec	Stress-XP
☞ [(made a PROPOSAL on this subject) (in MAY)]IP a.				*				*		*
[(made a proposal on this SUBJECT) (in MAY)]IP b.			*!	*			*!			
[(made a PROPOSAL on this subject in MAY)]IP c.		*!	*!				*			
[(made a PROPOSAL on this subject in MAY)]IP d.			*					*		*
[((made a PROPOSAL in MAY) on this subject)]IP e.			*!			*		*	*	*
[(made a PROPOSAL in MAY) (on this subject)]IP f.			*!		*	*				*
[(made a PROPOSAL in MAY) (on this SUBJECT)]IP g.	*!		*		*	*	*			

Figure 5.3: Evaluation of examples (740) [part I].

Pʜ=PPʜ. The optimal candidate is (a) regardless of the ranking of Aʟɪɢɴ-Foᴄ with respect to D-Gɪᴠᴇɴ. Aʟɪɢɴ-XP simply inserts a phonological phrase boundary after the deaccented *subject*, whose right edge coincides with that of the nP headed by *proposal*, and D-Gɪᴠᴇɴ takes care that *subject* is deaccented (cf. candidate [a] vs. candidate [b] in both tableaux).

In the tableaux in Figure 5.4, Pʜ=PPʜ dominates Aʟɪɢɴ-XP. Now, if Aʟɪɢɴ-Foᴄ dominates D-Gɪᴠᴇɴ, as in the first tableau, the optimal candidate is (c). This candidate has the word *subject* accented, due to QSC. If the ranking of these two constraints is reversed, as in the second tableau (i. e., D-Gɪᴠᴇɴ dominates Aʟɪɢɴ-Foᴄ), the defocused constituent is forced to move to the right and it will be accommodated in a recursive phonological phrase structure. The optimal candidate is (e). Consequently, the three optimal candidates seen in (740) and described in this section are all derived by the account developed here.

Concluding this section, it should be noted that movement of defocused constituents is not restricted to extraposition of PP from NP. To some extent it is also possible with relative clauses. Bolinger (1992) cites examples like (758) and (759), in order to show that defocused or deaccentable relative clauses can be extraposed. *Yours* is contrastive in (758) and the fact that the speaker made money on his bets yesterday is known to the addressee. In (759), the contribution of the relative clause is negligible and, therefore, it can be deaccented. Note that these examples differ from those discussed in section 4.3.3.6 because the relative clause moves across the constituent that has the nuclear stress, while the deaccented relatives discussed in section 4.3.3.6 were extraposed in the postnuclear stretch (i. e., across another deaccented constituent).

(758)   *All the money was YOURS that I made on my bets yesterday.* (p. 272)

(759)   a.   *I've never seen such an empty neighbourhood.*
        b.   *Yeah, a lot of people moved AWAY who used to live here.* (p. 296)

I have recorded several examples of this type, including (758) and the following ones, in order to verify Bolinger's claim. The examples contain non-contrastive and contrastive foci. But in all cases extraposition is not preferred and some speakers don't like them at all.[7]

(760)   *I've never seen such a desolate place.*
        a.   *(Yeah,) (most péople who used to líve here) (have been evácuated)*
        b.   ?*(Yeah,) (most péople have been EVACUATED who used to live here)*

[F made a proposal [G on this subject] in May]	PostNuc-D	QSC	Ph=PPh	Align-XP	Align H-IP	Align-Foc	D-Given	Align H-PPh	NonRec	Stress-XP
[(made a PROPOSAL on this subject) (in MAY)]IP a.			*!					*		*
[(made a proposal on this SUBJECT) (in MAY)]IP b.			*!				*			
☞ [(made a PROPOSAL on this subject in MAY)]IP c.				*			*			
[(made a PROPOSAL on this subject in MAY)]IP d.		*!		*						*
[((made a PROPOSAL in MAY) on this subject)]IP e.				*		*!		*	*	*
[(made a PROPOSAL in MAY) (on this subject)]IP f.				*	*!	*		*		*
[(made a PROPOSAL in MAY) (on this SUBJECT)]IP g.	*!			*	*	*	*			

[F made a proposal [G on this subject] in May]	PostNuc-D	QSC	Ph=PPh	Align-XP	Align H-IP	D-Given	Align-Foc	Align H-PPh	NonRec	Stress-XP
[(made a PROPOSAL on this subject) (in MAY)]IP a.			*!					*		*
[(made a proposal on this SUBJECT) (in MAY)]IP b.			*!				*			
[(made a PROPOSAL on this subject in MAY)]IP c.				*			*!			*
[(made a PROPOSAL on this subject in MAY)]IP d.		*!		*						
☞ [((made a PROPOSAL in MAY) on this subject)]IP e.				*		*		*	*	*
[(made a PROPOSAL in MAY) (on this subject)]IP f.				*	*!	*				*
[(made a PROPOSAL in MAY) (on this SUBJECT)]IP g.	*!			*	*	*	*			*

Figure 5.4: Evaluation of examples (740) [part II].

(761) *Did you explain the rules that generate all grammatical extrapositions to Susanne?*

    a. *(No,) (I expláined the rúles that generate all grammatical extrapositions to BERNIE)*

    b. ?*(No,) (I expláined the rules to BERNIE that generate all grammatical extrapositions)*

(762) a. *(I gáve the páinting) (that I bóught in tówn yesterday) (to MARY), not to JANE.*

    b. ?*(I gáve the painting to MARY that I bought in town yesterday), not to JANE.*

Fully grammatical, however, is rightward movement of heavy defocused NPs and CPs, illustrated in the following examples.

(763) *Have you mentioned all the papers on phonological weight to Susanne?*

    a. *No, I've mentioned all the papers on phonological weight to BERNIE.*

    b. *No, I've mentioned to BERNIE all the papers on phonological weight.*

(764) *Who did Bill explain Newton's law of gravitation to?*

    a. *Bill explained Newton's law of gravitation to MARY.*

    b. *Bill explained to MARY Newton's law of gravitation.*

(765) *Have you told anyone that you are quitting?*

    a. *Well, I've mentioned that I would leave my job to RONALD.*

    b. *Well, I've mentioned to RONALD that I would leave my job.*

Rightward movement in these cases is also not syntactic because they do not exhibit any freezing effect. The following examples show that wh-phrases can be extracted from a heavy NP and CP, respectively, regardless of whether they are *in situ* or displaced.

(766) *She has already mentioned several interesting papers on phonological weight to Susanne.*

    a. *But which construction has she mentioned [several interesting papers on t] to BERNIE?*

    b. *But which construction has she mentioned to BERNIE [several interesting papers on t]?*

(767) *She told ME that she would visit the BRITISH MUSEUM.*

    a. *But which museum did she mention [that she would visit t] to MARY?*

    b. *But which museum did she mention to MARY [that she would visit t]?*

Arguably these cases should also receive an account in terms of the two compet-ing forces established for defocused PPs: focused constituents are preferentially located at the right edge of the sentence, or rather intonational phrase, and defo-cused constituents in an intonational language like English are best perceived as such if they are completely deaccented. Complete deaccentuation is only guaran-teed in the postnuclear stretch in this language. Consequently, they can also be moved into that position. Rightward positioning of defocused constituents, after the focus, is well documented for Romance languages like Italian and Catalan. The English cases discussed here are reminiscent of (clitic) right dislocation in these languages.

5.3 Extraposition of light PPs

This section discusses extraposition of prosodically deficient PPs like (768), henceforth called light PPs. The moved constituents are defocused like the exam-ples discussed in the previous section, but they raise different questions concern-ing their prosodic representation and are therefore dealt with separately. What they share with all other cases of extraposition discussed so far is the optionality of the process.

(768)   *Pinker's new book is really amazing.*

    a.   *I read a review **of it** today in Time magazine.*
    b.   *I read a review today **of it** in Time magazine.*
    c.   *I read a review today in Time magazine **of it**.*

Extraposition of light PPs seems to be a quite frequent process. Many examples, like those in (769), can be found on the Internet. Examples were also found in the BNC (770) and in more formal texts, like (771), which is from a letter to Henry James by his mother.

(769)   a.   *He was better today at it.*[8]
       b.   *This is the student's chance to master the material before a test is given on it.*[9]

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8 http://www.giants.com/news/eisen/story.asp?story_id=25810, accessed 1 January 2010.
9 http://www.londonderry.org/lhs/teacherPage.cfm?teacherID=303. Initially retrieved from the website of Londonderry High School, but later included in a formal information brochure. Cf. http://www.londonderry.org/assets/twps/judinazro/AdvTopicsNotesforParents.doc, ac-cessed 18 July 2011.

c.   *I started a thread a few days ago about it.*[10]

(770)   *How angry are you with me?* [A0L 1587]

(771)   *Father's book appeared about a fortnight ago. No critical notice has yet appeared of it.* [Mary Walsh James, 21 September 1869]

In fact, if I hadn't encountered them performing an internet search, I would not have been aware of their existence. They can be easily overlooked because extraposition of light PPs is often denied in the literature.[11] For example, Shiobara (2001) claims that only focused or deictic PPs can be extraposed, as in (772).

(772)   a.   *By whom did a book come out yesterday?*
        b.   *A book came out yesterday by ME/*me.*
             (Shiobara 2001: 85–86)

It seems that PP complements can be extraposed more readily and some of my informants rejected examples containing a light adjunct like (773), too, but they can nevertheless be found. Example (774) is from a non-fiction text, with full context, which shows that the extraposed PP is not focused. I have no explanation for this variability and will therefore concentrate on complement PPs.

(773)   %*It was not until 1999 that new verse appeared by him.*

(774)   *1929 was the year when scandal struck Sabarmati. Chhaganlal's and Kasturbai's lapses came to light, and word got out of the seduction of a widow by another ashramite. Ghandi moved swiftly to contain the damage.* **An article appeared by him** *in the 'Bombay Chronicle' on 8 April condemning the guilty parties and attributing their sins to his own shortcomings, which he would try to 'discover and remove'.*[12]

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10 http://forums.moneysavingexpert.com/showthread.html?t=1110241, accessed 1 January 2010.

11 Examples of obligatory extraposition from wh-phrases (i) and null relative pronouns (ii) have occasionally been mentioned, but these are not restricted to light PPs and will not be considered here.

(i)   a.   *What have you read about it/the Tsunami?*
       b.   *What do you know about it/the Tsunami?*
       c.   *What have you heard that you don't like?*
       d.   **What about it have you read?*

(ii)   *These are the pictures that have been published of it.*

12 Kathryn Tidrick. 2006. *Ghandi: A political and spiritual life*. I. B. Tauris, p. 223.

The goal of this section is to determine whether rightward movement of light PPs is also prosodically conditioned. To this end, I will first consider the prosodic representation of light PPs in their base position and then in their extraposed position. The discussion that follows only scratches the surface of the phenomenon because the investigations would have to consider more thoroughly speech rate and speech rhythm at the phrasal level than I have time and space to allot to it.

In the subsections that follow I we will argue that light PPs are not prosodified uniformly. Some of them are arguably clitics, while others are prosodic words. The clitic status of function words has already been discussed briefly in chapter 3. The fact that light PPs can be clitics follows from the fact that both P and D are function words. Unlike lexical words, function words do not canonically correspond to prosodic words. In section 3.2.2.1 and thereafter I assumed that clitics are adjoined to prosodic words. Since this part of the chapter focuses on clitical PPs, a more careful examination and supporting evidence is required. In fact, Selkirk (1995b) argues that function words can have the four prosodic representations shown in (775), where *func* is a function word and *lex* a lexical word. Clitical function words can be dominated directly by the phonological phrase (*free clitic*), they can be integrated into the prosodic word (*internal clitic*) or adjoined to the prosodic word in a recursive structure (*affixal clitic*). Function words can also be prosodified as prosodic words.

(775)   a. free clitic: PPh   b. internal clitic: PPh
                     PWd   fnc   PWd
                      | lex   fnc
                     lex
        c. affixal clitic: PPh   d. prosodic word: PPh
                         PWd   PWd   PWd
                     PWd   fnc | |
                      | lex   fnc
                     lex
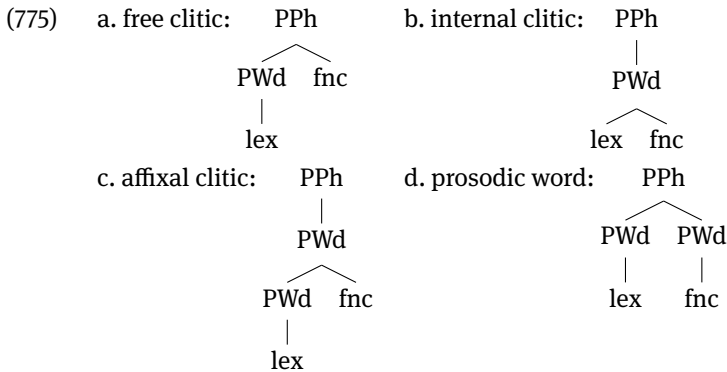
For the mapping between morphosyntactic structure and prosodic structure, Selkirk introduces the word alignment constraints in (776) and the prosodic word alignment constraints in (777). The former require the left and right edges of a lexical word to be aligned with the left and right edges of a prosodic word (cf. also Prince and Smolensky 2004 and McCarthy and Prince 1993). The latter require the left and right edges of a prosodic word to be aligned with the left and right

edges of a lexical word. The alignment constraints do not refer to functional categories at all, which may have one or the other prosodification just mentioned. The growing literature on this topic has revealed that the same function words may be prosodified differently across languages or even dialects of the same language.[13] Internal clitics are not attested in English and the existence of free clitics in English is controversial (cf. section 5.3.3).

