

Explorations in Second Language Acquisition and Processing

*Edited by Roumyana Slabakova,
James Corbet, Laura Dominguez,
Amber Dudley and Amy Wallington*

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INTRODUCTION

This volume springs from the 14th edition of the Generative Approaches to Second Language Acquisition conference. GASLA 14 was held at the University of Southampton from 7 to 9 April 2017. It was the first European edition of this conference, which had been held in North America before this.

The oral presentations and the posters presented at the conference were selected from the one hundred submitted abstracts, which went through a rigorous and anonymous review process. After the conference, presenters were invited to submit their work to this proceedings volume, which you are now holding in your hands. We are grateful to all authors for sharing their work.

Several themes and directions of research were visible at the conference and we have organized the different parts of the volume around them. The plenary by **Michael Sharwood Smith** develops further his ground-breaking theoretical model on bilingual representation and processing, providing the cornerstone of the volume. The chapter is particularly valuable to generative linguists for the clarity of the example of gender representation and processing, which runs through all the main sections.

The acquisition of subject and object pronouns was another topic of enhanced interest at the conference. The two chapters on L2 Portuguese by **Lobo, Madeira and Silva** and by **Fiéis and Madeira** look at native language transfer effects in choosing antecedents for null and overt pronouns, and at the interpretation of pronouns and clitics by Chinese learners. The next two chapters by **Kraš and Milicevic Petrović** and by **Milicevic Petrović, Kraš and Lisica** take up anaphora resolution in the competence of simultaneous Croatian–Italian bilinguals and translators. The bilingual participants were comparable to monolinguals in their choices, suggesting that difficulties are encountered only when languages mismatch. Neither the experienced nor the trainee translators demonstrated L1 attrition for the property. The final chapter in this part is by **Kubota**, who discusses referential interpretation and how that interplays with cognitive control in Japanese–English bilingual children.

The next two chapters also engage with interpretation, but in constructions which can be fully appreciated only at the interfaces between

interface. The chapter by **Teixeira** takes up locative inversion while the chapter by **Abumelha** considers generic constructions in L2 English. Teixeira asks if the syntax–discourse interface is a locus of permanent optionality and answers in the affirmative, adding some modulating factors. Abumelha uses linguistics-informed methods to teach generics under explicit and implicit instruction conditions.

Acquisition of syntax is the focus of the next part of the volume. **Rankin, Grüter and Hopp** investigate co-activation of the native syntax during processing of *wh*-questions in L1 German–L2 English interlanguage, using the eyetracking method. **Al-Thubaiti** discusses verb phrase ellipsis and adverb placement in the grammar of Arabic-native learners of English, both arguably dependent on an uninterpretable feature. L1 and L2 relative clauses and the process of reconstruction are the topic of the chapter by **Chen and Fukuda**. The authors argue that, for Chinese-native learners of Japanese, this is a poverty of the stimulus property and show that it is indeed acquired successfully. **Bauke** is interested in the grammar competition between V2 and non-V2 options in L2 English, using the *wh* + particle construction to tackle this matter. The chapter by **Quaglia, Kupisch and Lloyd-Smith** investigates embedded *wh*-questions, a construction that displays a high degree of variation in monolingual Italian. They look at various factors that can explain crosslinguistic influence in heritage and monolingual speakers of Italian.

The final part of the volume contains two chapters on functional morphology. Based on the Distributed Morphology model, **Burkholder, Mathieu and Sabourin** provide a theoretical proposal and experimental evidence for the role of gender in mixed-language nominal phrases. **Vender, Delfitto, Mantione and Melloni** are interested in whether Albanian–Italian and Romanian–Italian bilingual children show any bilingual advantage when asked to inflect real words and nonwords for the plural. They show that the bilingual participants indeed demonstrate this advantage.

The breadth and variety of the topics in this volume’s research is a testament to the vitality and rigor of generative second language acquisition. At the same time, the chapters make it clear that grammatical representation, processing and context have to be engaged together, in order to elucidate the process in all its complexity and richness.

The Editors

PART I:
PLENARY TALK

CHAPTER ONE

REPRESENTING REPRESENTATION: THREE PERSPECTIVES AND THE CASE OF GRAMMATICAL GENDER¹

MICHAEL SHARWOOD SMITH

1. Overview

In this chapter, I will present a processing-based working model of the mind, based on research findings across a range of disciplines within cognitive science. The inclusion of processing considerations should not obscure the fact that representational and processing explanations are integrated within this model, or more properly, within this theoretical framework. This makes it an extension of theoretical linguistic explanations for changes in the way a language is represented in the mind of an individual. It also runs counter to the current and, in present terms, entirely misguided tendency to see representations and processing routines as entirely separate phenomena. Where research deals with acquisition in real time, as is the case with developmental linguistics, only an integrated view makes sense. A representation existing in the mind of a specific individual engaged in language-related activity is a particular combination of structural and processing properties. These can change together over time and in different ways: you cannot consider one without considering the other.

The role of language is interpreted, in line with the generative enterprise, as being dependent on a uniquely human, biologically endowed linguistic ability. Language ability in its broadest sense depends on this core ability but is actually much more extensive, involving many parts of the mind that have other unrelated functions. Any unifying framework that encompasses all these aspects will need to incorporate much more than an

¹ Grateful acknowledgments are due to the editors, my anonymous reviewers and a productive exchange of views with John Truscott.

abstract account of linguistic structure divorced from time and space considerations. The manner in which its theoretical insights are formulated out for internal theoretical purposes will not be a reliable and complete guide when working out the nature of those mechanisms responsible for online processing, storage and development. The underlying aim is, accordingly, to integrate theoretical linguistic accounts with current explanations of how the mind processes and stores mental representations of any kind. This has also to be done in a way that is in tune with and can supplement work in current neuroscience.

A platform like this has arguably not been available to researchers thus far and, not surprisingly, researchers have become so accustomed to doing without one that they seem to have lost any sense of really needing one in the first place. I would argue strongly that such a conceptual platform, providing as it does a much clearer working model of the mind as a whole than one based on vague assumptions, should not be regarded as a luxury extra or perhaps just something for the future but rather as a dire necessity. It does require the abandonment of more locally-based frameworks for the guidance of research. In fact, it depends on them. At the same time, separate hypotheses and theories developed and tested using terminology and techniques that facilitate empirical work only within one individual research area do little to promote a combined view of what they all mean for our understanding of the mind. The tradition of studying separately linguistic representations, on the one hand, and on-line language processing, on the other, provides a prime example of academic apartheid that is not in the long term helpful for those interested in accounting for development which requires both perspectives to be combined.

After very briefly discussing the basic features of this framework, I will go on to show, in terms of the framework, how language cognition fits with cognition in general. This will include accounting for how two or more languages can be accommodated within the same mind and providing precise definitions for some crucial concepts that are often avoided or mentioned in imprecise terms. As suggested by the chapter subtitle, the life cycle of a representation, the chapter will conclude with a brief implementation. This will look at gender. Implementations of the framework can of course differ: alternative explanations can be proposed so this will just be an example to illustrate how the framework can be exploited. Grammatical gender will in fact form a thread running through the whole discussion.

2. Nesting Frameworks

Every researcher in language acquisition must of necessity work with some mental model of how the mind is organised. The model may be largely implicit although there will be explicit, more elaborated parts, reflecting just those areas where the researcher in question works and therefore is most expert. An obvious example in the context of this volume is what generative linguistic theory provides, including empirical studies in particular aspects of grammar and in particular languages. In addition, there may be other, somewhat less elaborated areas which have proved to be of obvious and immediate relevance, either in providing methodological tools or theoretical insights or both. What might some of those aspects of mental organisation be that one might expect any researchers to be knowledgeable about, that is, apart from the abstract linguistic properties of a given language system? Clearly, they would have to be issues concerning linguistic development in real time. Here is a small rough-and-ready checklist containing just a handful of the fundamental questions that would require coherent and detailed answers:

1. How do you personally imagine the way the mind instantiates and manipulates representations in real time?
2. What is working memory and how does it work?
3. "Interface" should be a familiar commonly used concept from the generative linguistic literature: how exactly do you think an interface works in real time to shed light on experimental results in studies of
 - a. on-line processing?
 - b. development over time?

My guess is that few researchers would like to be put on the spot and asked to produce detailed answers to these questions on the spur of the moment. The reason for that is twofold. First, given the current state of our knowledge in the relevant areas of cognitive sciences, there is very little consensus about any of these issues. Secondly, most researchers simply do not have the time available to acquaint themselves with the relevant research fields and review all the available options and will tend to plump for what seems to be the most accessible and long-established approach. One way out of this dilemma is to commit to interdisciplinary research projects, a norm in the hard sciences and increasingly popular now in cognitive science. Another way, especially compatible with the first, is the main focus of this chapter, namely to look for and use a wide-scope

framework in which coherent, explicit commitments are made about just the kind of questions listed above. “Wide-scope” here means that in principle a given currently used framework in one or more subdomains can be nested within the wide-scope framework. One positive outcome of this nesting of frameworks, apart from its potential to expand and refine explanations of data, should be synergies that enable the refinement of the frameworks themselves. By the end of this chapter, there should be answers to each of the question listed above, each of which will be precise and coherent. Whether they are right or even useful is of course an empirical question.