(776)   a.   ALIGN-LEX L: Align (Lex, L; PWd, L)
        b.   ALIGN-LEX R: Align (Lex, R; PWd, R)

(777)   a.   ALIGN-PWD L: Align (PWd, L; Lex, L)
        b.   ALIGN-PWD R: Align (PWd, R; Lex, R)

Three representations in (775) violate constraints on prosodic domination. The representation of free clitics in which the function word is a stressless syllable violates EXHAUSTIVITY at the foot level (Exh_{Ft}) and at the prosodic word level (Exh_{PWd}), due to that fact that parsing of the function word has failed at the respective levels (Kabak and Revithiadou 2009; Ito and Mester 2009b). Affixal clitics violate NONRECURSIVITY at the level of the prosodic word ($NonRec_{PWd}$).

5.3.1 The prosodic representation of light PPs

Let me begin the prosodic analysis with examples like (778), which typically allow optional extraposition of the PP. In most of the elicited data I have employed the pronoun *it*. This D only has a weak form, which allows me to focus attention on the preposition and the prosodification of the whole PP.[14]

(778)   *There is apparently a natural product from India that would be allowed,*

        a.   *but nó informátion on it was gíven.*
        b.   *but nó informátion was gíven on it.*

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13 Cf. Booij (1996) on Dutch, Peperkamp (1996, 1997) on different Italian dialects, Hall (1999) as well as Kabak and Schiering (2006) on German, Kabak and Revithiadou (2009) on Greek, to name a few.

14 The pronoun *it* has no strong form except in those (rare) cases in which it is focused, as in (i), retrieved from the BNC. Here it is a prosodic word conjoined with another one. I have also occasionally heard its German cognate *es* in conjunction with the focus particle *nur* 'only.'

(i)   *Dei Verbum is theologically the most fundamental of the documents of Vatican II. Of the four Constitutions, only it and Lumen Gentium are called "Dogmatic", indicating a more formal doctrinal authority.* [CRK]

Prepositions like *on*, which do not alternate between weak and strong forms are already footed in the input to the prosodic representation (Selkirk 1995b: FN 7). A sequence of strong P and weak D can be organised into a foot, due to the constraint Exh_{Ft}. Given that feet in English are trochees and minimally bimoraic, a possible prosodic structure for the DP *information on it*, spoken in isolation, is shown in (779). Prosodification of the light PP as a prosodic word would be due to Exh_{PWd}. No prosodic level is therefore skipped in this representation.[15]

(779)

```
                    PPh
                   /    \
               PWd       PWd
              /   \       |
      information      Ft
                      /  \
                     σ    σ
                     |    |
                    ɒn    ɪt
```
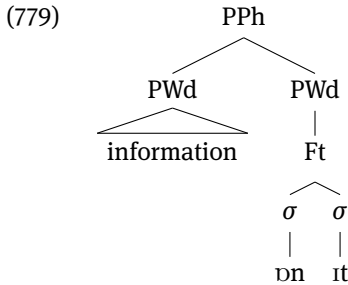
However, the analysis of a light PP as a prosodic word cannot be maintained because prepositions which alternate between weak and strong forms are typically weak unless constraints on the rhythmic organisation of phrases or other factors force them to be footed. Examples in which both P and D are reduced are given in (780). Example (780c) contrasts with (781), in which the light PP immediately follows a Class II suffix. The P in this case is strong and the PP is footed. Class I affixes, as in (780b), do not seem to have the same effect on the form of the following light PP.[16]

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15 Note that Exh_{Ft} replaces the more familiar constraint $\text{Parse-}\sigma$ from the optimality-theoretic literature on word stress (e. g., McCarthy and Prince 1993). Both require syllables to be parsed into feet, so one of them is redundant (cf. McCarthy 2003 for discussion).

16 Selkirk (1984: 399–400) claims that light PPs have either P or D stressed (i. e., either P or D has a strong form). However, she mentions that both can be destressed in *What did they give to you?* [təjə], particularly in fast speech. The strong forms of either P or D in her examples in (i) can also be attributed to other factors. Example (ia) possibly has a phonological phrase boundary after *documents*, which prevents cliticisation. The PP can be integrated in a recursive phonological phrase, as in (ii). In (ib) and (ic) they occur after a Class II affix, where weak P+D does not seem to be possible, as discussed in the main text.

(i)   a.   *Mary will give the documents to you soon.* [tuwjə], [təjuw], *[təjə]
      b.   *The others are looking at them.* [ætm̩], [ətðɛm], *[ətm̩]
      c.   *I'll be thinking of you.* [ʌvjə], [əvjuw], *[əvjə]

(ii)   (Mary) ((will give the documents) to you) (soon)

(780)   a.   *review of it* [əvɪt]
        b.   *translation of it* [əvɪt]
        c.   *Look at it!* [ətɪt]
        d.   *How good at it are you?* [ətɪt]
        e.   *How aware of it is he?* [əvɪt]
        f.   *How tired of them are you?* [əvðəm]

(781)   *I was looking at it only yesterday.* [ætɪt]

Furthermore, light PPs are not necessarily aspirated if P begins with a voiceless stop, as in (782). Stops are aspirated only in foot-initial and prosodic word initial position. For example, in words like potato [pʰə.tʰéɪ.təʊ] only the stop in the onset of the final extrametrical syllable is not aspirated and typically realised as a flap in AE. Consequently, *to it* in (782) is neither a foot, nor a prosodic word.

(782)   *How close to it is it?* [tʊɪt]

A more likely analysis of PPs with reduced P and D in non-extraposed position is an analysis as affixal clitics. Discussion in the literature has mainly concentrated on weak object pronouns (McCarthy 1993; Selkirk 1995b), but there is no reason to assume that clitical PPs are represented differently. Footed PPs like *on it* are presumably adjoined to the prosodic word as well. The two representations are shown in (783). They violate NonRec$_{PWd}$ and the unfooted syllables in (783a) also violate Exh$_{Ft}$.

(783)   a.

```
                    PWd
            _____|_____
           PWd      σ        σ
          __|__     |        |
         σ    Ft    əv       ɪt
         |    |
         re   σ
              |
            view
```

b.

```
                    PWd
            _____|_____
           PWd               Ft
        ____|____          __|__
    information           σ     σ
                          |     |
                          ɒn    ɪt
```
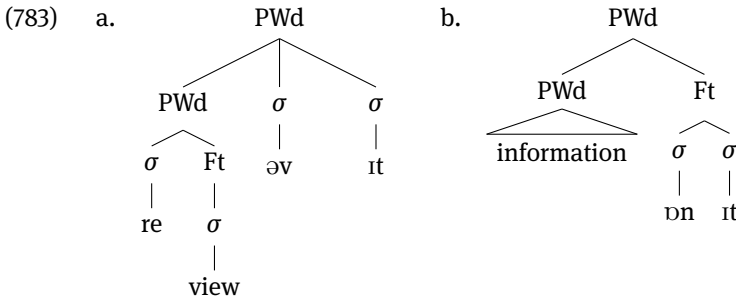
In English, enclitic pronouns and light PPs pattern prosodically like Class II suffixes. Both are not affected by (certain) word-level phonological processes. One such process is stress assignment.

5.3.2 Stress neutrality

Unlike Class I affixes, light PPs and Class II suffixes do not have any effect on the assignment of word stress.[17] The following examples show the effect of Class I affixes (*-al*, *-ity*, *-ous*, *-ion*) on word stress and the neutrality of Class II affixes (*-able*, *-ness*) as well as clitics.

(784)   a.   *órigin, oríginal, orìginálity* (I+I)

         b.   *míracle, miráculous, miráculousness* (I+II)

         c.   *váry, váriable, váriableness* (II+II)

(785)   a.   *invéstigàte, invèstigátion* (I)

         b.   *invéstigàte it, invèstigátion of it* (I+clitic)

If the domain of word stress is the minimal prosodic word and Class II suffixes, as well as enclitics, are adjoined to the prosodic word, as in (786), this behaviour is captured. The comparison of clitics with affixes is clearly not unreasonable if viewed from a cross-linguistic perspective. For Dutch, Booij (1996) argues that enclitics pattern phonologically with suffixes, while proclitics pattern with prefixes. In Lucanian Italian, clitics do have an effect on word stress and are incorporated into the minimal prosodic word (Peperkamp 1996, 1997).

(786)   a.   *((miraculous)$_{PWd}$ ness)$_{PWd}$*

         b.   *((investigation)$_{PWd}$ of it)$_{PWd}$*

That there is a prosodic boundary before stress-neutral suffixes was already proposed by Chomsky and Halle (1968: 366–370.), namely their # boundary, essentially a word boundary. Besides stress-neutrality, they also discuss the deletion of final /g/ in favour of such a boundary (cf. *rin[g], rin[g]ing, rin[g]er* vs. *finger*). This process also occurs before clitics (cf. *rin[g] it*).

     However, from the evidence reviewed so far one can only conclude that there is a prosodic word boundary preceding the clitic(s). The data is also consistent with an analysis in which they are free clitics, dominated directly by a phonological phrase. So let me consider another piece of evidence.[18]

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17 The classical reference for the distinction between Class I and Class II affixes is Siegel (1979), which formed the historical foundation of Lexical Phonology.

18 Hayes (1989: 206–207) argues against Chomsky and Halle's word boundary preceding Class II suffixes by discussing the difference between *visited* and *visit it*. In the former, he claims, /t/ can be slightly aspirated due to ambisyllabicity, but not in the latter, where it cannot be analysed as the onset of *it*. For Hayes, there is no word boundary before Class II affixes, while the verb and object clitic form two separate words that are grouped together into a clitic group.

5.3.3 Intrusive-*r*

Light PPs also pattern like Class II suffixes with respect to intrusive-*r* in certain non-rhotic dialects of English, particularly Boston English, discussed by Mc-Carthy (1993, 1999). Intrusive-*r* may precede a Class II suffix or a simple clitic, as in (787). It may also follow a clitic or a whole clitic cluster, as in (788).[19]

(787) a. *saw-r-ing, withdraw-r-al* (II)
       b. *saw-r-it, saw him* [sɔrɪm] (clitic)

(788) a. *I saw yar on TV.*
       b. *I'll give yar a call.*
       c. *I'll send it to yar on Tuesday.*

The traditional analysis of intrusive-*r* in non-rhotic varieties is that it is inserted to bridge a hiatus of non-high vowels at the juncture of two syllables. Etymologic or linking-*r* has roughly the same distribution, but is additionally banned from the coda of a syllable. One possibility to deal with the distribution of [r] is in terms of constraints like the CODA CONDITION in (789a) and NO-HIATUS in (789b).

(789) a. CODA-COND: *$VrX]_\sigma$
       b. NO-HIATUS: *$V]_\sigma [_\sigma V$

McCarthy (1993), however, shows that the two constraints cannot handle a set of exceptions, particularly the non-occurence of intrusive-*r* after proclitical function words, like (790). In this context only liking-*r* surfaces. The only environments where intrusive-*r* can occur after function words is when the function word is phrase-final (791a) or focused (791b) (cf. McCarthy 1999 for the latter).

However, other data supports Chomsky and Halle's analysis and groups Class II affixes with clitics. For example, Abercrombie (1964) notes that in RP the /l/ in *feel it* and *feeling* is the clear [l], not the expected dark [ɫ] found in the coda of the syllable, and therefore contrasts with *feel ill* [fiːɫ ɪɫ]. Clear [l] is the result of resyllabification, generally assumed to be confined to the prosodic word, possibly the maximal prosodic word in a recursive word structure. Clear [l] is also found in *tell it* and *telling*, in which resyllabification is not an option because the stressed syllable has a short vowel and requires a coda. Clear [l] in the last two examples can be attributed to ambisyllabicity (cf. Rubach 1996).

19 Intrusive-*r* is certainly a prominent feature of BE dialects, but its occurrence before clitical objects and Class II prefixes seems much more restricted. For example, Gimson (1962: 204) remarks: "… thus, *I saw it* /aɪˈsɔːrɪt/, *drawing* /ˈdrɔːrɪŋ/, are generally disapproved of, though it is likely that many RP speakers have to make a conscious effort to avoid the use of such forms." Anyway, I have heard the form /drɔːrɪŋ/ frequently in BBC art documentaries (where it is easy to look out for). Some commentators produced it sporadically or not at all, while others inserted -*r*- regularly.