There should be no controversy about the need to take a wider perspective on local theoretical issues. Indeed, it has increasingly been acknowledged in the research literature: wishes for this need to be addressed typically take one or other of two forms:

1. the whole-mind perspective
2. the mind/brain perspective

Expressing the whole-mind perspective, Thierry, a neurolinguist, writes as follows: “The time has come, perhaps, to go beyond merely acknowledging that language is a core manifestation of the workings of the human mind and that it relates interactively to all aspects of thinking” (Thierry 2016, p. 690). The second, mind/brain perspective is expressed by Kroll, a psycholinguist, who looks in the other direction: “Understanding how different aspects of language processing will engage cognitive and neural processes will be crucial” (Kroll 2015, p. 33). Although not a necessary implication, I choose to interpret these sentiments as an implicit plea for a facilitating framework of some kind. Such a framework should specify, with much greater precision than has been customary hitherto, the basic psychological processes and mechanisms involved. The proviso is only that it should take account of theoretical views and empirical findings in cognitive- and neuro-scientific research. Of necessity it will leave open much to be debated and refined.

3. The Interactive Modular Mind

3.1 The Framework

The wider-scope framework to be used in this discussion is the *Modular Cognition Framework* (MCF). A brief comment on this name is appropriate at this juncture. The framework has been known more widely

as the MOGUL (Modular Online Growth and Use of Language) framework. Accordingly, in all discussions relating to language cognition as in this chapter, it can still be used interchangeably with MCF: MOGUL happens to be the instantiation of the framework that is used specifically to explain language-related phenomena. In order to situate language within the mind as a whole so as to account for general issues such as perception, memory, cognitive control, attention and consciousness, it had been necessary to widen the scope to take that into account: the MCF name more appropriately reflects that mind-wide perspective, which should be equally applicable to research on areas of cognition other than language.

I will now outline briefly the main features of MOGUL (MCF). The mind, like the brain, has a modular architecture. In broad terms this is fairly uncontroversial, the devil being in the detail. In MCF, this means that the mind is composed of a network of interacting expert systems, each of which has an identical basic design. This basic design is of course neurally instantiated in many different ways but a mind-based account abstracts away from these. The modular system can be seen as a collaborative network, coping with a myriad of different tasks in parallel and with the modules connected with other modules by means of interfaces. Its neural instantiation will also be a network of interacting systems but will naturally look quite different. Unlike the interfaces posited purely within the context of mainstream generative linguistic literature, the framework versions are processors that operate in real time. They generally mirror the way interfaces are described in Jackendoff's architecture of the language faculty (see, for example, Jackendoff 1987, 2002). Moreover, these interfaces, as just mentioned, are not limited to just those that connect up the language-specific systems to adjoining systems outside but include all the other connections between modules as well.

Another important point is that, within this collaborative network of modular systems, no system can be described as "domain-general." This term has been frequently used as a convenient way of saying "not in the language module" or "not governed by principles of UG" and so the implications of the existence of a domain general system have not been found relevant. In MCF, there are two potential candidates for domain-general status. The first obvious one is the *conceptual system*, which in the human mind forms a central hub for many of the mind's operations and, although its neural underpinning involves a number of different brain

systems, the most striking one is the human prefrontal cortex.² The second candidate is a temporary phenomenon related to the generation of conscious experience. In neural terms, it is what arises when intense synchronised online activity occurs in the various perceptual memory stores: these perceptual stores are coactivated with all the other stores that are relevant to the current context but it is indeed just these perceptual stores that create the experience we call “awareness” in both humans and other species. In a sufficiently cognitively advanced species, humans being the prime and perhaps only example, whatever conceptual content becomes available to awareness can immediately form the basis for conscious analysis, reflection and planning. Awareness of particular properties of language input, coupled with a preoccupation with aspects of grammatical gender, provide one relevant example here. Whether or not these higher levels of conscious cognition are active as well, the intense collaboration between individual memory stores, creates a combined effect called “global working memory” (GWM). This is the MCF version of a much-debated notion called the “global workspace” (Truscott 2017, cf. Baars 1988, 1997, 2002, 2007; Dehaene and Changeux 2011; Engle 2002). However, both these two candidates fail to fit the idea of a central processor where all mental activity is supervised. The conceptual system, even though it often plays the role of a central hub where connections between different stores intersect, still cannot be treated as a controlling mind-within-a-mind. In other words, it is no homunculus. Rather, it conforms like any other module to the same basic working principles in the way it works internally and the way it works externally via its interfaces with other modules. Global working memory, the other candidate, does in some measure have the appearance of possessing a supervisory, decision-making capability (which may be illusory, see Libet 1993). However, being exclusively about various degrees of awareness, it excludes by definition the vast majority of mental processes that work below the level of awareness and therefore beyond its direct control: it is an Oval Office with the computers down, the doors locked and very few people available to respond to orders. To sum up, whatever we may think, no one system controls the mind, which is not hierarchical but rather “heterarchical”³, without a permanent central executive in place.

² The ramifications of this are much more fully discussed in Truscott and Sharwood Smith (in prep.).

³ In other words, also in terms of the framework, all modules are equal: there is no master module (McCulloch 1945, Sharwood Smith & Truscott 2014, p. 21).

3.2 Modules: The Basic Design

I will now spell out, for those less familiar with MOGUL, the basic features of any module in the framework although some points will be made that have not been regularly emphasised in earlier publications. The reader is encouraged to keep in mind two things, firstly the fact that in most of the processing (psycho)linguistic literature there is frequent mention of given linguistics constructions being “harder to process” or “easier to process” on the basis of relative response times and/or measures of accuracy and secondly, the absence of any clear account of how the processing mechanisms that produce these particular responses actually work. This may seem an unjustified or exaggerated claim because frequent references are made to working memory and to particular accounts of what that is. Apart from the fact that working memory research is a dynamic field with much controversy and a variety of theoretical approaches on offer, the details of how processing works and the commitment to one or other of these approaches are not a regular feature of discussion sections of psycholinguistic studies (see Sharwood Smith 2017a and other contributions in the same special issue of *Second Language Research*).

A modular system contains a processor and a store. The processor is driven by principles unique to that module. For example, the syntactic module is constrained by syntactic principles, the nature of which is defined in various ways in syntactic theory. These principles have the effect of ensuring that any syntactic structure or “representation”⁴ known or created by an individual conforms to what can be thought of as a syntactic *code*.

A processor works in real time so it activates and assembles representations in response to current processing demands, which will be elaborated shortly. If we can say, using familiar terminology, that any syntactic representation must conform to the principles of UG, in this case as instantiated in the syntactic processor, then effectively we can say *that any module has its own UG*.⁵ The special contribution of syntactic theory is precisely to shed light on the properties of the syntactic processor and

⁴ From now on the terms “representation” and the philosophically non-committal “structure” will be used interchangeably i.e., as synonyms.

⁵ This characterisation of human mental modules in general stands in stark contrast to statements by those who would like to see the whole notion of UG; i.e., innate grammatical principles, however minimally defined, as a dead duck. In other words, it puts specifically linguistic properties (*N, V, Agr, sonorant, syllable* etc.) into a mind-wide context, as examples of what is actually *characteristic of cognition as a whole*.

the syntactic representations it handles. In fact, the notion of a module-specific code which is part of our biological endowment can be applied across the board. In this way any *visual* representation must conform to visual UG, or in present terms, the *visual code*, and this will reflect innate, universal human principles governing human visual cognition. Note also that visual processing and syntactic processing in the brain, as indeed any other kind of neural processing, are distinguished by unique neural patterns as well. In other words, this modular idea can work in neural terms as well, although obviously in quite dissimilar ways as it involves particular brain locations, neural patterns and pathways.

Turning now to the stores which house the structures of a given module, these structures include *primitive elements*, structural properties or features from which more complex representations can be assembled and which reside in the system from the start. For example, the visual system will have its own primitives to help build complex representations of visual input over the life time, making human vision different from vision in any other species. Theoretical linguists may think of a store as a syntactic lexicon or “syntacticon” (Borer 1984; Emonds 1985, 2000). However, responding to input over the lifetime, these primitive structural elements may be combined in various lawful ways to build new complex (syntactic or other) structures in the appropriate (memory) store. The primitives are already there at birth, ready to be used when required.⁶ Hence a store will contain not only the primitives but all these more complex structures that have been created. A psycholinguist will see stores as *memories* and indeed this is what they are, one for each module. A modular approach to memory is very much in line with current thinking about memory in psychology as well as neuroscience (see for example D’Esposito and Postle 2015; Erikson et al. 2015; Oberauer et al. 2016).

3.3 Representations and Neurons

For those who are not classical connectionists, the basic idea of a representation is a familiar term and is defined in various ways according to a given researcher’s theoretical stance. The above description of structures in a store as either basic simple structural items (primitives) or combinations of those items forming more complex items should not be objectionable. Whatever the preferred ways of describing representations in a given theory are, it should be easy for most people to reconceptualise

⁶ Alternatively, primitives may be thought of as belonging to the processor and only deployed in the store when needed.

a representation as a network, either as very local networks of features expressing some basic structural category or as a combination of such micro-networks into a larger, more complex representation. The designation of the smallest items as “primitives”, that is, structural items that are provided as part of our biological inheritance, is more controversial but should certainly not be objectionable to those of generative linguistics persuasion. Furthermore, the description of structural items of greater or less complexity as being subject to processes such as storage and (co)activation will not give psycholinguists any cause for complaint, provided that they do not hold to the view that the concept of a representation is just a convenient post-hoc description for what is actually a set of interconnected nodes that have no symbolic function.

Interestingly, neuroscientists who may not regularly employ the term “representation” in describing neural phenomena may nevertheless still find the concept attractive, important and potentially very useful. Accordingly, some have felt the need to spell out what a representation might be in neural terms. Antonio Damasio, for example, uses the term “dispositional representation” which he defines as “a potential pattern of neuron activity in small ensembles of neurons” which “may be distributed over a number of different locations in the cortex” (Damasio 1994, pp. 102–105). Joaquin Fuster uses the term “cognit,” the definition of which seems to fit best with the kind of representation, that involves a set of connections between representations ranging across different systems so not just representations within a single store (Fuster 2006, 2007, 2008). Both see representations as assemblies of interconnected neurons and Fuster makes clear that it is, for him at least, the neuronal patterns that count: the same cognit may involve different neurons on a subsequent occasion and still be the same cognit. He also assumes that some cognits are innate.

In sum, it seems appropriate to note that if neuroscientists feel the need to spell out what they think a representation might be for them, then researchers working in linguistics, in this case generative linguistics, should be equally interested in exploring and even developing the intellectual interface between theoretical psychological and linguistic constructs, on the one hand, and the theoretical concepts used in brain research, on the other. For this to work effectively, one needs a platform for doing this, which researchers working in these different areas can use; in other words, an overarching conceptual framework.

3.4 Module Cooperation: Interfaces and Schemas

In the mind, we can distinguish between the (sensory) perceptual systems, on the one hand, and the modules involved in deeper level processing, on the other. The perpetual systems responsible, respectively, for visual, auditory, gustatory, olfactory and somatosensory representations⁷ (seeing, hearing, taste, smell and body sense) together form the portal for the initial cognitive processing of environmental input (the ring of modules in Fig. 1-1).

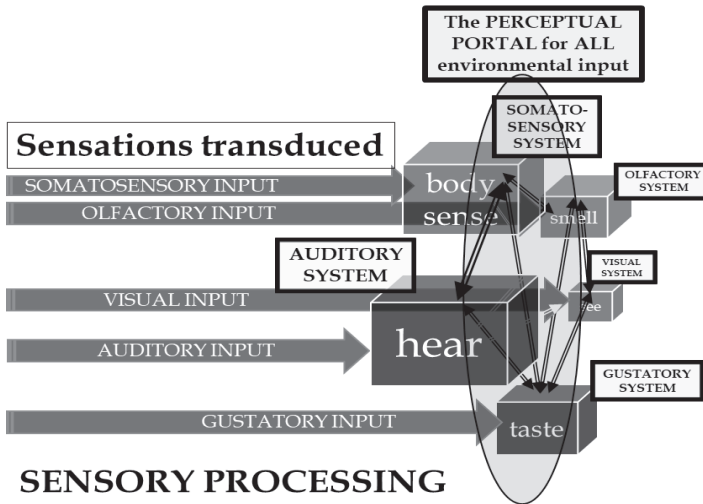


Figure 1-1. The perceptual portal featuring five stores [only stores and not their processors are displayed]

In neural terms, this is already about the different functions of the cortex rather than the initial, peripheral systems responsible for the transduction of environmental stimuli via the various sense organs. The auditory module, to take one example of a perceptual module, receives inputs originating in the ear and builds, processes, stores and activates auditory representations for any kind of sound (linguistic or otherwise). In the MCF, and therefore in MOGUL, these representations are known as “auditory structures” (AS). We can, in this way, distinguish between the

⁷ The cover term for these representations created in each of the five modules in response to sensory input is *POpS* which stands for *perceptual output structures*.

brain's auditory system which is distributed across the brain as pathways and various cortical locations, and the mind's auditory system. The latter, at this deeper level of abstraction, can be conceptualised more economically as a single system in one metaphorical location, a module in fact equipped with an auditory processor specialising in auditory structure and an auditory store where the structures are housed, and where they can be activated.

Fig. 1-1, where the five perceptual processors have been omitted for the sake of simplicity, shows the web of five richly interconnected perceptual stores. These form the first sensory stage in the processing of environmental input impacting on the senses. In other words, together they form the portal through which processing has to pass before a second, deeper level of processing is reached. Building up a representation of something that can simultaneously be seen *and* heard, for example, will require collaboration between the auditory and the visual module in the perceptual portal. Minimal processing of an experience of a bee, say, will require these two modular systems to collaborate. In present terms, this means activating an association between a particular auditory structure (AS) in the auditory store, on the one hand, and a particular visual structure (VS) in the visual store, on the other. This operation is carried out in parallel by means of the existing connection system between the two modules concerned: this is the “visual-auditory interface” represented thus: $AS \leftrightarrow VS$. Note that interfaces are shown in the figures as bidirectional double arrows connecting the stores. This particular two-way collaboration between two separate modules goes a little of the way towards explaining a particular instantaneous bee experience.

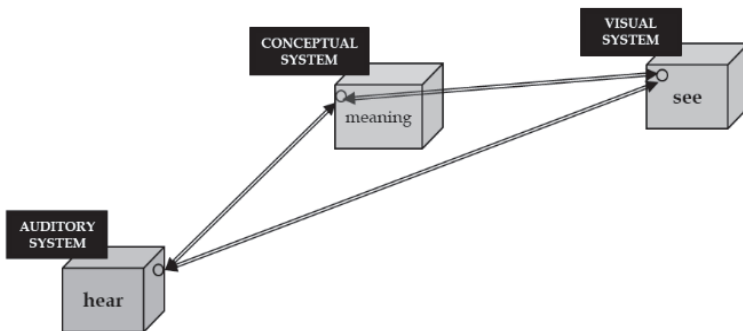


Figure 1-2 A three-node representational schema

Further collaboration between modules at the second deeper level will enrich the experience: engaging the conceptual module, for example, will provide a meaning in the form of a conceptual structure (CS). The conceptual system will have interfaces with both the visual and the auditory module ($CS \Leftrightarrow VS$ and $CS \Leftrightarrow AS$). This provides us with a very simple example of a small “representational schema” with three nodes, i.e. three representations, each from three separate stores, each encoded in a manner different from any other module (see the three small circles in Fig. 1-2). These three representations, each in a different store, can be activated in parallel, as a schema, but they cannot be merged into a single structural unit because they are mutually incompatible as they are written in different codes, respectively auditory, conceptual and visual. This collaboration without incorporation of representations reflects the key feature of this type of modularity and the parallel processing architecture of the current framework. More will be said later about the conceptual system and its role in giving the instant, complex experience of the bee its unified character.

Before going on to describing language processing, one question needs answering straightaway, namely: how do interfaces actually form associations between representations sitting in different memory stores in the first place? Exactly what mechanisms are involved? “Acquisition” in terms of the framework can be defined precisely and minimally as a time that an association between representations (structures) is first made. In other words, acquisition thus defined is instant. The moment of acquisition for any representation is also at present difficult to establish empirically, but the idea behind it should be quite acceptable. A connection between two representations can be formed within a modular system as well as between systems. In the case of an association between representations in adjoining (interfaced) modules, the representations involved are each given a specific *index* marking the fact that they are now associated. For convenience, we can imagine that this index is a number. The interface(s) involved in a given representational schema or simple chain of two assigns an index to each representation. For example, $CS_{123} \Leftrightarrow VS_{123}$ shows the assignment of a particular meaning to a particular visual representation using a (here randomly picked) number. In addition to the operation of assigning indices, an interface’s subsequent function is to co-activate structures that have identical index. Next time CS_{123} is activated, VS_{123} will be coactivated along with any other representation that has the same index.

To sum up, an interface assigns indices and coactivates co-indexed structures such that when one structure within a store is activated, for whatever reason, all the others are immediately coactivated as well. Once

a bee is sighted, all associated representations become active, thanks to the interfaces. Interfaces can be thought of as simple processors that have this function of associating and coindexing. However, when representations are first associated within a single module thus forming a more complex representation, clearly no interfaces are involved. Rather, it is the processor belonging to that module that binds them together in line with its own unique, internal set of principles. The addition, by the syntactic processor, of a syntactic gender feature like [fem] or [masc] to a pre-existing genderless assembly of features would be a case in point. This is the way all modules work, internally and externally. Representations will be associated in various ways within modules and across modules and they may in the course of a lifetime come to have many indices attached to them to reflect their multiple intermodular connections.