(790)   *to add to his troubles* [tə(*r) æd tə(*r) ɪz trəbəlz]

(791)   a.   *Did you or didn't you?* [dɪʤər ə dɪdən jə]
         b.   *I wanna(*r) eat.* vs. *I WANNAr eat.*

McCarthy argues that intrusive-*r* is the consequence of a constraint that forbids prosodic words to end in a vowel, the constraint in (792). In other words, intrusive-*r* marks a prosodic word boundary. The only word-final vowels in (Boston) English are [ɑ, ə, ɔ] and the only other word-final nuclei are diphthongal, analysed as ending in a glide [ij, ej, ɑj, ow, ɔj]. Intrusive-*r* (and also etymological-*r*) are ambisyllabic, which is reflected by the fact that it is more vocalic than a simple onset [r]. The CODA-COND prohibits their occurrence exactly in those cases in which there is no following word that begins with a vowel. It must therefore be rankend higher than FINAL-C.[20]

(792)   FINAL-C: *V)$_{PWd}$

Returning to data under discussion, a phrase-final function word is also word-final and a focused function word must have the status of a prosodic word because it is also the designated terminal element of the phonological phrase and intonational phrase. Intrusive-*r* cannot occur after proclitics because these are not at the right edge of a prosodic word. Because intrusive-*r* can also precede and follow Class II suffixes as well as enclitics, McCarthy (1993, 1999) and Selkirk (1995b) conclude that they are adjoined to the prosodic word, as in (794).

(793)   a.   ((saw)$_{PWd}$ ing)$_{PWd}$
         b.   ((saw)$_{PWd}$ it)$_{PWd}$
         c.   ((send)$_{PWd}$ it to ya)$_{PWd}$

On the other hand, proclitic function words do not end a prosodic word and do not allow intrusive-*r*; function words like *to* in (790) are also not aspirated and therefore, according to Selkirk, do not initiate a prosodic word. Selkirk concludes that they are free clitics dominated directly by a phonological phrase, as in (794).

(794)   PPh
         ⟨σ PWd⟩
         σ   PWd
         | ⟨add⟩
         to   add

---

20 For reasons that are not fully clear to me, the CODA-COND must be considered not violated when [r] is ambisyllabic.

Although Selkirk does not distinguish between minor phonological phrases and major phrases in her (1995a) article, in Kratzer and Selkirk (2007) it is the minor phrase that is defined as the domain that contains the clitics. I have already rejected this analysis in section 3.2.2.2, essentially following arguments by Itô and Mester (2009b), opting instead for adjunction to the prosodic word of both proclitics and enclitics in English. One reason presented there was that the minor phonological phrase duplicates the clitic group proposed by Nespor and Vogel (1986) and Hayes (1989). Secondly, if the minor phonological phrase is the relevant domain, then Selkirk's attempt to eliminate the clitic group certainly did not succeed. Finally, note that in the analysis pursed here, i. e. the one represented in (795a), FINAL-C is not violated either since the proclitic is not final in the prosodic word. In fact, McCarthy (1993) also proposed that it should be adjoined to the prosodic word defined by the lexical word. Only enclitics are preceded and followed by a prosodic word boundary, as in (795b).

(795) a. PWd   b.   PWd

σ PWd   PWd σ

to   add   saw   it
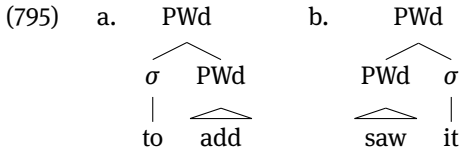
If McCarthy's analysis of intrusive-*r* is taken at face value, then this phonological process provides clear evidence for the analysis of enclitics as adjoined to the prosodic word. On the other hand, the analysis of proclitics as adjoined to the prosodic word is only compatible with the data from Boston English and RP.

The account of intrusive-*r* in terms of FINAL-C has not gone unchallenged. In a more recent paper, Itô and Mester (2009a) reject FINAL-C. They note that this constraint, which requires a coda in a syllable in a particular position, conflicts with the universal dispreference for codas and that independent phonological evidence for a requirement of word-final consonants is sparse.[21] Secondly, they show that there are dialects in which -*r*- surfaces after proclitical function words (e. g., Norwich English *t(ər) eat*). In Itô and Mester (2009b), they also show that in Boston English it does not surface in expected contexts, for example, if the "clitic" is trisyllabic and must be analysed as a subordinate prosodic word (e. g., *supposeta eat*, *shouldn'ta eaten*). The analysis they propose is that intrusive-*r* is

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21 But see Golston and Wiese (1998), who argue that the majority of German roots are consonant-final (96 % in their data). See also Lappe (2007: ch. 8), who argues that English monosyllabic truncated names and clippings show a strong tendency towards preservation of a word-final consonant after tense vowels and diphthongs (74 % in her data, cf. *Abraham > Abe*, *★A*). Both studies crucially rely on FINAL-C.

the result of a constraint that requires the maximal prosodic word to begin with a consonant, which is more in line with the cross-linguistic preference for onsets. In other words, the bridging of the hiatus is not the result of the first prosodic word preferring to end in a consonant, but it is due to the fact that the second prosodic word wants to begin with a consonant (cf. also Anttila and Cho 1998). I will not go into the details of their analysis here, but refer the reader to the two articles. Suffice it to say that the data in (787) and (788) follow from the constraints they introduce as well as from their ranking. Dialectal differences are then captured in terms of different rankings of those constraints. Nevertheless, Itô and Mester (2009a) endorse, and their account is crucially based on, the adjunction analysis of both proclitics and enclitics. In the remainder of this study I will assume that the adjunction analysis of enclitics is correct.

5.3.4 The prosodic representation of extraposed light PPs

In this section I discuss the prosodic representation of extraposed light PPs. Their representation does not necessarily change as a result of extraposition. The PP is footed only if P has a strong form, as in (796). P and D may also be weak and unstressed, as in (797).

(796)   *There is apparently a new product from India that would be allowed.*
   a.   *But nó informátion on it was gíven.* [ɒnɪt]
   b.   *But nó informátion was gíven on it.* [ɒnɪt]

(797)   *His latest novel was published in May.*
   a.   *Since then, twó translátions of it have appeared.* [əvɪt]
   b.   *Since then, twó translátions have appéared of it.* [əvɪt]

However, there seems to be a strong pressure for the new host to be accented upon extraposition, like the verb *appear* in (797b). The verb phrase may also form a separate phonological phrase upon extraposition, as in (798). But this seems to be a consequence of increased weight.

(798)   *His latest novel was published in May.*
   a.   *Since then, ((twó translátions of it) have appeared)*
   b.   *Since then, (twó translátions) (have appéared of it)*

Other hosts which are also normally deaccented exhibit a similar behaviour. For example, speakers, like my BE informant, who treat *Time magazine* as a com-

pound in (799) are likely to accent its right-hand constituent if the PP ends up at its right edge.

(799)   *Pinker's new book is really amazing.*
    a.   *(I've réad a revíew of it today) (in Tíme magazine)* [əvɪt]
    b.   *(I've read a revíew today) (in Tíme magazíne of it)* [əvɪt]

If the context is such that the host is focused and has to be accented, as in (800), extraposition is fairly free. An Internet search also returned examples like those in (801) in which the host requires an accent. In (801a), *today* and *yesterday* are contrasted. Example (801b) implies that there was some other day when I was not so good at it.

(800)   a.   *I haven't found a solution yet, (but I was véry close to it) (todáy)* [tʊɪt]
    b.   *I haven't found a solution yet, (but I was véry close) (todáy to it)* [tʊɪt]

(801)   a.   *Yeah, I wish Apple would simply let you turn off the acceleration. I'm just as bad today at it as I was yesterday.*[22]
    b.   *He was better today at it.*[23]

Nevertheless, several examples were recorded in which the host was not accented. Presumably, *so far* in (802) cannot be accented and *today* in (803) was accented by one of my informants, while two others did not accent this word.

(802)   a.   *I've gotten twó injéctions of it so far.* [əvɪt]
    b.   *I've gotten twó injéctions so far of it.* [əvɪt]

(803)   *Pinker's new book is really amazing.*
    (I've réad a revíew today of it) (in Tíme mágazine) [əvɪt]

Consequently, a prosodically deficient extraposed PP requires a prosodic word as its host, particularly if P+D are both weak. This does not exclude functional categories if they are focused or accented for some other reason. In (804), the PPs are clitics of a contrastively focused pronoun. Focus on the pronoun ensures that it is the designated terminal element (DTE) of an intonational phrase, which entails that it is also the head of a phonological phrase and of a prosodic word. In (805b), *is he* is grouped together into a foot and, due to the accent, this foot is also the head of a prosodic word as well as the head of the phonological phrase formed by the whole question.

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22 http://hintsforums.macworld.com/archive/index.php/t-63077.html, accessed 21 July 2011.
23 http://www.giants.com/news/eisen/story.asp?story_id=25810, accessed 1 January 2010.

(804) a. *How afraid are YOU of it?*[əvɪt]
       b. *How tired are YOU of it?* [əvɪt]
       c. *How angry are YOU at it?* [ətɪt]

(805) a. *Hów awáre of it is he?* [əvɪt]
       b. *Hów aware ís he of it?* [əvɪt]

The reduced forms of extraposed P and D and the lack of aspiration in examples
like (800b) above make me believe that the light PP can be an affixal clitic cluster
in the new environment as well, as shown in (806). The prosodic structure that
results from movement of a light PP is therefore not necessarily different from the
prosodic structure of the unscrambled word order.[24]

(806)

```
                          PWd
                    _____|_____
                   /      |       \
                 PWd      σ        σ
                /‾‾\      |        |
              today      əv       ɪt
              appeared
              (so) far
              YOU
              ís he
```
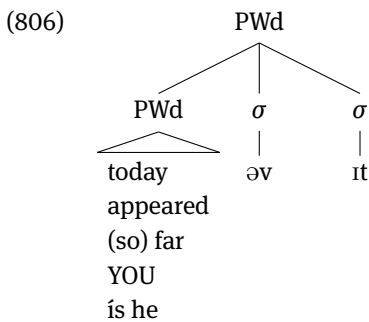
The next task is to show that adjacency to a prosodic word requires cliticisation,
regardless of whether the light PP is extraposed or not.

5.3.5 Cliticisation and extraposition

In this subsection I will first present an optimality-theoretic analysis of cliticisation, then I will examine whether extraposition results in optimisation of the
prosodic structure. It will turn out that only a subset of extrapositions do so. Finally, I will discuss variation among speakers in the prosodification of light PPs
and outline some topics for future research.

5.3.5.1 Cliticisation

I will first show that in a sequence of a verb plus weak object pronoun (807a) the
pronoun is forced into a recursive prosodic word structure. Then I show that strong
pronouns (807b) and light PPs (807c) are also incorporated in the same fashion.

---

24 Variable prosodifications of P+D are discussed in section 5.3.5.3.

(807) a. *review it*
       b. *review one*
       c. *review of it* [əvɪt]

For Selkirk (1995b), and also Itô and Mester (2009b), the recursive prosodic word structure of a verb plus weak object pronoun simply follows from the syntactic representation and undominated ALIGN-LEX. Selkirk assumes that weak object pronouns are adjoined to the lexical verb in the syntax, as in (808).[25] ALIGN-LEX requires the right and left edges of the lexical verb to be aligned with the right and left edges of a prosodic word. Therefore, the recursive prosodic word structure simply reflects the recursive syntactic structure.

(808) a. $[_V [_V$ review] it]
       b. $(_{PWd} (_{PWd}$ review) it)

The analysis is based on the ranking of the constraints in (809) and the evaluation can be inspected in the tableau in Figure 5.5. Selkirk assumes that ALIGN-PWD is not violated in any of the candidates because *review it* is considered a complex lexical verb and each segment of V is a segment of lexical V. Candidates (a) and (c) each violate ALIGN-LEX once because the right edge of the complex lexical verb *review it* (candidate a) and the right edge of *review* (candidate c) are not aligned with a prosodic word edge. EXH$_{PPh}$ is considered a relatively low ranked constraint in order to allow the derivation of free proclitics in English, an analysis which has eventually been rejected in this study.[26]

review it	Align-Lex	NonRec$_{PWd}$	Align-PWd	Exh$_{PPh}$
[(review)$_{PWd}$ it]$_{PPh}$ a.	*!			*
☞ ((review)$_{PWd}$ it)$_{PWd}$ b.		*		
(review it)$_{PWd}$ c.	*!			
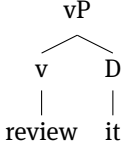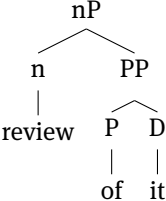
Figure 5.5: Selkirk's analysis of enclitics.

---

25 This analysis can also be found in her earlier work, namely Selkirk (1984: 396–397).
26 Note that Selkirk interprets EXH$_{PPh}$ somewhat differently from what I have been assuming so far (cf. section 3.2.1). The approach taken here recognises only violations of lower levels of EXHAUSTIVITY, namely EXH$_{Ft}$ and EXH$_{PWd}$, because the weak unstressed *it* has not been parsed at the level of the foot and at the level of the prosodic word. However, it is parsed at the level of the phonological phrase. I have essentially adopted the interpretation of EXHAUSTIVITY found in Truckenbrodt (1999), McCarthy (2003), Kabak and Revithiadou (2009) and Itô and Mester (2009b). The latter more aptly call this constraint PARSE-INTO-X, where X is any prosodic category. Notwithstanding, low ranked EXH$_{PPh}$ in Selkirk's analysis has no effect on the evaluation in the tableau in Figure 5.5.