3.5 Memory

Memory has already been described as modular: in other words, each module has its own memory. These are the stores referred to above and examples can be found, displayed as boxes, in Figs 1-3. However, memory is not *internally* modular. It does contain representations which can be either simple or a cluster of associated representations as is expressed in the idea of “feature assemblies” (Lardiere 2008). Apart from that, a memory store has no subsystems. This means a particular stance is taken on the status of *working memory* which is not the modular view of working memory pioneered by Baddeley that has proved so popular in psycholinguistic studies (Baddeley 1986, 2012, 2017). By contrast, the MCF adopts the “state” view, namely that representations in working memory are defined as those representations in a store that are currently in an activated state (Cowan 2005). In other words, this means that whenever a processor activates a given representation, that representation is *ipso facto* “in” working memory, or, in more precise terms “in a working memory state.” For example, at this psycholinguistic level, a minimal MCF description of a “word” currently in working memory will involve the coactivation of three separate representations, each one in a different memory store, each being either simple or complex representations written in the code of their particular module but all sharing the same index, call it “456.” The word with the meaning “bee” would then be a combination of phonological, syntactic and conceptual representations expressed very roughly as $PS_{456} \Leftrightarrow SS_{456} \Leftrightarrow CS_{456}$ or thus:

$$/bi/_{456} \Leftrightarrow \text{Noun} [\text{singular}]_{456}, \Leftrightarrow BEE_{456}.$$

The interfaces ensure that when one is activated in its respective module, the other two will be immediately activated in parallel. The specification of the conceptual structure which happens to be in English (CS₄₅₆ in this example) reflects the abstract meaning of the word, not its language identity. The phonological structure in the above example (PS₄₅₆) is one associated with English but BEE could equally be associated with syntactic and phonological structures that are appropriate for representing equivalent words in other languages like Portuguese *abelha*, Polish *pszczoła* or Dutch *bij*. Also, the complete syntactic representation of SS₄₅₆ may or may not contain a gender feature and the specific gender feature might be [fem] or [masc] or another gender depending on the language and the current state of the individual's knowledge of that language.

The processing characterisation of this word as a combination of just three different types of structure (PS, SS and CS) is a simplification. In fact, more modules will have been involved than those of primary interest to phonologists and syntacticians or indeed those primarily interested in semantics and pragmatics. The original cause of the co-activation of PS and SS will have been external input into one of these two modules. In speech or written production, it will have been the activation of the conceptual structure already mentioned, namely BEE. In speech comprehension it will have been the AS (auditory structure; see Fig 1). This AS will itself have been activated in response to input generated by raw acoustic stimuli (speech sounds in the immediate environment). In all cases, initial input, wherever it came from, will have triggered the parallel coactivation of all the coindexed structures in the modules involved.

Another point is that, within any of the given modules, clusters of associated representations will have been activated, making them more complex than was shown in the above examples. For example, the simple characterisation of N[singular] may, in fact include representations of gender, case, number etc. Different languages will of course have different outcomes. In Portuguese, the same meaning (CS) should have triggered, apart from a different PS corresponding to the sound of the word *abelha*, a feminine *gender* feature [fem] in the syntax module. This gender feature will not have been triggered for the English counterpart, CS BEE, at least in the mind of a monolingual English speaker since English, unlike Portuguese, does not have grammatical gender.

3.6 Competition and Activation

Crucial to any account of language processing or indeed cognitive processing of any kind is an account of how input from an external source

is responded to, whether that input is a) still somewhere within the collaborative network itself and involves input from one module into another, or b) literally external, i.e. physical stimuli originating in the environment in the immediate vicinity. As suggested above, competition is a dominant feature of input processing. This will be very familiar to those working in the psycholinguistics of bilingualism⁸ processing, since there is almost a consensus now maintaining that bi/multilingual processing is “non-selective”; in other words, all languages are activated to some extent in a bilingual’s mind irrespective of the one currently being used. This means that input will trigger competition between structures irrespective of their linguistic origin before a best-fit is found.

Competition is also standard in the monolingual individual since there are often alternative solutions to representing a given meaning even within a language system. This is not confined to accurate representations. For example, on hearing *bee* a monolingual English speaker will have inadvertently activated rival phonological candidates more appropriate to words like *me* and *bay*, so called phonological “neighbours.” From a MCF perspective, however, the regular use of “selection” and “selective”, in themselves harmless and useful metaphors, requires a strong accompanying cautionary statement to the effect that there is actually no “selector.” In other words, the final outcome falls out as a best-fit solution and not because there is a procedure involved whereby some kind of subconscious executive chooses one solution over the other: the winner in a race has not been selected as the winner but just happens to have run the fastest.

The selection idea only really makes sense, possibly, when conscious decisions are involved. In fact, as indicated earlier, since Libet’s well-known experiment in 1993, even the status of conscious decisions has been open to question (Libet 1993). It might still seem to some people to be extremely uneconomical to have so much non-selective, competitive activity go on at a subconscious level when only a very small part of that activity is reflected in the final representation of some input. This should not, however, pose a problem if one accepts that the vast amount of subconscious activity that goes on in the mind/brain is actually very resource-friendly and could even be considered as virtually resource-free. Conscious processing, by contrast, requires intense levels of activation and is therefore not at all resource-friendly. It forces processing out of its parallel mode into a serial one. As has been recognised since William James, especially where unfamiliar tasks are concerned, it is also

⁸ This term is used to include multilinguals.

experienced as more or less effortful (James 1890; Dehaene and Changeux, 2011). Puzzling consciously over what the gender of a particular word in Portuguese might be could be quite tiring. Subconscious gender assignment just happens.

Activation lies at the centre of any processing model; it does so in neural explanations as well. Competition arises between those representations that have been activated and not those that lie dormant, that is to say at some kind of *resting level*. A framework of the present kind needs a theory of activation in which the mechanisms that cause a structure to change its state from “resting” to “activated” are described in precise terms. This should also detail the way in which activation increases and decreases in strength under given circumstances. In a framework of this kind and arguably in any approach to language development (acquisition and attrition), it should be possible to have a way of talking about representations that includes both a) the structural linguistic properties and b) their processing profile at the same time. This makes representations more than just “present” or “absent” in a person’s mind: it allows for different degrees of accessibility or robustness.

As is true for working memory and other crucial component of any cognitive processing theory, without some commitment to a view on activation, discussions about how words and constructions are processed should be viewed with an appropriate degree of skepticism. However, *with* such a commitment we at least have the basis of a proper language processing model to work with, until a better one comes around (see for example Paradis 2004, Sharwood Smith and Truscott 2014). Furthermore, along with a theory of activation, we also have in the current framework a transition theory; that is, a proper theory of acquisition as well, something arguably most non-connectionist or non-behaviourist work on language acquisition does not and has never had (Gregg 1996).

There are various ways of representing the idea of activation. In MCF, a vertical height metaphor has been used but it would be equally possible to represent degrees of activation with light, so a representation would glow intensely if it was strongly activated, weakly if it was only slightly activated or remain dim if it was at its current resting level of activation (RLA).

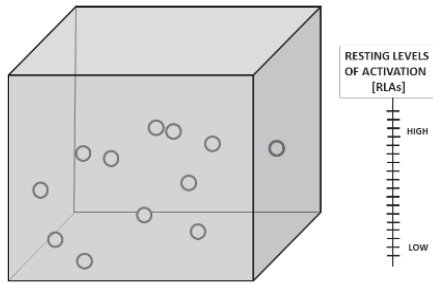


Figure 1-3 Representations in a store at different RLAs.

If we keep in mind that memory is not to be broken down into separate components like long-term and short-term and working memory and divisions beyond that, as in Baddeley’s model of working memory, vertical height nevertheless gives a better idea of how activation works; so, imagine a memory store as a tank with structures (representations) suspended at different heights (see Fig. 1-3). This would show structures at their current resting levels, the height being determined by how much they had been activated previously. The uppermost layer of the store would then be the place where representations arrive at a point in working memory where they are selected to participate in on-line processing. Selection, in this metaphorical sense of the term, will therefore depend on the outcome of representations that are currently competing for participation. Let us assume for the moment that gender features are syntactic primitives. A never-activated masculine gender feature, say, in a monolingual whose L1 has no grammatical gender would be resting at the bottom of the syntax module; whereas another monolingual whose L1 has grammatical gender, including masculine gender, would have the respective feature floating at a higher level in the store with a better chance of making it to the top of the store and outcompeting any rival candidates.⁹ Note in passing that “low” and “high” are used differently from the way Paradis frames his comparable activation threshold hypothesis, so that every time an item’s activation threshold is “lowered”, it becomes more accessible (Paradis 2004). Here, working memory accessibility is increased the more an item’s RLA is “raised.”

⁹ Alternatively, unused primitive features may only appear in a store when the processor puts them there in response to input. In this case location at the bottom level would imply “activated only once” or “scarcely activated”.

From this description of activation, two things emerge. Firstly, activation is a relative concept and admits of gradience. Secondly, resting levels of activation (RLAs) depend on previous activation history. This idea is expressed in so-called Activation by Processing Theory (APT) introduced in Truscott and Sharwood Smith (2004). Out of context, APT could describe many frequency-driven theoretical approaches to activation such as emergentism and any version of connectionism. Note, however, that in this modular parallel processing architecture, frequency only really counts with regard to a specific module's memory and perhaps also the history of its coactivation via its interfaces. RLAs have a very indirect relationship with frequency of input coming from the external environment. As modules participate in building representations, a particular memory store has to be engaged during this online mental activity for any representations in that store to have their RLAs raised. This will be illustrated in the life-cycle example below. In other words, module-internal frequency of activation is what counts and not automatically what happens in other modules and especially not what happens in the external environment. In addition, what happens in language attrition is also linked to activation history. A reduction in the frequency of activation is going to impact on a representation's RLA making it less accessible. This happens not only with a complete cessation of activation but also with continued *weak* activation, that is when, say, a gender feature is activated on a given occasion, since activation is non-selective and does not depend on which language is being used, but regularly fails to participate fully in online representation cutting off its activation time. In other words, such a feature is still activated as a matter of course along with other representations but is nevertheless regularly outcompeted by rival representations associated with another, now more dominant language, e.g. an "L2"¹⁰. This "loser" will be deactivated before it has a chance to participate in the representation of current input, thus reducing the time and intensity of its activation compared with the "winners." Selection and participation in the representation of current input gives a representation its best chance of remaining competitive. Continuing failure will, over a period of time, cause a cumulative decline in a structure's RLA.

¹⁰ L2 in the sense of any language currently known to some degree by the given individual, so also an L3, an L4, an L5 etc.

3.7 Three Levels of Description

To sum up so far, cognitive representations, including those associated with language cognition, can be studied at three distinct levels of description. Firstly, at the top, there is the “theoretical linguistic level.” Here spatio-temporal aspects can be safely ignored even where the theoretical linguistic framework used is intended as a contribution to psychology and/or biology, as is the case with the biolinguistic perspective strongly associated with those working with the Minimalist Program (see Di Sciullo and Jenkins 2016). Staying strictly within theoretical linguistics, theorising permits the free use of metaphors of space and time without any necessary suggestion that the mechanisms used actually related directly to real time and real space. You might, for example have a merge or feature-checking “stage” (a temporal metaphor) in the derivation of a particular construction. This may be a very effective and economical way of describing the architecture of, in this case, syntax.

The architecture designed at this highest level of abstraction cannot, however, be imported without further ado into a description of how the language system works at the next, lower level of description, which is the “psychological level,” or even beyond that to describe operations in the brain at the “neural level” where real space is involved as well as time. Psycholinguistically speaking, a representation has to be at least situated in time, since we need to know its psychological characteristics, particularly its current RLA or the RLAs of its component parts and perhaps its likely competitors. This we find out using various instruments including those that measure response times. We may also incorporate measures that deliver neural data; in other words, brain imaging and ERP (event related potential) measures.

This strategy somewhat fudges the distinction between the second and third, least abstract level of description, namely the neural level, the one referred to above when Damasio’s and Fuster’s notions of representation were discussed. ERP data will include not only the timing of particular responses when investigating participants’ current knowledge but also the presumed brain locations involved, something that is actually best identified using fMRI scans. This means, for a psycholinguist, that a representation should be a combination of the properties derived from theoretical accounts at the highest, most abstract level of description plus their real-time processing characteristics which are described theoretically at the second, psychological level of description: at this point you have a solid basis for empirical psycholinguistic investigation. A given Spanish noun phrase in psycholinguistic terms will therefore look different and behave differently in a Spanish L1 user and a Spanish L2 user and any

other kind of Spanish user. In all of these individuals, there may well be a gender feature associated with that NP but the gender representation that forms part of the complex representation (the NP as a whole) may well have a different RLA, making the overt behaviour of each speaker different just for that NP.

A complex representation's overall profile can only be assessed by looking at the performance characteristics of each of its component parts. N(oun), for example will have a very high RLA but various features bundled with it may include some with low RLAs because these particular features have only recently been acquired (in the minimal sense used here). At the third level of description, the neural level, this selfsame NP in a given individual will be described as a particular pattern of neurons, whose spatial characteristics with regard to approximate locations in the relevant areas of the cortex and pathways cross different systems. Something that will only really be possible in the future. Here again we may hope that given characteristics of representations at the psychological level of description will be relatable to, for example, synaptic strengths and resting potentials at this neural level. The neural plausibility of psychological architecture cannot be taken for granted, and vice-versa, so interdisciplinary cooperation is needed to maintain plausible relationships between these two levels.

3.8 Modules and the language faculty

Turning now to the overall MCF architecture, the set of modules in the current version of the framework contain what is represented in Figure 4. except for two modules not yet added. Here, in Fig 4., we see the outer circle of perceptual structures to which three more modules have been added (displayed as grey boxes, again without the accompanying processors). These three are involved in a second “deeper” level of cognitive processing. Each is connected with all the others via interfaces. Although in Fig. 4. there is no real relationship between size and importance, the central module, the conceptual system, is in fact one that is strikingly different in the human species being enormously elaborated and complex, even begging the interesting question as to what extent it has parallels in other species. If it does, then the human conceptual system still stands out by virtue of its immense complexity as one obvious way of differentiating us from our evolutionary cousins (see extended discussions in Truscott and Sharwood Smith, in prep).

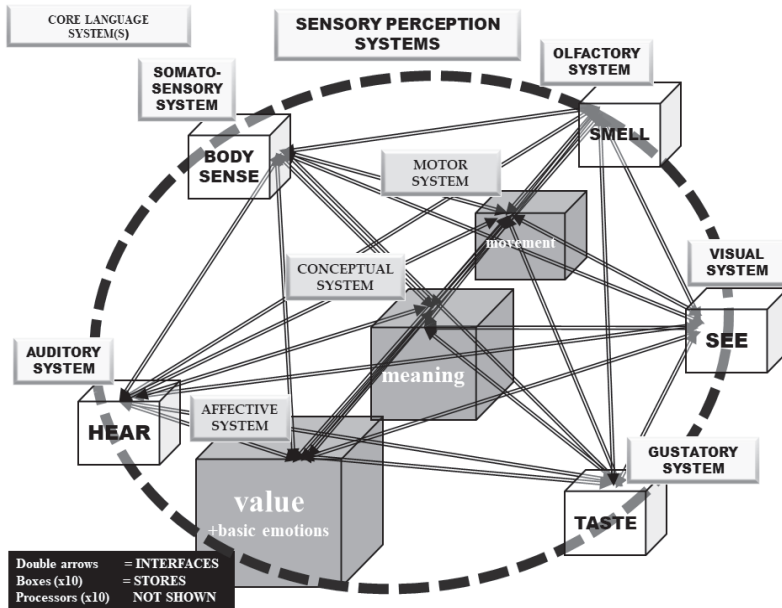


Fig. 1-4. All collaborating modules except two (to be added later)

If emergentists and cognitive linguists were to have their way, Fig. 1-4. might already for them represent an acceptable model of the human mind. Let us pursue this possibility for a moment. As has been shown above, it is definitely possible to form sound-meaning connections between the auditory representation (AS) of a spoken word like *bee* and a meaning representation (CS). To a limited extent, this kind of connection would work in animal cognition, for some animals at least, as long as the existence of a simpler conceptual system for them makes sense (Truscott and Sharwood Smith 2014, p. 352; Sharwood Smith 2017b pp. 52–55, 155). Given the complexity of the human conceptual system, would it not be possible to assemble not only a vast lexicon in this way but also relate the resulting set of words and their component parts to a grammar without recourse to innate linguistic properties? If so, we could dispense with the notion of an innate language faculty.

In terms of the framework, the answer to this challenging question is both *yes* and *no*. The conceptual store is a repository of representations that together constitute the core of our understanding of the world we live in and so contains the basis for our encyclopaedic knowledge and episodic

knowledge reflecting our person experience. This includes the explicit, declarative grammatical knowledge that we can reflect upon and analyse consciously, in other words, metalinguistic knowledge about grammar, what might therefore be termed our “conceptual grammatical knowledge” (Sharwood Smith 2017b, 126–129, 188–190). As a place where meaning is stored and processed, it also includes anything falling under the rubric of lexical, semantic, pragmatic and discourse knowledge, all potentially amenable to conscious introspection. Much if not all of language cognition is already accounted for, it seems. This explains the *yes*. The *no* has to do with the two missing modules which together constitute the core language system that lies at the centre of human linguistic ability, namely (in line with a version of Jackendoff’s parallel architecture: Jackendoff 2002). These are, respectively, the phonological and (morpho) syntactic modules. Irrespective of difference in the generative linguistic world about the precise nature of the narrow language faculty, shared arguments about learnability and the basic rationale for a human-specific language faculty are the basis of this framework’s characterisation of language in its broadest, most inclusive sense. More will be said about the framework’s bimodular core language system shortly.

The other two non-sensory perception modules in Fig. 1-4. are the affective and motor systems. The affective system is very much work in progress; at least as it is currently presented in discussions of the MCF, it relates to the way representations of different kinds generally may be “valued”, that is, in positive and negative terms and with various degrees of strength. This gives it a powerful position influencing processing and storage of all kinds. The assignment of a given value is determined by interface connections between the affective store and the relevant representations in the stores of other modules to which the affective system is connected. The ways in which the representations’ RLA can be given an extra boost or otherwise inhibited under varying circumstances can be attributed to the influence of affect. This idea has been recently applied to the explanation of code-switching (Truscott and Sharwood Smith 2017; see also Sharwood Smith 2017c).