(809) ALIGN-LEX ≫ NONREC$_{PWd}$ ≫ ALIGN-PWD, EXH$_{PPh}$
(Selkirk 1995b: 460)

However, even if one assumes that the syntactic structure on which the analysis is based is correct (cf. also Chomsky 1995: 336–338), such an analysis cannot be extended to light PPs because they are maximal projections and a maximal projection cannot be adjoined to a head. Therefore, the prosodic structure must follow from the ranking of the interface and phonological well-formedness constraints even if the pronoun does not form a complex word with the verb, i. e., if it has the PF representation (810a) or (810b) after Spell-Out. The analysis must also be able to exclude the representation of the weak pronoun or light PP as free clitics and rule out a representation as internal clitics.

(810)   a.   vP   b.   nP

           v   D   n   PP

    review it   review P   D

                            of it

I set out with the constraint hierarchy in (811). Undominated ALIGN-LEX essentially bans the internal clitic representation, as in Selkirk's analysis. The exhaustivity constraints are unranked with respect to each other, but this will be modified below. Ranking EXHAUSTIVITY higher than ALIGN-PWD is part of the explanation for cliticisation. Also included is undominated FTBIN, a constraint that requires feet to be minimally bimoraic in English (i. e., they consist of either two light syllables [LL] or one heavy syllable [H]).

(811)   ALIGN-LEX, FTBIN ≫ EXH$_{Ft}$, EXH$_{PWd}$, EXH$_{PPh}$ ≫ ALIGN-PWD ≫
NONREC$_{PWd}$

As can be seen in the tableau in Figure 5.6, the free clitic analysis (candidate a) violates EXH$_{Ft}$ and EXH$_{PWd}$ because the pronoun has not been parsed at the re-

review it	Align-Lex	FtBin	Exh$_{Ft}$	Exh$_{PPh}$	Exh$_{PWd}$	Align-PWD	NonRec
[(review)$_{PWd}$ it]$_{PPh}$ a.			*		*		
[(review)$_{PWd}$ ([it]$_{Ft}$)$_{PWd}$]$_{PPh}$ b.		*				**	
☞ ((review)$_{PWd}$ it)$_{PWd}$ c.			*			*	*
(review it)$_{PWd}$ d.	*		*			*	

Figure 5.6: Pronominal unfooted clitic.

spective levels.[27] Candidate (b), in which the pronoun is prosodified as a prosodic word—and due to HEADEDNESS also as a foot—is ruled out by FTBIN.[28] Candidate (d), the internal clitic analysis, is excluded by ALIGN-LEX because the right edge of *review* is not aligned with the right edge of a prosodic word. This ranking of constrains therefore correctly chooses candidate (c), the recursive prosodic word structure, without a recursive V morphosyntactic structure in the input to the generator.

If the pronoun is footed in the input, e. g. *one* in (807), the constraint ranking will also select the recursive prosodic structure as the optimal one. In the tableau in Figure 5.7, the pronoun in candidate (a) has failed to be parsed at the prosodic word level, hence violates ExH$_{PWd}$. ALIGN-PWD decides between candidates (b) and (c). The recursive prosodic word structure wins over prosodification of the pronoun as a prosodic word because it incurs only one violation of ALIGN-PWD. Whether footed or not, the pronoun is a function word, not a lexical word. Furthermore, if one accepts footed proclitics (e. g., the P in *into debt*), one cannot *a priori* reject footed enclitics.

If *review* is a noun and selects a PP complement, both P and D can be weak (cf. section 5.3.1 above). That is, they are not parsed into a foot. The tableau in Figure 5.8 features the P+D sequence as free clitics and as two recursive prosodic word

review one	Align-Lex	FtBin	Exh$_{Ft}$	Exh$_{PPh}$	Exh$_{PWd}$	Align-PWd	NonRec
[(review)$_{PWd}$ [one]$_{Ft}$]$_{PPh}$ a.					*		
[(review)$_{PWd}$ ([one]$_{Ft}$)$_{PWd}$]$_{PPh}$ b.						**!	
☞ ((review)$_{PWd}$ [one]$_{Ft}$)$_{PWd}$ c.						*	*

Figure 5.7: Pronominal footed clitic.

review of it	Align-Lex	FtBin	Exh$_{Ft}$	Exh$_{PPh}$	Exh$_{PWd}$	Align-PWd	NonRec
[(review)$_{PWd}$ of it]$_{PPh}$ a.			**		**		
((review)$_{PWd}$ of)$_{PWd}$ it)$_{PWd}$ b.			**			**!	**
☞ ((review)$_{PWd}$ of it)$_{PWd}$ c.			**			*	*

Figure 5.8: Clitical light PP.

---

27 I am ignoring in the evaluation the first syllable of *review*, which is also not footed.

28 The main evidence that *it* is not bimoraic like *fit* is its non-accentability. Note that a centralised allophone of /ɪ/ happily occurs in unstressed syllables in English and is often an alternative pronunciation for [ə]. Alternatively, the coda in *it* is non-moraic or extrasyllabic. Cf. Hammond (1999) for arguments and evidence that coronals in English are only optionally moraic, while non-coronals must be moraic.

structures. Candidate (a) is ruled out because the two weak function words are not parsed at the level of the prosodic word. Exh$_{Ft}$ and Exh$_{PWd}$ are violated twice. In (b), each function word is adjoined separately to the prosodic word, whereas in (c) P and D form an unfooted clitic cluster. Separate adjunction to the prosodic word, however, incurs two violations of ALIGN-PWD, whereas the cluster violates this constraint only once and is therefore the optimal candidate.

The analysis as it stands has a serious flaw, however. It cannot account for the fact that P and D are not (necessarily) parsed into a foot (i. e. as [ʊ́vɪt]). If this candidate were included in the tableau in Figure 5.8, it would actually come out as the optimal one. This can be seen in the tableau in Figure 5.9, where [ʊ́vɪt] is a prosodic word dominated by phonological phrase (candidate d) and a foot dominated by a

review of it	Align-Lex	FtBin	Exh$_{Ft}$	Exh$_{PPh}$	Exh$_{PWd}$	Align-PWd	NonRec
a. $[(\text{review})_{PWd}\text{ of it}]_{PPh}$			**		**		
b. $(((\text{review})_{PWd}\text{ of})_{PWd}\text{ it})_{PWd}$			**			**	**
c. $((\text{review})_{PWd}\text{ of it})_{PWd}$			**			*	*
d. $[(\text{review})_{PWd}([\text{óf it}]_{Ft})_{PWd}]_{PPh}$						**!	
e. ☞ $((\text{review})_{PWd}[\text{óf it}]_{Ft})_{PWd}$						*	*

Figure 5.9: Wrong prediction.

prosodic word in a recursive prosodic word structure (candidate e). Candidate (e) would be preferred because it violates Align-PWd only once as only one prosodic word edge is aligned with a functional category, not two as in (d), where the right edge of *it* and the left edge of *of* are aligned with a prosodic word edge.

Similarly, proclitics in English that are based on discrete weak function words are not organised into feet either (cf. *fŏr thĕ wóman*). English, therefore, contrasts with languages like German in which footed P+D is the norm in proclisis (e. g., *auf dem* [aʊfm̩] 'on the,' cf. Kabak and Schiering 2006, Itô and Mester 2009b) or Neapolitan, in which two enclitics are automatically footed (Peperkamp 1996, 1997). In other words, while unstressed syllables in English are footed in lexical constituents whenever possible (cf. Lee 1996; Hammond 1999; Pater 2000), footing at the phrase level is not an automatic consequence of Exh_{Ft}. In lexical phonological terms, foot structure and stress is determined at Level I, but is not determined for Level II affixes and postlexical material added in the syntax. Postlexical stress must therefore be the result of the interplay of completely different factors (e. g., focus, higher level exhaustivity effects and phrasal rhythm).

In order to prevent footing of essentially unstressed function words, I will include the constraint in (812), proposed by Itô and Mester (2009b). Head-to-Lex requires heads of prosodic constituents to be contained in lexical (not functional) material.

(812)   Head-to-Lex: Prosodic heads must be contained in lexical words.

If Head-to-Lex is ranked higher than Exh_{Ft}, it will prevent footing of weak P+D. In German, it would be ranked lower than Exh_{Ft}. The result can be inspected in the tableau in Figure 5.10, from which some irrelevant constraints have been excluded. Some evidence that the analysis is correct comes from *r*-insertion in Boston English. Selkirk (1995b: 459, FN 14) notes that *-r-* cannot be inserted between two clitics, e. g., **give yar it*, which suggests a flat structure if McCarthy's Final-C analysis is correct.

review of it	Exh_{PWd}	Head-to-Lex	Exh_{Ft}	Align-PWd	NonRec
[(review)$_{PWd}$ of it]$_{PPh}$ a.	*!*		**		
(((review)$_{PWd}$ of)$_{PWd}$ it)$_{PWd}$ b.			**	**!	**
☞ ((review)$_{PWd}$ of it)$_{PWd}$ c.			**	*	*
[(review)$_{PWd}$ ([óf it]$_{Ft}$)$_{PWd}$]$_{PPh}$ d.		*!		**	
((review)$_{PWd}$ [óf it]$_{Ft}$)$_{PWd}$ e.		*!		*	*

Figure 5.10: Clitical light PP (revised).

Ito and Mester's analysis of sequences of (pro)clitics differs from mine in certain essential aspects. Firstly, they argue that clitics are adjoined successively to the prosodic word, as in (813a). The cluster in (813b) is supposed to be ruled out as a "gratuitous" violation of PARSE-INTO-Ft (i. e. EXH$_{Ft}$). But note that both structures violate this constraint twice since both contain two syllables that are not parsed at the foot level. Therefore, HEAD-TO-LEX prevents automatic footing in clitic clusters even if the structure is flat, as in (813b).

(813) a.

```
                PWd
              /     \
            σ        PWd
            |       /    \
           fŏr    σ       PWd
                  |      /   \
                 thĕ   house
```

b.

```
            PWd
         /   |    \
        σ    σ     PWd
        |    |    /   \
       fŏr  thĕ  house
```
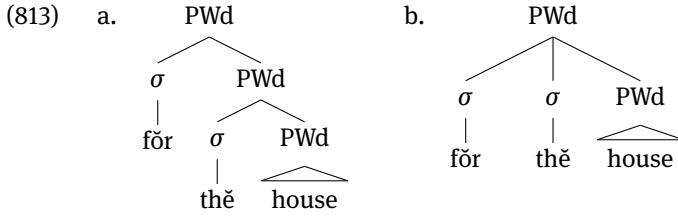
The double recursive structure also prevents footing of weak function words because of the prosodic word boundary separating them, but it is unclear to me how the structure can be derived in Itô and Mester's approach, particularly, because a detailed evaluation is completely absent in their paper.

Another difference between Itô and Mester's account and mine is the parametric difference between English and German (proclitics). In their approach it follows from different rankings between HEAD-TO-LEX and NONREC$_{PWd}$. The ranking HEAD-TO-LEX ≫ NONREC$_{PWd}$ is supposed to account for the English structure in (813a), while the reverse ranking is supposed to account for the flat structure (814), with concomitant footing in German.

(814)

```
                PWd
              /      \
            Ft        PWd
           /  \      /   \
          σ    σ    Tisch
          |    |
         aʊf   m̩
```
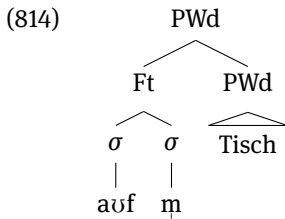
Note that Selkirk's ALIGN-PWD is not part of their constraint inventory. In my analysis it is ALIGN-PWD that prevents adjunction of one clitic at a time, preferring a flat structure for clitic clusters. NONREC$_{PWd}$ is ranked too low to have any effect at all on the evaluation. However, ALIGN-PWD does not simply take over the work of NONREC$_{PWd}$, but prevents the representation of footed function words as separate prosodic words (cf. the tableau in Figure 5.7 above).

In the following tableaux I have worked out Itô and Mester's prediction both for the analysis of English and German. Since no ranking of Exh_{Ft} is given by these authors and Exh_{PWd} is virtually inviolable for them, three possibilities are shown for both languages. As can be seen in the tableaux for English in Figure 5.11, the wrong structure is chosen regardless of the ranking of Exh_{Ft} with respect to HEAD-TO-LEX and NONREC$_{PWd}$. Either the flat structure is predicted (first and second tableau) or the representation as a separate prosodic word (third tableau).

func func lex	Exh$_{PWd}$	Head-to-Lex	NonRec	Exh$_{Ft}$
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*			**
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.			**!	**
☞ (func func (lex)$_{PWd}$)$_{PWd}$ c.			*	**
[([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.		*!		
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.		*!	*	

func func lex	Exh$_{PWd}$	Head-to-Lex	Exh$_{Ft}$	NonRec
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*		**	
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.			**	**!
☞ (func func (lex)$_{PWd}$)$_{PWd}$ c.			**	*
[([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.		*!		
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.		*!		*

func func lex	Exh$_{PWd}$	Exh$_{Ft}$	Head-to-Lex	NonRec
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*	**		
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.		*!*		**
(func func (lex)$_{PWd}$)$_{PWd}$ c.		*!*		*
☞ [([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.			*	
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.			*	*!