Following APT, a very recently acquired structure such as [masc] newly co-activated with [N]oun for the Spanish word *problema* ‘problem’, should sit at the metaphorical floor level of the memory store, i.e. with a very low RLA, making it minimally accessible. At this early stage, the learner may well have [fem] associated with this word by analogy with many other words in Spanish ending in *-a*. [Fem] will have a higher RLSA than [masc] and so for a time may compete successfully leading the learner to persist in producing, for example, non-native determiner-Noun

agreement (**la problema*). For a time [masc] will be activated only very weakly, awaiting the time when frequent exposure to input such as *el problema* will have gradually raised the RLA of [fem] to a point where it too can regularly participate in the speaker's spontaneous speech and outcompete [fem]. At the same time, the learner may have become metalinguistically aware of the incorrectness of *la problema*, which means that his or her conceptual grammar will reflect the native norms while at the same time spontaneous production driven by the syntax module will still be reflecting the dominant [fem].

The third, movement module in Fig. 1-4, i.e. the motor system, is responsible for the cognitive control of the body's motor responses. It is as if it were the software part of motor control and its interfaces with other cognitive systems ensure that, for example, meanings (conceptual representations) can be realised as movements of the speech organs and the production of appropriate sound wave patterns. A complete schema corresponding even to the production in speech of the word *bee* will be a much more complex network than the one suggested by Fig. 1-1 and would certainly include motor structures and auditory structures as well, since speakers will always, subconsciously or otherwise, be monitoring their production of the word by activating the related auditory representations that match the acoustic processing of the selfsame word. In other words, when we talk in psycholinguistic terms about the representation of the word *bee*, we are actually talking about a complex set of interrelated representations involving interfaces and modules across the system as a whole. Two of the implicated modules will be the ones that make up the core linguistic system mentioned above and which were left out of Fig 4. These are the phonological system specialising in the processing of speech structures and the syntactic system which deals with (morpho)syntactic structures. There is one interface that links these two systems: the phonological module associates speech representations (PS) with syntactic ones (SS). Reaching outside the core linguistic modules to mental systems that are not specifically linguistic, the SS \leftrightarrow CS interface associates syntactic structures (SS) with conceptual ones (CS). Similarly, the AS \leftrightarrow PS interface will associate generic sound (auditory) structures with phonological ones.¹¹ This means that both the auditory and the

¹¹ What are traditionally phonetic structures are in fact AS which have proved compatible with the phonological system, so they are *speech-related* or *language-related* representations rather than speech representations themselves. The same indirect relationship with language applies to CS. In other words, semantic structures and pragmatic structures are *language-related* representations that are written in the same code and processed in the same way as any meaning structure

conceptual systems being non-language-specific, also store and process structures that are not language-related.

Fig 1-5 accordingly shows gives the completed model of the mind with the core linguistic systems added in. The thicker interface arrows represent the direct connections within and beyond the two core language systems. A direct link between phonology and vision is included in line with sign language theorising that suggests just such a connection and even uses the term sign language “phonology” despite the fact that no sound is involved (Sandler 2012).

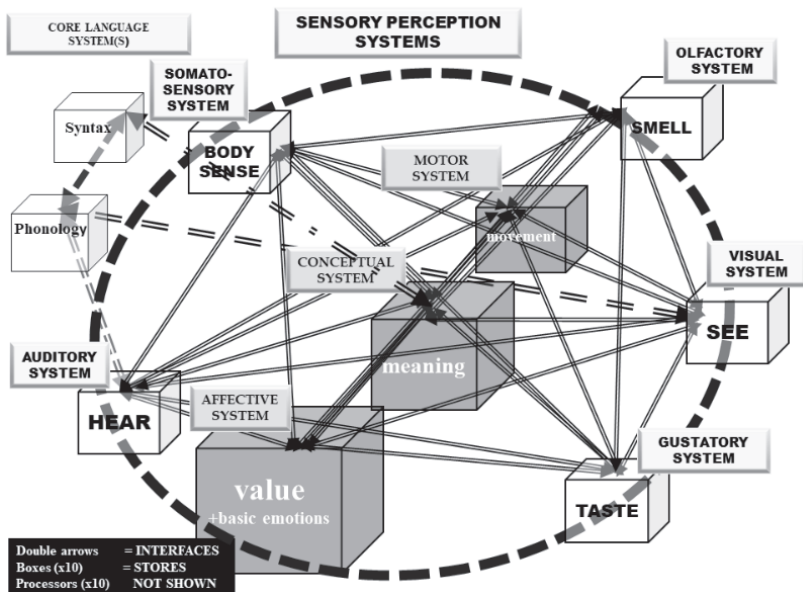


Figure 1-5. The MCF/MOGUL model of the mind

3.9 Activation and Consciousness

No mind-wide framework should exclude some account of consciousness reflecting current thinking on this thorny issue. Despite continuing, inevitable controversy, a picture is building in neuroscience that conscious awareness is generated by means of high levels of activation in different

that happens to be associated with other types of representation and not currently expressible in language.

brain locations in synchrony with one another (see, for example, Crick and Koch 2007; Baars 2007; Dehaene 2014). Also common is the idea that consciousness is intimately linked with perception.

Consciousness plays a very important role in understanding language. For instance, experimental techniques used to access language knowledge and ability typically involve participants' conscious participation: at the very least, they are conscious of what they are expected to do before and as they perform tasks and they will have conscious thoughts concerning what they know or suspect the experiment is about. But related questions touch on more general issues such as the nature of metalinguistic knowledge and metalinguistic processing and what terms like "explicit" and "declarative" mean in terms of this framework. What, for example, is the status of my understanding of how gender works in Spanish and the difference between grammatical and biological gender? Briefly, the MCF take on this is as follows. Conscious awareness is generated in the perceptual systems (the outer circle of systems in Figs. 1-4 and 1-5). To create a unified experience, the representations in the working memory of these systems have to be very highly activated and synchronised. This gives us and at least our fellow mammals basic awareness that is the global sense of our surroundings at any given moment. When some aspect of this global awareness gets focused on, processing of this particular area in focus is intensified. This is normally referred to as "attention". Humans and many other species need this ability for survival, for example to deal with potential threats.

Attention has proved notoriously difficult to distinguish from awareness (see for example Boxtel et al. 2010). The framework approach at least permits a basic definition of attention as having to do with different degrees of (sensory) perceptual awareness, in humans and other species as well. However, this does not explain the explicit knowledge of, and focused reflection on, the Spanish gender system. For this, as mentioned earlier, we need the complex human conceptual system. The framework account goes as follows. We have developed the ability to project the content of conceptual representations into global perceptual awareness. Provided I have conceptual representations of the Spanish system that are sufficiently well established (with high RLAs), I can project the meaning content into the perceptual systems. There, I can perform what (it might seem) only humans can perform; namely, the thought operations we know as introspection, conscious analysis, planning

and imagining.¹² I can think about different theoretical approaches to the acquisition or attrition of Spanish gender and I can even dream about Spanish gender. The downside is only that this requires such high levels of activation that it can become effortful and the speed with which I can operate in this mode is hampered by the probably related fact that thinking has to be *serial*: in other words, it cannot benefit from the speed and efficiency associated with parallel processing.

These perceptually-based accounts of the conscious awareness of language structure would certainly be compatible with various views expressed in cognitive neuroscience. What we cannot project into conscious awareness, or even be minimally aware of, is the structure and processing activity of the conceptual representations themselves. This limitation goes for any module and any interface in the system as a whole. Moreover, in line with the notion that phonological and syntactic structures are also completely inaccessible to awareness in any sense, grammatical knowledge representations and grammatical processing in the core language system are quite different from the representations involved in, for example, our explicit, declarative knowledge of Spanish gender. This is projected from knowledge residing in the conceptual system. This allows for the possibility that one can be very knowledgeable about gender in Spanish in the explicit, metalinguistic sense but have little or no ability to use grammatical gender when spontaneously producing or comprehending Spanish utterances. Perhaps reading Latin and Ancient Greek offer better examples of this difference, since it is likely to be more pronounced especially in those less expert in classical languages (Sharwood Smith 1996).

4. A Developmental Perspective

4.1 A Theory of Acquisition and Attrition

Turning now to how the framework might be used as a tool for understanding cognitive development, a mind-wide perspective should clearly involve dealing with both language acquisition and language attrition phenomena. Acquisition has already been given a precise

¹² It is appropriate to mention here the Cambridge *Declaration on Consciousness* signed by a group of neuroscientists that casts doubt on the exclusivity of humans in this domain. The declaration includes the sentence “Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness” (see the *Francis Crick Memorial Conference* website at <http://fcmconference.org>).

definition in the framework both for language as well as cognition in general.

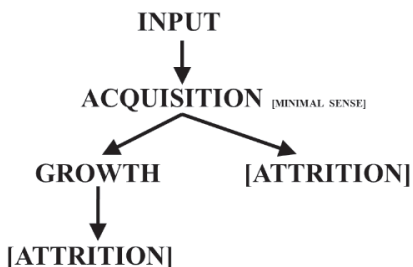


Fig. 1-6. Stages of acquisition and attrition

There have been various definitions of acquisition in the research literature. In the nineteen seventies, the creative construction school adopted the criterion used in contemporary L1 (child language) acquisition studies; namely, one based on frequency of occurrence in spontaneous production and using adult norms as the target. The usual criterion was 80% or 90% supplience of the target (native) form, or at least something sufficiently recognisable as the target form, in obligatory contexts (Brown 1973; Dulay et al. 1975). Some studies still use this frequency measure. One problem with this handy definition for experimental researchers was that it conflated what many would call acquisition in the sense of the initial reanalysis of given input signalling a change in the learner's current mental grammar with full mastery or native-like fluency. Pienemann came up with a better approach to defining acquisition as an emergence criterion that seemed to have resolved this problem (Pienemann 1998). This briefly places the moment of acquisition at the first appearance or, to be on the safe side, the first four or five appearances of the given form in spontaneous production. After this point, the rest was a matter of building up mastery so that the form was produced regularly. Pienemann's definition was also better in that it was not uniquely focused on the presumed endpoint, native-like production. In other words, it could be applied equally well to a *non-native* form, one that marked a recognised stage in a stage-by-stage developmental sequence. To a limited extent, this could have been applied in some of the creative construction studies, since they also included in their investigations a few of the stages originally noted in child language acquisition, particularly stages in the acquisition of negation and *wh*-questions (Klima and Bellugi 1966; Bellugi 1965). Pienemann's Processability theory is, however, deliberately aimed at

explaining *production* data and not the point at which the mental grammar changes. This means that the timing of acquisition is established once forms have actually appeared in the learner's overt performance and not at some currently indeterminate time when something covert occurs.

The MCF definition of acquisition, although it is not focused on native-like mastery, is at least in one sense in line with the creative construction approach. That is to say, it is not based on production but on input. It defines acquisition as happening the very first time an association is made that results in a different analysis of the input, this is defined as the point of acquisition. It may either be the first binding of representations *within* a store, as for example when a syntactic feature like [fem] becomes part of a complex N(oun) representation (Lardiere 2008). It may also be the first time an interface coactivates and coindexes representations sitting in adjoining modules as, for instance, when a given auditory structure (the sound of the word *bee*) is associated with a phonological structure /bi/ or when this PS is associated with a syntactic representation (Noun). Clearly establishing the moment of acquisition poses an empirical problem so, at the moment, it awaits advances in neuroscience to assist in pinpointing the initial formation of a new representation. This need not hinder the establishment of a theoretical definition in advance.

Defined in this precise but minimal way, acquisition can be ephemeral. No sooner is an association gained, it may be lost. This rapid type of attrition is displayed on the right in Fig. 1-6 following the topmost arrow through acquisition and then down and to the right ending up as attrition. This we could call "Attrition I" as opposed to "Attrition II" (see bottom-left in Fig. 1-6) that may occur later on in, or after, the consolidation stage. Attrition II is a slower process, even in children who can lose a language relatively quickly. Hence, acquisition in the minimal sense is to be distinguished from what might be called "acquisition as growth" (the "G" in MOGUL) but here the preferred equivalent term is "consolidation." After a representation has become firmly consolidated, it will have built up a high RLA and, unless inhibited for some reason, becomes very accessible and competitive during online processing. If, however, there is an extended period during which it is either not frequently or never selected due to lack of use or as a result of the presence of a stronger rival representation, e.g. from a newly dominant L2, then the formerly robust representation begins to undergo a longer period of attrition (Attrition II) quite unlike the rapid, ephemeral Attrition I and is the reverse of consolidation, although the form in which it takes will be influenced by many factors which are the objects of current research.

4.2 The life of [fem]

Let us now, finally, focus on syntax and imagine just one possible life cycle for a syntactic gender feature in individuals who only have one language, English, which has no grammatical gender¹³ but only biological gender. In other words, we will ignore the growth of conceptual knowledge of gender, what can be classified as FEMALE, MALE etc., and deal only with core language syntax where grammatical gender is assigned and processed. We will also make some theoretical assumptions for this illustration regarding the nature of syntactic features and gender. So, for example, in English (L1), which does not have grammatical gender any more, pronouns referring to a female person will be marked using a *conceptual gender* structure, not a syntactic structure, the CS [FEMALE]. In other words, when deciding what pronouns to select to refer to Suzanne, the speaker needs to know that she is a woman: that particular knowledge is available in the speaker's conceptual system. Hence, we can contrast syntactically-driven gender assignment and conceptually-driven gender assignment. For example, processing Portuguese *mãe* 'mother' should involve the parallel coactivation of various associated coindexed representations in parallel, including the conceptual structure CS [MOTHER] and the syntactic structure SS[fem]. Portuguese *abelha* 'bee' will similarly require [fem] alongside [BEE] to allow gender agreement to operate. In English, however, [fem] is not needed. *Mother* and *bee*, which will also trigger the conceptual representations, CS [MOTHER] and CS [BEE] respectively, requires only the parallel coactivation of CS[FEMALE] to operate pronominal selection and agreement. Languages like Portuguese and French have both gender systems whereas English only has conceptual gender (sometimes called lexical gender). In English, it is a CS that triggers the *she* and the *her* in: *Suzanne said she prefers her own chair*: gender agreement in this case is conceptually driven across the SS↔CS interface.

In languages with both systems, we have to assume that the crucial determiner of gender agreement is processed in the syntax module. Any accompanying coactivation of a conceptual representation identifying Suzanne's biological (or sociological) gender is not relevant as far as syntactic gender assignment and agreement is concerned. The conceptual gender will affect conceptual processing alone, although acquirers will learn early on that there are some reliable regular correspondences between, say, female human animate individuals and syntactic [fem]. This

¹³ The assumption here is that historical traces of the original gender system are now handled, in modern English, by the conceptual system.

should, in advance of any direct syntactic input evidence, already permit syntactic [fem] assignment for any nouns that denote an unfamiliar individual who can be independently identified with the conceptual representation [FEMALE].¹⁴ The regular parallel triggering of syntactic gender representations like [fem] and conceptual structures like [FEMALE] in languages with both gender systems may have consequences for how gender is acquired and attrited in certain bilingual scenarios, as will be mentioned below.

The following illustration offers one possible explanation for the life cycle of a syntactic gender feature exploiting the framework architecture. It is mainly intended to show the potential of the framework. For this particular account to become a hard and fast claim, it would naturally require empirical confirmation, as already pointed out. This might well include resorting to supporting neurolinguistic evidence from imaging and ERP data; research by Osterhout and his colleagues shows evidence of very early learning that could not have been detected in behavioural data and provides examples of such techniques (McLaughlin et al. 2005). The successful upshot of such interdisciplinary cooperation would produce accounts that are plausible at all three levels of description.

4.3 Input Stage

Beginning with the first stage shown in Fig. 1-6, environmental stimuli begin to regularly provide perceptual (visual and auditory) systems with highly robust evidence of grammatical (syntactic) gender. This may count as evidence for outside observers, but in the mind of the individual concerned it can only become syntactic evidence once processing has gone through the perceptual portal to a deeper level and triggered a particular response in the syntactic system: this is when the syntactic processor has (as it were) recognised the input it is receiving from auditory and/or visual input specifically as evidence for grammatical gender. Learners may

¹⁴ The conceptual system may be recruited to assign gender in other contexts; for example, where the phonological shape of the human animate noun is strongly correlated with another, inappropriate gender. Rodina & Westergaard discuss the case of Russian where, for example, nouns like *papa* ‘father’ have a morphology that is typically feminine. In such cases, now using the current framework, the regular SS [masculine] CS MALE association appears in Russian L1 children to win over the first type of correlation; that is, the one existing between the PS form in *papa*-nouns and SS [fem]. This suggests that, in such cases, children proceed conservatively. In doing so, they are able to master various subclasses of nouns avoiding massive overgeneralisations (Rodina and Westergaard 2012).

already be able, when processing L2 utterances, to create some sort of phonological structure from the auditory structure input (i.e. PS from AS) using easily accessible PS associated with their L1. They may also be able to associate these PS with some kind of syntactic and conceptual structure without responding appropriately to the specific phonological structures that actually reflect the presence of syntactic gender. The core language modules will always, as it were, do their best to represent their input: the grammar does not crash easily and straightforwardly as it would in a theoretical linguistic account. So, one thing that does not happen in this initial stage of our illustration is acquisition in the *syntax* module. In other words, [fem] is never triggered and gender is marked either randomly or by selecting a default marker corresponding to [masc], for example.

Alternatively, the learner may proceed item-by-item producing superficially correct pronouns on familiar feminine nouns but without using [fem]. Possibly, in such cases, the highly accessible CSs [FEMALE] and [MALE] are recruited for this purpose, treating some inanimate and non-human nouns as if they were male or female: in other words, the conceptually-driven gender system of the L1 is recruited to manage the assignment of given pronouns and adjective forms to given L2 nouns. Using this L1 procedure may have the effect of prolonging the input stage in the syntax module.

4.4 Acquisition Stage

The input stage can be interrupted by a sudden new association. This launches the acquisition stage. Now, for the first time the PS input triggers a response in the adjoining syntax module that has the effect of activating the gender feature, i.e., the syntactic structure [fem]. In dealing incrementally with the flow of input created originally by the utterances the individual is exposed to, the syntactic processor responds by matching given phonological input with syntactic structure containing [fem]. At this point, [fem] has been acquired instantaneously, according to the definition mentioned above. It is hardly likely, however, that learners will be able to immediately make full use of an L2 syntactic gender system at this point, since they will be faced with the competition of more established L1-based routines described above. From now on, unless the absence of further input brings about early attrition (Attrition I), the relevant feature assemblies (complexes) of component syntactic representations, when activated online, will include struggling new gender features with low, uncompetitive RLAs.