Figure 5.11: Itô and Mester's prediction for English.

Now consider Itô and Mester's analysis for German in the tableaux in Figure 5.12. It turns out that the intended representation as a footed clitic sequence is ruled out and the representation as a separate prosodic word is predicted in all three tableaux. For the sake of completeness, I have also included the prediction of my analysis for German in the tableau in Figure 5.13. As mentioned above, German differs from English in that Exh_{Ft} is ranked higher than HEAD-TO-LEX. This ranking forces footing of any two function words. ALIGN-PWD decides between the remaining two candidates (d) and (e), ruling out the candidate in which *func func* forms a separate prosodic word, namely (d). NONREC$_{PWd}$ cannot rule out this candidate because it is not violated.

func func lex	Exh$_{PWd}$	NonRec	Head-to-Lex	Exh$_{Ft}$
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*			**
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.		*!*		**
(func func (lex)$_{PWd}$)$_{PWd}$ c.		*!		**
☞ [([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.			*	
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.		*!	*	

func func lex	Exh$_{PWd}$	NonRec	Exh$_{Ft}$	Head-to-Lex
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*		**	
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.		*!*	**	
(func func (lex)$_{PWd}$)$_{PWd}$ c.		*!	**	
☞ [([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.				*
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.		*!		*

func func lex	Exh$_{PWd}$	Exh$_{Ft}$	NonRec	Head-to-Lex
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*	**		
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.		*!*	**	
(func func (lex)$_{PWd}$)$_{PWd}$ c.		*!*	*	
☞ [([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.				*
([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.		*!		*

Figure 5.12: Itô and Mester's prediction for German.

func func lex	Exh$_{PWd}$	Exh$_{Ft}$	Head-to-Lex	Align-PWd	NonRec
[func func (lex)$_{PWd}$]$_{PPh}$ a.	*!*	**			
(func (func (lex)$_{PWd}$)$_{PWd}$)$_{PWd}$ b.		*!*		**	**
(func func (lex)$_{PWd}$)$_{PWd}$ c.		*!*		*	*
[([func func]$_{Ft}$)$_{PWd}$ (lex)$_{PWd}$]$_{PPh}$ d.			*	**!	
☞ ([func func]$_{Ft}$ (lex)$_{PWd}$)$_{PWd}$ e.			*	*	*

Figure 5.13: German clitics.

5.3.5.2 Extraposition

In the analysis developed so far, the driving force behind cliticisation is Exh$_{PWd}$, ranked higher than ALIGN-PWD. Adjunction of function words to a prosodic word incurs only one violation of ALIGN-PWD, while prosodification as a separate prosodic word incurs two. The ranking HEAD-TO-LEX ≫ Exh$_{Ft}$ in between them in English, avoids footing of a sequence of weak clitics (cf. Figure 5.10). But what drives movement of the clitical PP to the right?

In an earlier account inspired by Vogel (2006), Göbbel (2013a) argues that Exh$_{PWd}$ could equally well force the clitical PP to be displaced, instead of incorpo-

rating it into an adjacent prosodic word. But it is clear to me now that no prosodic optimisation is thereby achieved. The clitical PP has the same representation in its base and derived position. Evaluating such examples against the constraint hierarchy established so far would result in two optimal constructions because the evaluator would not be able to distinguish between the two variants.

In this subsection I will discuss an alternative solution based on the rhythmic properties of the two alternative word orders. I will show that, at least in a number of cases, extraposition optimises the rhythmical structure of the whole sentence. Specifically, it eliminates a rhythmical lapse which a weak PP necessarily induces in its base non-final position in the clause. If the PP is moved to the right, the distribution of prominences is much more regular and the prosodic structure considerably more eurhythmic. However, not all examples can be explained in this fashion.

The discussion that follows just scratches the surface of the phenomenon. The reason is that phrasal rhythm is not fully understood at the moment of writing. Only rhythm at the word level has received and is still receiving considerable attention, but there is also considerable work on rhythm in compounds (cf. Hayes 1995 and Visch 1990, 1997, 1999 for discussion and overviews). Once you move to the post-lexical level, where prominence assignment is much more flexible, the development of a more rigorous account also becomes more difficult. Nevertheless, work in this direction and with special attention to the effect of rhythm on word order is gaining momentum, for example, in studies like Schlüter (2005), Anttila (2008, 2016), Anttila, Adams, and Speriosu (2010) and Shih et al. (2015). Schlüter (2005), for example, proposes a *Principle of Rhythmic Alternation* that pervades the grammar of a language with effects that can be observed synchronically and diachronically. The basic idea is that speakers prefer an alternating rhythmical pattern, which means that stress clashes and stress lapses are avoided, if possible, at all levels of the phonological representation. Figure 5.14 shows the representation of a clash (a) and two lapses, where (c) is worse than (b).

(a) ∗ ∗   (b) ∗   ∗   (c) ∗   ∗
     ∗ ∗   ∗ ∗ ∗ ∗   ∗ ∗ ∗ ∗ ∗

Figure 5.14: Stress clash and lapse.

Now consider the example in (815) and the two grids in Figure 5.15. As discussed in section 5.3.4, the verb can remain deaccented in (815a), but is accented and may form a separate phonological phrase in (815b). The auxiliary *have* is also footed, maybe for rhythmical reasons or because it occurs at the edge of a phonological phrase. The light PP in non-final position induces a lapse at the level of the foot.

```
            *                    PPh
  *         *              *      PWd
  *    *  ┌ *          * ┐   *      Ft
  *    *  │ *  *   *   * │   *  *    σ
         └───────────────┘
two translations of it have appeared
```

```
            *              *      PPh
  *       ┌ *              * ┐     PWd
  *    *  │ *       *      * │     Ft
  *    *  │ *  *    *    *  * │  *  *  σ
         └─────────────────┘
two translations have appeared of it
```
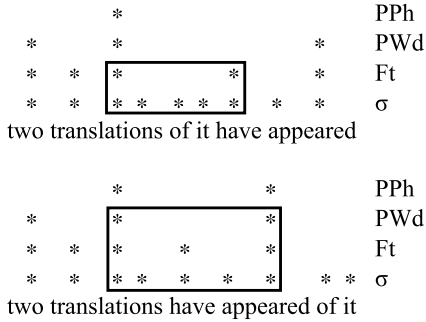
Figure 5.15: Extraposition of an unfooted PP (I).

Extraposition of the light PP gives rise to a perfectly alternating rhythmic structure, both at the foot-level and the prosodic word level.

(815)   *His latest novel was published in May.*

      a.   *Since then, ((twó translátions of it) have appeared)* [əvɪt]
      b.   *Since then, (twó translátions) (have appéared of it)* [əvɪt]

The fact that a new, less severe lapse is created by the light PP at the right edge of the sentence does not disturb the rhythm of the utterance if weak elements at the right edge are extrametrical. Final extrametricality in this case invariably calls to mind the feminine endings prevalent in the poetry of several cultures. Depending on the poet, one or two syllables, restricted to function words or unstressed syllables of polysyllabic words, can be ignored for the purpose of the meter. For example, Milton allows one extrametrical syllable at the end of an iambic pentameter line because his meter is strictly syllable-based, while Shakespeare allows two, as in (816), because he can associate even a (linguistic) foot with a position in the meter (cf. Hanson 1995 and Hanson and Kiparsky 1996). One would certainly expect that feminine endings in poetry have a parallel in natural language, as suggested by Hanson (2009).[29]

(816)   *Unless I spoke or look't or touch't or carv'd <to thee>* (Err. 2.2.118)

---

29 The same holds of trochaic substitution at the beginning of an iambic line or half-line, as in (i), which to all appearances is rooted in the fact that phonological phrases want to begin with a prominent word, that is, a pitch accent demanded by ALIGN(PPh,T*,L). The observation that the rule targets edges of phonological phrases is due to Hayes (1989).

(i)   *(Words without thoughts)*_{PPh} *(never to heaven go)*_{PPh} (Hamlet 3.3.98)

In contrastive environments optimisation by extraposition may also occur at the level of the foot. In (817), *very* and *today* are emphatic and constitute the heads of separate phonological phrases. Extraposition to the end of the utterance gives rise to a perfect alternation between stressed and unstressed syllables if the last two syllables of (817b) are ignored, as can be seen in Figure 5.16. Both examples exhibit a stress clash at the level of the word which does not seem to disturb the rhythmical pattern very much since the clashing words reside in different phonological phrases.[30]

(817) a. *I haven't found a solution yet, (but I was véry close to it) (todáy)* [tʊɪt]
       b. *I haven't found a solution yet, (but I was véry close) (todáy to it)* [tʊɪt]

```
        *               *         PPh
        *       *       *         PWd
  *     *     ┌─*───────*─┐       Ft
* * *  * *   │* * * * *│       σ
but I was very close to it today
```

```
        *           *             PPh
        *     *     *             PWd
  *     *   ┌─*─────*─┐           Ft
* * *  * * │* * *│ * *           σ
but I was very close today to it
```
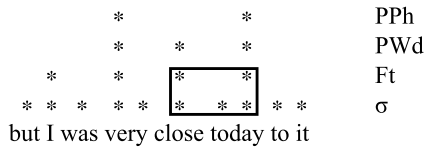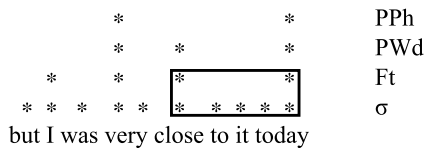
Figure 5.16: Extraposition of an unfooted PP (II).

Not all examples of extraposition improve the rhythmic structure of the utterance, by eliminating a lapse at the foot level. While an example like (818) does show a reduction of a sequence of four unstressed syllables to two, examples in which the PPs are clearly footed, as in (819) or (820) do not improve rhythmically. In these examples, prosodic optimisation consists in the reduction of the number of phonological phrases, which can be seen in the pitch tracks in Figure 5.17. Therefore, these examples conform with the constraint *PPʜ, which prefers as few phonological phrases as possible (cf. Truckenbrodt 1999).[31]

(818) a. *(How ángry with me) (is Máry)?*
       b. *(How ángry is Máry with me)?*

---

30 In her study on the effect of rhythm on prenominal attributes, Schlüter (2005) also relies on the lowest level of rhythm, namely that at the foot level.
31 Note the application of the Rhythm Rule in (820b), which provides additional evidence for the analysis of this example as one phonological phrase.
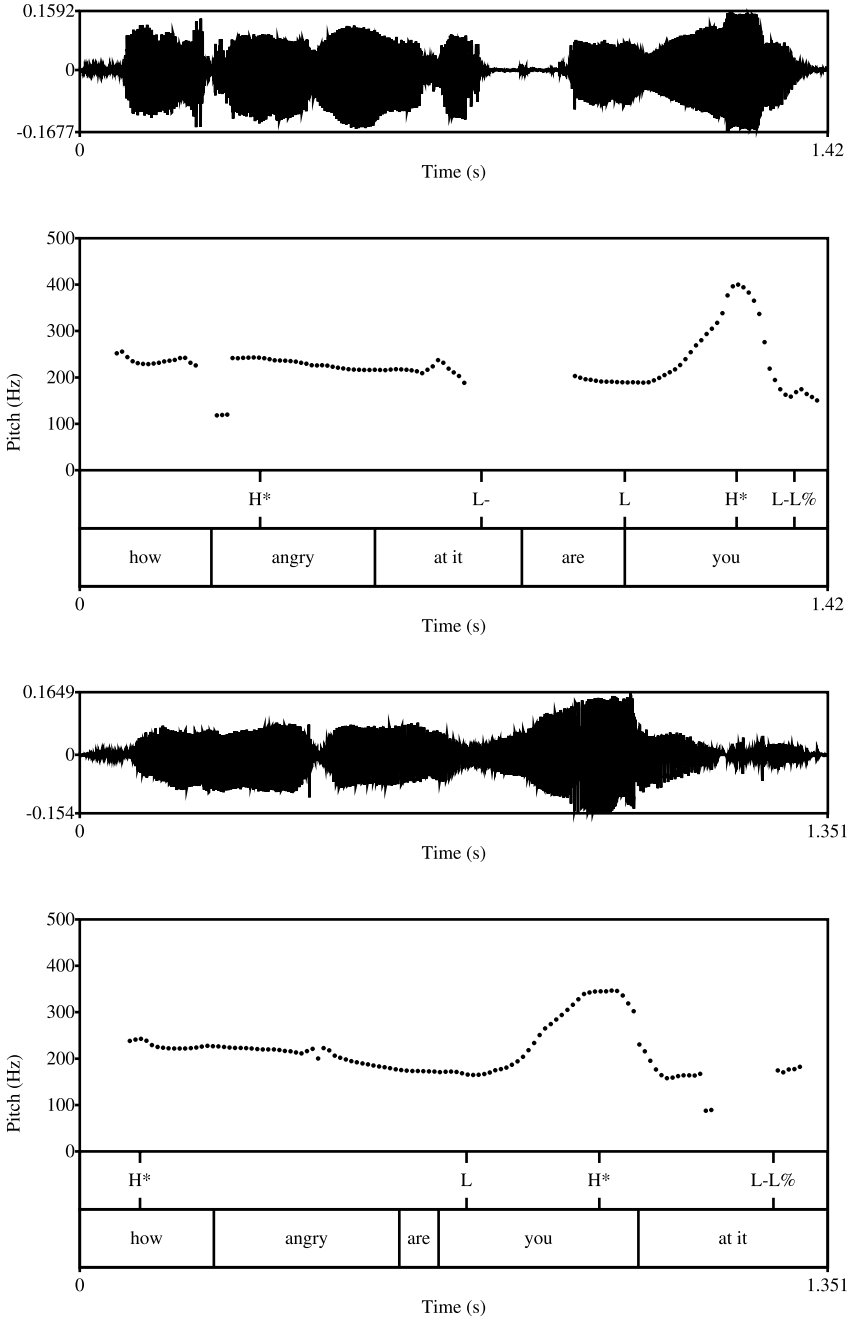
Figure 5.17: Extraposition of a light PP.

(819) *There is apparently a natural product from India that would be allowed,*

  a. *(but nó informátion on it) (was gíven)*

  b. *(but nó informátion was gíven on it)*

(820) a. *(How ángry at it) (are YOU)?* [ætɪt]

  b. *(Hów angry are YOU at it)?* [ætɪt]

In (821) a light complement of a verb is extraposed with the same effect: a phonological phrase is eliminated upon extraposition. Alternatively, the prosody influences the adjunction site of the adjunct. Adverbs can in principle occur between a verb and its PP complement, given the fact that the verb moves within the extended projection of the verb phrase.

(821) a. *(I was lóoking at it) (ónly yésterday)* [ætɪt]

  b. *(I was lóoking only yésterday at it)* [ætɪt]

In the examples discussed so far extraposition results in optimisation of the rhythmical structure or the number of phonological phrases is reduced. But there are clear cases where extraposition does not result in any phonological optimisation at all, as far as I can see. These are examples in which the light PP has a different prosodification upon extraposition. For example in (822) and (823), recorded with two accentual patterns and spoken by an AE and a BE speaker, respectively, the PP is an affixal clitic in its base position, but footed and prosodified as a prosodic word in its extraposed position. In (822b) and (823b), the AUX+D string carries no stress and, to all appearances, cliticises onto the word *close* itself. Possibly, there is no room for the light PP in the left-adjacent (extended) prosodic word.

(822) *I know the Chinese restaurant is near the intersection of Pleasant Run and The Mall,* (AE)

  a. *but how clóse to it is it?* [tʊɪt]

  b. *but how clóse is it to it?* [tʰuwɪt]

(823) *I know the Chinese restaurant is near the intersection of Pleasant Run and The Mall,* (BE)

  a. *but HOW close to it is it?* [tʊɪt]

  b. *but HOW close is it to it?* [tʰuːɪt]

The examples in (824) and (825) recorded with the same speakers show that the first two function words can have reduced forms. The last two are footed.

(824) *A hurricane is expected to hit the coast next week.* (AE)

  a. *How afráid of it are you?* [əvɪt ɑːrjuw]

  b. *How afráid are you of it?* [əju ɒvɪt]

(825)   *A hurricane is expected to hit the coast next week.* (BE)

   a.   *How afráid of it are you?* [əvɪt ɑ:ju:]
   b.   *How afráid are you of it?* [əju(:) ɒvɪt]

The examples in (826) show that cliticisation of either P+D or AUX+D does not depend on the adjective being accented. The fact that *you* in *afraid are you* is lengthened or diphongised is an indication of a prosodic boundary, in this case a prosodic word boundary. In other words, *you* is not necessarily footed. Lengthening occurs at all boundaries. The higher the category in the prosodic hierarchy, the longer the word at its edge. The string *are you* at the end of the sentence forms one foot, in which *are* is the head and *you* is lengthened/diphthongised due to its occurrence at the right edge of a phonological phrase.

(826)   *It gives me the creeps when I am thinking of the approaching hurricane.*
        (AE)

   a.   *Yes, I know. But HOW afraid of it are you?* [əvɪt ɑ:rjuw]
   b.   *Yes, I know. But HOW afraid are you of it?* [əjuw ɒvɪt]

Examples (824) and (825) have the following prosodic structures. I assume that unaccented *how* is a footed proclitic, but nothing actually hinges on this detail here.

(827)   a.
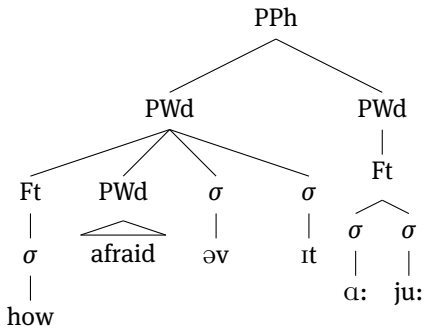
   b.
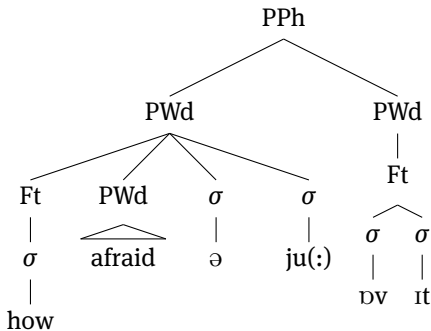
Note that the AUX+D cluster in (827b) is not a syntactic constituent, let alone a complement of the adjective. The fact that it can clitisise onto the adjective provides some independent motivation for the analysis in section 5.3.5.1, which relies on constraint ranking and not on the direct correspondence of syntactic/PF structure with prosodic structure.[32] The three factors that favour cliticisation are (i) a dispreference for footing weak function words (a consequence of Head-to-Lex), (ii) high ranked Exh$_{PWd}$, which requires parsing at the level of the prosodic word, and (iii) lower ranked Align-PWD, which allows cliticisation in the first place.

In the case at hand, Exh$_{PWd}$ prefers the light PP in its base position to cliticise onto an adjacent prosodic word. But there is no host for P+D in extraposed position because AUX+D can also cliticise. As a consequence of this the light PP at the right edge of the phonological phrase will be prosodified as a prosodic word. Note that if D or AUX are accented, as in (828) and (829), the light PP can cliticise onto the prosodic word headed by this function word.

(828)   a.   *How afraid are YOU of it?* [əvɪt]
        b.   *How tired are YOU of it?* [əvɪt]
        c.   *How angry are YOU at it?* [ətɪt]

(829)   a.   *Hów aware ís he of it?* [əvɪt]
             Hów aware ((ís he)$_{PWd}$ of it)$_{PWd}$
        b.   *How tired ARE you of them?* [əvðəm]
             How tired ((ARE you)$_{PWd}$ of them)$_{PWd}$

While no apparent optimisation of the prosodic structure occurs by extraposing the PP in (824)/(825), the optionality of the operation is nevertheless allowed by the approach to extraposition pursed in this study. The generator provides the alternative structures and the evaluator cannot distinguish the two optimal variants. The evaluation of (824)/(825) can be inspected in the tableau in Figure 5.18.

---

32 But see Kaisse (1985: ch. 3) for a different view. She denies the possibility of AUX to cliticise onto a lexical category in SpecCP if AUX is a single consonant allomorph, as in (ia). She claims that AUX must govern its host in order to be able to cliticise. But AUX in C cannot govern the adjective contained in the AP in SpecCP. It is unclear to me what role government can possibly play in the phonology. Note that the weak form with a centralised [ɨ] in (ib) is explicitly allowed by Kaisse. This only shows that there are further restrictions for single consonant allomorphs, which according to Anderson (2005: 67), adjoin to an adjacent syllable.

(i)   a.   **How likely's it to rain?*
      b.   *How likely* [ɨz] it to rain?
           (Kaisse 1985: 52)

		Exh_PWd	Head-to-Lex	Exh_Ft	Align-PWd	NonRec
	how afraid of it are you					
☞	a. [(how (afraid)_PWd of it)_PWd ([are you]_Ft)_PWd]_PPh		*	**	****	*
☞	b. [(how (afraid)_PWd are you)_PWd [of it]_Ft)_PWd]_PPh		*	**	*****	*
	c. [(how (afraid)_PWd)_PWd [of it]_Ft)_PWd ([are you]_Ft)_PWd]_PPh		**!		******	*
	d. [(how (afraid)_PWd)_PWd ([are you]_Ft)_PWd [of it]_Ft)_PWd]_PPh		**!		******	*
	e. [(how (afraid)_PWd)_PWd [of it]_Ft [are you]_Ft]_PPh	*!*	**		*	*

Figure 5.18: Extraposition of light PP.

The three non-optimal candidates are represented separately in (830). Candidates (a) and (b) are both optimal because they incur the same number of constraint violations. In other words. HEAD-TO-LEX prohibits footing of sequences of function words and rules out the representation in which both P+D and AUX+D are footed and prosodified as prosodic words (candidates c and d). Candidate (e) is ruled out by Exh_PWd because P+D and AUX+D are just footed, but not parsed at the level of the prosodic word.

(830)   c.

```
                              PPh
                  ┌────────────┼────────────┐
                 PWd          PWd          PWd
              ┌───┴───┐        │            │
             Ft      PWd       Ft           Ft
              │     ┌──┴──┐   ┌─┴─┐        ┌─┴─┐
              σ    afraid  σ   σ    σ       σ
              │           │   │            │   │
             how         ɒv  ɪt          ɑː  juː
```

d.

```
                              PPh
                  ┌────────────┼────────────┐
                 PWd          PWd          PWd
              ┌───┴───┐        │            │
             Ft      PWd       Ft           Ft
              │     ┌──┴──┐   ┌─┴─┐        ┌─┴─┐
              σ    afraid  σ   σ    σ       σ
              │           │   │            │   │
             how         ɑː  ju          ɒv  ɪt
```

e.

```
                              PPh
                  ┌────────────┼────────────┐
                 PWd           Ft           Ft
              ┌───┴───┐      ┌──┴──┐      ┌──┴──┐
             Ft      PWd      σ     σ      σ     σ
              │     ┌──┴──┐   │     │      │     │
              σ    afraid    ɒv    ɪt     ɑː    juː
              │
             how
```
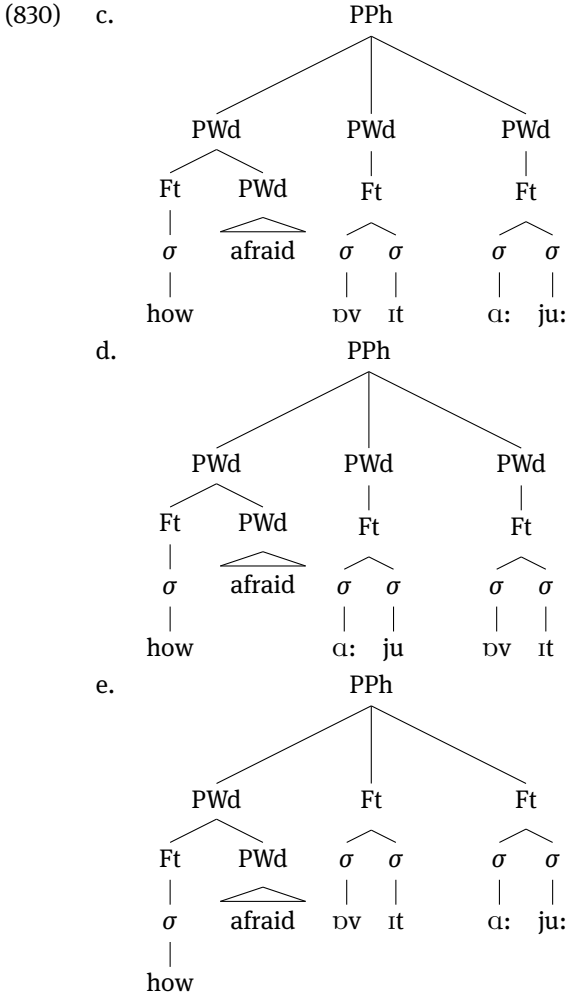
5.3.5.3 Variation and topics for future research

The previous section has shown that prosodic optimisation does occur in a subset of the data. Hence a prosodic solution can be the right way to approach the phenomenon. Nevertheless, the account is far from being complete. In this section some problems are presented with possible phonological solutions, but they should be considered topics for future investigations.

Firstly, the account of optionality of example pairs like (824)/(825) in the tableaux in Figure 5.18 relies on the fact that P+D has the same prosodic representation in its base and extraposed position. One of the func+func sequences

cliticises, while the other one is prosodified as a prosodic word. In other words, the analysis does not admit variation in prosodification of light PPs and AUX+D strings. But such variation does occur as can be seen in the following examples recorded with three experiment participants. Particularly the D+P sequence seems more prone to cliticisation than the AUX+D string when it is adjacent to a lexical category. Since the optionality of extraposition only follows if both candidates incur the same constraint violations, this variation in the prosodic representation of func+func strings is not captured.

(831) *We could all do with a little bit of organisation in our life,* (BE)
   a. *but how góod at it áre you?* [ətɪt ɑ:ju:]
   b. *but how góod are you at it?* [əju(:) ʔætɪt]

(832) *We could all do with a little bit of organisation in our life,* (AE₁)
   a. *but how góod at it are you?* [ətɪt ɑ:rjuw]
   b. *but how góod are you at it?* [ɑ:rjuw ætɪt]

(833) *We could all do with a little bit of organisation in our life,* (AE₂)
   a. *but how góod at it are you?* [ætɪt ɑ:rjuw]
   b. *but how góod are you at it?* [ɑ:rjuw ætɪt]

Similarly, P+D may be prosodified variably in extraposed position, even if AUX or D is emphatically accented, as can be seen in the following examples:

(834) a. *How angry ARE you at it.* [ætɪt] (BE)
   b. *How angry are YOU at it?* [ətɪt]

(835) a. *How aware IS he of it.* [əvɪt] (AE₁)
   b. *How angry ARE you at it.* [ætɪt]
   c. *How angry are YOU at it?* [ætɪt]
   d. *How tired are YOU of it?* [əvɪt]

(836) a. *How afraid ARE you of it?* [ɒvɪt] (AE₂)
   b. *How afraid are YOU of it?* [əvɪt]

One possible solution is to assume that Head-to-Lex is freely ranked with Exh$_{Ft}$. That is, the 'German' ranking is an option in English (cf. section 5.3.5.1). This has the consequence of allowing in two more optimal candidates. If Exh$_{Ft}$ ≫ Head-to-Lex, then the first two functional categories can be incorporated as a clitical foot. The two additional optimal candidates are (f) and (g) in the tableau in Figure 5.19. However, free ranking of these two constraints predicts that we should find a similar variation in the prosodification of English proclitics. This does not seem to be the case, though.

how good at it are you	Exh$_{PWd}$	Exh$_{Ft}$	Head-to-Lex	Align-PWd	NonRec
a. [(how (good)$_{PWd}$ at it)$_{PWd}$ ([are you]$_{Ft}$)$_{PWd}$]$_{PPh}$		*!*	*	****	*
b. [(how (good)$_{PWd}$ are you)$_{PWd}$ ([at it]$_{Ft}$)$_{PWd}$]$_{PPh}$		*!*	*	****	*
c. [(how (good)$_{PWd}$)$_{PWd}$ ([at it]$_{Ft}$)$_{PWd}$ ([are you]$_{Ft}$)$_{PWd}$]$_{PPh}$			**	*****!	*
d. [(how (good)$_{PWd}$)$_{PWd}$ ([are you]$_{Ft}$)$_{PWd}$ ([at it]$_{Ft}$)$_{PWd}$]$_{PPh}$			**	******!	*
e. [(how (good)$_{PWd}$)$_{PWd}$ [at it]$_{Ft}$ [are you]$_{Ft}$]$_{PPh}$	*!*		**	*	*
f. ☞ [(how (good)$_{PWd}$ [at it]$_{Ft}$)$_{PWd}$ [are you]$_{Ft}$)$_{PWd}$]$_{PPh}$			**	****	*
g. ☞ [(how (good)$_{PWd}$ [are you]$_{Ft}$)$_{PWd}$ ([at it]$_{Ft}$)$_{PWd}$]$_{PPh}$			**	****	*

Figure 5.19: Reranking Head-to-Lex and Exh$_{Ft}$.

Since free ranking of Head-to-Lex and Exh$_{Ft}$ would create problems for the analysis of proclitics, an alternative would be to exploit the idea that there is a preference for proclisis over enclisis in English. Specifically, assume that only weak function words can be incorporated as enclitics, while strong-weak sequences or any strong function word are prosodified as separate prosodic words.

This can be implemented if we adopt and extend an idea from Itô and Mester (2009b). They argue that the existence of recursive prosodic categories makes it necessary to formulate constraints that refer specifically to different levels of

those categories, e. g., PWd$_{min}$ (a prosodic word that does not dominate any other prosodic word) and PWd$_{max}$ (a prosodic word that is not dominated by any other prosodic word). They argue that the direction of cliticisation can be captured if, in addition to undominated ALIGN-LEX, which forbids internal clitics and which refers to PWd$_{min}$, a more specific version of that constraint is adopted, namely one that refers to PWd$_{max}$. The two constraints subsumed under ALIGN LEX-TO-PWD$_{max}$ in (837) require that a lexical category word be aligned with the left and right edges of a PWd$_{max}$. Depending on the ranking of the two constraints with respect to each other, either affixal proclisis or enclisis will be tolerated, as shown in (838).

(837)   ALIGN LEX-TO-PWD$_{max}$

    a.   LEX-TO-PWD$_{max}$ L (Lex, L; PWd$_{max}$, L)

    b.   LEX-TO-PWD$_{max}$ R (Lex, R; PWd$_{max}$, R)

(838)   a.   Proclisis: LEX-TO-PWD$_{max}$ R ≫ LEX-TO-PWD$_{max}$ L

    b.   Enclisis: LEX-TO-PWD$_{max}$ L ≫ LEX-TO-PWD$_{max}$ R

The ranking in English could therefore be (838a). In other words, the right edge of PWd$_{max}$ is less tolerant for cliticisation than the left edge. Now, if LEX-TO-PWD$_{max}$ R is freely ranked with HEAD-TO-LEX, then the following four candidates are allowed by this fragment of the English grammar. If HEAD-TO-LEX outranks LEX-TO-PWD$_{max}$ R, only unfooted function words will be allowed to cliticise (839). If LEX-TO-PWD$_{max}$ R dominates HEAD-TO-LEX, no clitics at all are allowed. The function words must then be prosodified as separate prosodic words (840). The evaluation can be inspected in the tableaux in Figure 5.20.[33]

(839)   HEAD-TO-LEX ≫ LEX-TO-PWD$_{max}$ R

    a.

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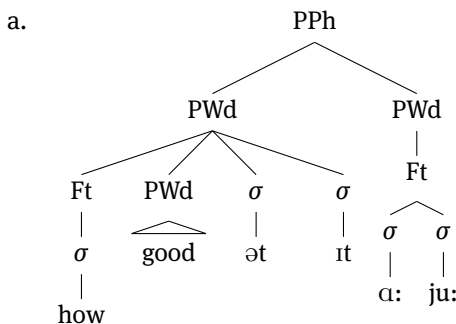
33 The constraint LEX-TO-PWD$_{max}$ L is not included. It can be safely ignored if it is ranked sufficiently low.

how good at it are you	Exh_PWd	Head-to-Lex	Lex-to-PWd_max R	Exh_Ft	Align-PWd	NonRec
☞ a. [(how (good)_PWd at it)_PWd ([are you]_Ft)_PWd]_PPh		*	*	**	****	*
☞ b. [(how (good)_PWd are you)_PWd ([at it]_Ft)_PWd]_PPh		*	*	**	****	*
c. [(how (good)_PWd)_PWd ([at it]_Ft)_PWd ([are you]_Ft)_PWd]_PPh		**!			*****	*
d. [(how (good)_PWd)_PWd ([are you]_Ft)_PWd ([at it]_Ft)_PWd]_PPh		**!			*****	*
e. [(how (good)_PWd)_PWd [at it]_Ft [are you]_Ft]_PPh	*!*	**			*	*
f. [(how (good)_PWd [at it]_Ft ([are you]_Ft)_PWd]_PPh		*!	*		****	*
g. [(how (good)_PWd [are you]_Ft)_PWd ([at it]_Ft)_PWd]_PPh		**!	*		****	*

how good at it are you	Exh_PWd	Lex-to-PWd_max R	Head-to-Lex	Exh_Ft	Align-PWd	NonRec
a. [(how (good)_PWd at it)_PWd ([are you]_Ft)_PWd]_PPh		*!	*	**	****	*
b. [(how (good)_PWd are you)_PWd ([at it]_Ft)_PWd]_PPh		*!	*	**	****	*
c. [(how (good)_PWd)_PWd ([at it]_Ft)_PWd ([are you]_Ft)_PWd]_PPh			**		******	*
d. [(how (good)_PWd)_PWd ([are you]_Ft)_PWd ([at it]_Ft)_PWd]_PPh			**		*****	*
☞ e. [(how (good)_PWd)_PWd [at it]_Ft [are you]_Ft]_PPh	*!*		**		*	*
f. [(how (good)_PWd [at it]_Ft) ([are you]_Ft)_PWd]_PPh		*!	**		****	*
☞ g. [(how (good)_PWd [are you]_Ft)_PWd ([at it]_Ft)_PWd]_PPh		*!	**		****	*

Figure 5.20: Cliticisation of only weak func+func.

b.

```
                        PPh
                  _____/_____
                 /              \
               PWd              PWd
          ___/__|___             |
         /   |   |   \           Ft
        Ft  PWd  σ   σ          /\
        |    |   |   |         σ  σ
        σ  good  ə  ju(:)      |  |
        |                     æt  ɪt
       how
```

(840) Lex-to-PWD$_{max}$ R ≫ Head-to-Lex

a.

```
                        PPh
                 _____/|_____
                /       |       \
              PWd      PWd      PWd
            __/\        |        |
           /    \       Ft       Ft
          Ft   PWd     /\       /\
          |     |     σ  σ     σ  σ
          σ   good    |  |     |  |
          |          ɑ: ju(:) æt  ɪt
         how
```

b.

```
                        PPh
                 _____/|_____
                /       |       \
              PWd      PWd      PWd
            __/\        |        |
           /    \       Ft       Ft
          Ft   PWd     /\       /\
          |     |     σ  σ     σ  σ
          σ   good    |  |     |  |
          |          æt  ɪt   ɑ: ju:
         how
```
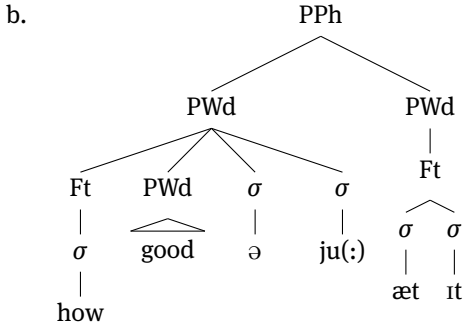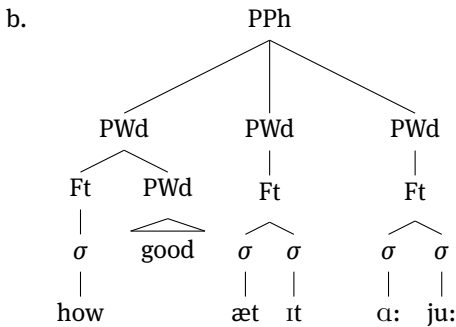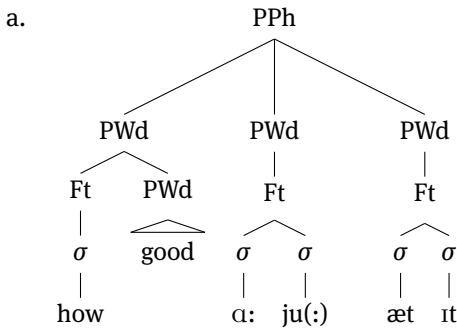
Whatever its virtues, this analysis has nothing to say about the prosodification of final function words in examples like (834), (835) and (836), in which the host is not lexical, but a focused function word. Align Lex-to-PWD$_{max}$ simply does not apply to them. In these cases either the pronoun or the P+D sequence cliticises, depending on which of them is adjacent to the focused function word. Maybe, there is only room for one clitic or clitic sequence.

Another issue not addressed so far are PPs with a disyllabic P, like *into* and *about*. How are they prosodically represented and what causes extraposition of such heavier PPs? Cf.:

(841) *Reuters reports that two of the new tiltrotor aircraft have experienced an unidentified malfunction while crossing the Atlantic. Unsurprisingly,*

    a. *(the Návy) (is láunching an invéstigation into it) (todáy)*
    b. *(the Návy) (is launching an invéstigation today into it)*

(842) *Pinker's new book is really amazing.*

    a. *(I háven't héard any cómments today about it)*
    b. *(I máde a few cómments) (a few dáys ago about it)*

(843) *Apple has disclosed that new products will be released in March,*

    a. *(but they give nó informátion about them at the moment)*
    b. *(but they give nó informátion at the moment about them)*

Extraposition of such PPs is also optional and examples can be found which span a considerable distance. They can easily end up in an adjacent phonological phrase, as in (842b) and (844). The latter was found in an internet forum and its relative acceptability confirmed by my informants.

(844) a. ?*I know the common opinion is generally negative so far about it.*[34]
    b. *(I knów the common opínion) (is génerally négative so far about it)*

Concerning their prosodic representation, disyllabic Ps are clearly footed. The left-hand prominent *into* is a foot with D presumably adjoined to it, as in (845a), or *into it* forms a prosodic word consisting of only functional material, as in (845b). The former is the optimal candidate, given the constraints and their ranking established in section 5.3.5.1.

(845) a.   PWd   b.   PPh
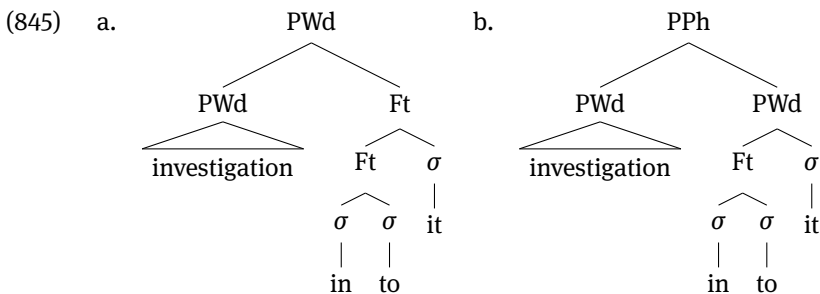
Disyllabic Ps, with a stressed second syllable (*abóut, aróund, agáinst, betwéen, towárd, becáuse*) must, however, be given a different analysis. They all have a

prefix-stem structure, with the stem originating from lexical words.[35] It is not unreasonable to consider these Ps truly lexical and the interface constraints would require them to be represented as prosodic words.[36] If they are prosodic words, they are also subject to the regular stress rules and the first syllable remains unparsed at the level of the foot, analogous to lexical words like *atone* and *disturb*. A clitical pronoun can be adjoined to the prosodic word, as in (846).

(846)

```
              PWd
             /    \
         PWd       σ
        /   \      |
       σ    Ft     ɪt
       |    |
       ə    σ
            |
          baʊt
```
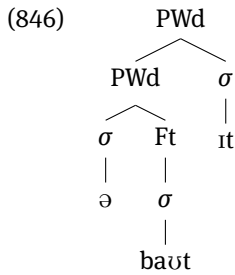
If PPs like *about it* are extraposed, they are also not clitical. Recall that cliticisation of light PPs to an unaccented word may lead to accentuation of the new host. I could not detect the same effect in my recording of examples containing these lexical PPs, presumably because they are not clitics. They may end up after an accented or a deaccented word, as can be seen in (842), (843) and (847).

(847)   *Pinker's new book is really amazing.*

      a.   *(I've réad some cómments about it today) (in Tíme mágazine)*

      b.   *(I've réad some cómments today about it) (in Tíme mágazine)*

      c.   *(I've réad some cómments today) (in Tíme mágazine about it)*

---

35 Some of these preposition were already complex words in Old English, with an adverbial or adjectival stem. Others can be traced back to Middle English. Cf. the following etymologies from the Oxford English Dictionary:

(i)   a.   *about*: OE *onbūtan*, from *on* + *būtan* 'on the outside of'

      b.   *between*: OE *betwēonum*, from *be* 'by' + a Germanic word related to *two*

      c.   *around*: ME prefix *a* + *round*

      d.   *against*: ME from *ayen* 'again' + genitive ending *es* + *-t*

      e.   *because*: ME from the phrase *by cause*

36 Actually, the common classification of all Ps as lexical is just a relict of early generative analysis, which defined them in terms of negative lexical category features (i. e., [–V, –N]). Negative features are no longer useful for grammatical categorisation. The phonology treats most Ps like functional categories, regardless of whether they are case Ps (e. g., *of* and *to* in *pictures of Mary* or *allude to Mary*) or have semantic content like locative and directional Ps.

The extrapositions here hardly improve the rhythmic structure of the sentence and only (841) avoids two phonological phrases. It remains to be seen if a satisfactory phonological solution can be found.

5.4 Conclusion

In this chapter two cases of extraposition from NP have been discussed that have not received much attention in the literature. The first part concentrated on defocused PPs, which optionally move to the right edge of a phonological phrase. The explanation is straightforward: only in the postnuclear stretch is defocused material also completely deaccented and a deaccented constituent is easily identified as defocused by the hearer. In other words, it is a grammatical means that facilitates processing of information structure. Movement of defocused constituents into the postnuclear stretch, however, conflicts with another grammatical requirement, namely, that focused constituents also tend to occur at the right edge (the traditional Principle of End Focus). The formal analysis exploits these contradictory requirements and implements it as free ranking of D-Given and Align-Foc.

Extraposition of light PPs, on the other hand, does not always lead to an optimised phonological structure. Only for a subset of the data improvements in the rhythmic structure or a reduction of phonological phrases could be established. Therefore, I opted for a concluding section that points out some unsolved problems and suggests possible solutions, which will hopefully be explored in future work.

6 Concluding remarks

The main goal of this study on extraposition was to establish the causes or triggers for rightward movement of PP complements and adjuncts of nouns as well as of relative clauses. The last two chapters of this book provided essentially phonological solutions for a traditional syntactic construction. The fact that prosody can have an effect on word order is certainly not new and research in this area is growing exponentially as more phonological data on different constructions becomes available.

The first departure from purely syntactic accounts was the impetus of studies on information structure and word order phenomena. Constituents can typically move rightward if they are focused and/or heavy. As discussed in chapter 4, theories of information structure in the eighties and early nineties were seeking solutions for thetic sentences and thetic sentences are those sentences in which extraposition from subject is most natural. While the distinctive prosody of thetic sentences is still in need of an adequate account, it is now generally accepted that it has nothing to do with focus because thetic sentences are informationally unstructured. I hope to have shown at several points in this study that an information-structural approach cannot be defended for core cases of extraposition.

A fresh look at rightward movement operations became possible with the development of new theories of the syntax-phonology correspondence and more articulated theories of phonological phrasing. The main point developed in this study, following a programme initiated by Truckenbrodt (1995a), is that extraposition receives a more adequate account if the whole prosodic structure of sentences is taken into account, not only sentential accentuation. Therefore, the guiding methodological question in this study was whether rightward movement gives rise to a more optimal prosodic structure. The issue could be elucidated by comparing the prosodic structure of canonical word order with the prosodic structure of scrambled word order.

Several aspects related to the prosodic hierarchy and its derivation from syntactic structure were examined: (i) phonological phrasing or the mapping of syntactic structure onto prosodic structure, (ii) strict layering, particularly the role of exhaustive parsing, and (iii) phrasal as well as sentential prominence, embodied by head-alignment constraints. It turned out that only phonological phrasing and certain options allowed by the correspondence rules between syntax and prosodic structure play a role in extraposition constructions. The prosodic structure resulting from extraposition of a PP or relative clause is the most optimal from the perspective of the syntax-phonology correspondence. Removal of a PP

or relative from within NP allows syntactic phases like transitive vP and clauses containing unaccusative or passivised verbs to be contained in one phonological phrase. Extraposition, therefore, optimises the syntactic structure – phonological structure correspondence, in the sense that each syntactic phase corresponds to one phonological phrase.

The fact that defocused and clitical material can also be extraposed required examination of factors not directly related to the prosodic hierarchy. On the one hand, two contradictory forces, namely, a preference to represent defocused constituents in the postnuclear stretch, where they can be deaccented completely, and a preference for focused constituents to be represented at the right edge of an intonational phrase, may optionally cause defocused constituents to move rightwards. On the other hand, the rhythmic structure of sentences plays a role in extraposition of clitical PPs.

Without claiming that the account developed in this study is the last word on this construction and that only phonological triggers are at stake, for which see section 4.4, but if it is essentially on the right track, it is reasonable to assume that extraposition occurs at PF. This entails that, in the syntax, nominal complements or adjuncts are not separated from the noun. Particularly objects can undergo QR, which captures the semantic effects which have led to several divergent analyses in the past. Discontinuous NPs do not have to be represented discontinuously in the syntax, neither in terms of movement, for which there is no evidence, nor as base-generated separate constituents, which would make the construction uninterpretable by any compositional semantics. It is the phase-based model of the syntax employed in chapter 2 which allows the representation of "extraposed" constituents in two different positions at the interfaces. In this sense, the approach developed here is an interface approach. The syntax only does what it should do, namely, provide representations that are legible at the interfaces.

A List of constraints

(1) ALIGN-FOC (FOC, R; PPH, R)
Each focused constituent is right-aligned with a phonological phrase boundary. (Chicheŵa)

(2) ALIGN-FOC (FOC, R; IP, R)
Each focused constituent is right-aligned with an intonational phrase boundary. (English)

(3) ALIGN H-IP (IP, R; Head-IP, R)
Align the right edge of every intonational phrase with the right edge of its head.

(4) ALIGN H-PPH (PPh, R; Head-PPh, R)
Align the right edge of every phonological phrase with the right edge of its head.

(5) ALIGN H-PWD (PWd, R; Head-PWd, R)
Align the right edge of every phonological word with the right edge of its head.

(6) ALIGN-LEX L/R
a. ALIGN-LEX L (Lex, L; PWd, L)
b. ALIGN-LEX R (Lex, R; PWd, R)

(7) ALIGN LEX-TO-PWD$_{max}$
a. LEX-TO-PWD$_{max}$ L (Lex, L; PWd$_{max}$, L)
b. LEX-TO-PWD$_{max}$ R (Lex, R; PWd$_{max}$, R)

(8) ALIGN-PPH (PPh, R; PWd, R): Every PPh ends in a PWd.

(9) ALIGN(PPh,T⋆,L)
The left edge of every phonological phrase coincides with a pitch accent.

(10) ALIGN(PPh,T⋆,R)
The right edge of every phonological phrase coincides with a pitch accent.

(11) ALIGN-PWD L/R
a. ALIGN-PWD L: Align (PWd, L; Lex, L)
b. ALIGN-PWD R: Align (PWd, R; Lex, R)

(12) ALIGN ROOT-CP (root-CP, R; IP, R)
Align the right edge of every root CP with the right edge of an intonational phrase.

(13) ALIGN-XP R (XP, R; PPh, R)
The right edge of any XP in syntactic structure must be aligned with the right edge of a phonological phrase in prosodic structure.

(14) ALIGN-XP L (XP, L; PPh, L)
The left edge of any XP in syntactic structure must be aligned with the left edge of a PPh in prosodic structure.

(15) BINMAP
A major/phonological phrase consists of just two minor/accentual phrases.

(16) BIN(IP): An intonational phrase contains exactly two phonological phrases.

(17) BIN(PPH): A phonological phrase contains exactly two prosodic words.

(18) CODA-COND: $^*VrX]_\sigma$

(19) D[ESTRESS]-GIVEN: A given constituent is not accented.

(20) FINAL-C: $^*V)_{PWd}$

(21) FTBIN: Feet are minimally bimoraic.

(22) HEAD-TO-LEX: Prosodic heads must be contained in lexical words.

(23) Linearisation (X-bar theory) constraints
    a. HEAD-L: Heads are at the left edge of XP
    b. HEAD-R: Heads are at the right edge of XP
    c. SPEC-L: Specifiers are at the left edge of XP

(24) Linearisation constraints of adjuncts
    a. ADJUNCT-L: The right edges of adjuncts are aligned with the left edges of XPs
    b. ADJUNCT-R: The left edges of adjuncts are aligned with the right edges of XPs

(25) MINBIN(PPH)
A phonological phrase contains at least two prosodic words.

(26) MAX(PPH)
A phonological phrase contains maximally three prosodic words at normal speech rate, possibly more at faster rates.

(27) NOCLASH: Pitch accents are not adjacent.

(28) NO-HIATUS: $^*V]_\sigma [_\sigma V$

(29) PARSE-OBJ
Structural arguments must be parsed prosodically with an adjacent lexical verb.

(30) PARSE-NCOMP
Nominal complements are parsed prosodically with the noun.

(31) PARSE-σ: Syllables are parsed into feet.

(32) PH[ASE]=PPH
  a. A Spell-Out Domain corresponds to a phonological phrase, or
  b. Lexical terminals spelled out on a syntactic cycle form a phonological phrase if they have phrasal stress.

(33) POSTNUCLEAR DEACCENTING (POSTNUC-D)
No pitch accents are realised in the postnuclear stretch.

(34) *PPH: Do not form any phonological phrases.

(35) Prosodic domination (SLH), where C^i = some prosodic category
  a. LAYEREDNESS
      No C^i dominates a C^j, j > i,
      e. g. "No σ dominates a Ft."
  b. HEADEDNESS
      Any C^i must dominate a C^{i-1} (except if $C^i = \sigma$),
      e. g. "A PWd must dominate a Ft."
  c. EXH[AUSTIVITY]
      Terminal elements are parsed at every level of the prosodic hierarchy.
  d. NONREC[URSIVITY]
      No C^i dominates C^j, j = i,
      e. g. "No Ft dominates a Ft."

(36) QUADRISYLLABIC CONSTRAINT (QSC)
Pitch accents within a phonological phrase are spaced close to four syllables apart.

(37) STRESS-FOC
An F-marked constituent contains intonational phrase level metrical prominence.

(38) STRESS-XP
Each XP must contain a beat of stress at the level of the phonological phrase.

(39) WEIGHT INCREASE (WI)
In a sequence $\alpha\beta$ of prosodic constituents, $W(\beta) \geq W(\alpha)$.

(40) WRAP-XP: Each XP is contained in a PPh.

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