4.5 Growth (Consolidation) Stage

Whereas the acquisition stage is instant, this growth stage never is. As consolidation proceeds, [fem] is activated with increasing frequency and begins to accumulate higher RLAs, allowing it to show up in behavioural tests for the existence of syntactic gender. On further exposure to more and more L2 nouns, the resulting phonological input coming across the PS \leftrightarrow SS interface will be accordingly coindexed with gender features. As this gender assignment gradually approximates to native-norm, L2 speakers will accordingly become more native-like in their overt use of L2 gender, that is in their production as well as in their comprehension. Initially and maybe, as current research suggests, until quite advanced stages of overall proficiency, conceptually-driven gender agreement or item-by-item learning may continue to prove difficult to dislodge in spontaneous speech. This may be true even where the individual can show evidence of covert syntactic gender activation under experimental conditions, indicating that what has been acquired is still having difficulty with competing influences that have the effect of keeping its RLA relatively low. This problematicity surrounding gender acquisition has made it a popular topic for research (see, for example, Parafita Couto et al. 2016; Bobb et al. 2015; Rodina and Westergaard 2012; Foucart and Frenck-Mestre 2012; Sagarra and Herschensohn 2011).

4.6 Attrition Stage II

During this stage, lack of continuing exposure to the L2, the growth process in the bi/multilingual ceases and [fem] a) loses its high RLA and b) faces growing competition from relevant representations which are associated with other increasingly dominant languages with the precise results dependent upon the particular gender characteristics of those particular languages. In the worst-case scenario, the associations and hence the L1 coindexations formed during the acquisition and consolidation stages are ultimately lost. Even if this never literally happens, the relevant RLAs fall to a point where syntactic gender as instantiated in the L2 is lost to all intents and purposes. This is when there are no indications at all of its existence in observable performance, including grammaticality judgements tests. On re-exposure to the L1, it is an open question as to whether the relevant gender properties are re-acquired, i.e., as in stage 2, or whether the connections that form the L1 representations have not been completely extinguished so that their RLAs are gradually built up again to a point where they become competitive

again. In this case it would be a case of re-consolidation rather than re-acquisition.

4.7 Alternative Life Cycle Scenarios for [fem]

A lot will depend on the interaction of different language systems in the mind of the developing bilingual. How, for example, might one characterise the life cycle of [fem] in an L1 speaker of a language which already has grammatical gender acquisition and is acquiring an L2 like English where [fem] is irrelevant. And how would it be if that same L1 speaker is acquiring an L2 that also has grammatical gender but with different gender assignments? *Chaise*, a word in French meaning *chair*, for example requires [fem] but a translation equivalent in German *Stuhl* requires [masc]. One might imagine, in the first L1=>L2 scenario, that a French acquirer of English, for example, would have no problem with gender. The learner already has conceptual gender activated when nouns referring to human animate beings and some animals as well, and this system can be used to acquire pronoun–antecedent agreement. The only obvious crosslinguistic influence we might expect is that due to the already formed association between conceptual and syntactic gender due to coactivation when talking about humans might overgeneralize, such that English *chair* might trigger the use of *she* and *her* in the French L1 speaker or *he* and *him* in the German L1 speaker. Anecdotal evidence suggests this is more likely in the case of animate beings but the present writer is unaware of any experimental evidence to confirm this. For example, again anecdotally, a Polish speaker regularly refers to a fly and indeed Polish *mucha* using *she* and *her*, suggesting influence from the association between [fem] and [FEMALE] in the L1 although she never refers to a chair (which is feminine in Polish) using *her*. One would imagine that crosslinguistic influence is unlikely to be a serious impediment for the grammatical gender L1 learner, given the abundant evidence of a non-alternating morphology in the L2 adjective and determiner systems (*the black chair*, *the black fly*, *the black lamp*, etc.) and the regular use of the pronoun *it* to refer to the vast majority of non-animate nouns.

In the second L1=>L2 scenario, a French learner acquiring L2 German activates syntactic gender but may initially coactivate [fem] with CS [CHAIR] and produce feminine determiners as in **die Stuhl* ‘the chair’ instead of masculine *der Stuhl*. Generally, the empirical evidence seems to point to both these alternative scenarios posing considerably less of a challenge to the learner than the one used in our main example where, on

encountering the L2, [fem] has to be activated for the first time (see, for example, Parafita Couto et al. 2016; Bobb et al. 2015; Sagarra and Herschensohn 2010).

5. Conclusion

To sum up, this chapter has focused the notion of a mental representation seen in different ways. The discussion has been conducted in a manner compatible with a generative linguistic perspective. However, representations were reinterpreted to suit two other different theoretical levels of description. These were argued to be crucial for any research in areas like language acquisition and attrition that deal with events and states in real time. A modular cognitive architecture was adopted for this purpose, one broadly based on current cognitive science and another aim of this chapter was to demonstrate its usefulness. The MCF provides the necessary explanatory framework for studying the growth, online processing and attrition of representations. It is an ongoing research program, open to anybody who wishes to make use of it, and still under development. By considering representations from a psychological and neurological point of view, as well viewing them *in abstracto* as purely theoretical linguistic entities, various advantages stand out. In particular, a clear line is drawn between these three levels of description avoiding potential confusion caused by importing descriptions unchanged from one to another. This still allows for synergies: it facilitates the exploitation, where useful, of insights from all three of them. The example of grammatical gender was chosen to illustrate how representations derived from theoretical linguistics can be treated as entities that are, figuratively speaking, born, develop and die, hence the metaphor of a life cycle. For the purposes of illustration, one simple and straightforward scenario was focused on in particular; namely, the situation where a learner with an L1 having only conceptual (lexical) gender is exposed to a language which has syntactic gender as well.

In conclusion, a leitmotiv throughout the chapter was the need for, and advantages of an overarching framework, such as the one used here, which provided four new benefits, especially for those of a generative persuasion:

1. An integrated account of representation and processing while keeping the two distinct.
2. A developmental theory (APT).

3. A set of clearly defined mechanisms for both a) module-internal operations and b) module-external, interface operations across the whole system.
4. A cross-disciplinary embedding for local theories and hypotheses and the empirical findings that have flowed from them.

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PART II:

**THE ACQUISITION OF SUBJECT
AND OBJECT PRONOUNS**

CHAPTER TWO

L1 EFFECTS IN THE INTERPRETATION OF SUBJECT PRONOUNS IN L2 PORTUGUESE¹

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1. Introduction

Our study aims at investigating whether the L1 affects the preferential interpretation of Portuguese L2 speakers for null and overt subject pronouns. Participants, in a picture selection task, had to choose the image that they considered more adequate for a sentence. The pictures matched either a subject antecedent or an object antecedent interpretation. The experimental items contained a pronoun in an embedded adverbial sentence with two available antecedents in the main clause (subject or object). Two groups of L2 speakers with different proficiency levels were considered: L1 Italian and L1 German. Besides the type of pronoun, we manipulated the position of the antecedent (anaphoric vs. cataphoric).

In a consistent null subject language, as is the case of European Portuguese, null subjects usually recover a subject antecedent, whereas overt pronominal subjects usually recover a non-subject antecedent (Montalbetti 1984; Carminati 2002; Costa, Faria and Matos 1998; Luegi 2012). The division of labor between null and overt pronouns has been reported to develop late both in L1 acquisition (e.g. Serratrice 2007, for Italian; Papadopoulou et al. 2015, for Greek; Lobo and Silva 2016, for European Portuguese) and in L2 language acquisition (Sorace and Filiaci 2006; Serratrice, Sorace and Paoli 2004; Sorace, Serratrice, Filiaci and Baldo 2009). The interpretation of null subjects tends to stabilize earlier

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than the one for overt pronouns, and anaphoric contexts seem to be acquired earlier than cataphoric ones.

Following previous studies, we aimed at investigating whether the properties of the L1 of the participants (null subject language vs. non-null subject language) would impact their performance, and specifically whether Italian speakers, whose L1 is also a null subject language, would perform better than German speakers, whose L1 does not allow null subjects. Furthermore, we considered whether there was a developmental effect from the elementary to the advanced levels, and whether there were differences between anaphoric and cataphoric contexts, and between null and overt subject pronouns.

2. Background

Consistent null subject languages, as European Portuguese, Italian and Spanish, manifest interpretative differences between null subjects and overt pronominal subjects in different contexts, including embedded complement clauses and adverbial adjunct clauses with the indicative mood. Although native speakers do not have categorical judgments, a null subject usually recovers a more prominent antecedent (typically a subject), and an overt pronoun usually recovers a non-subject antecedent:

- (1) a. O avô_i disse ao pai_i que **pro**_{i/??j} estava atrasado.
the grandfather told to.the father that was late
- b. O avô_i disse ao pai_j que **ele**_{??i/j} estava atrasado.
the grandfather told to.the father that he was late
“The grandfather told the father that he was late.”
- (2) a. O carteiro_i telefonou ao bombeiro_j quando **pro**_{i/??j} adoeceu.
the postman phoned to.the fireman when got.sick
- b. O carteiro_i telefonou ao bombeiro_j quando **ele**_{??i/j} adoeceu.
the postman phoned to.the fireman when he got.sick
“The postman called the fireman when he got sick.”

These interpretative effects are described in Chomsky (1981) and Montalbetti (1984) and were explained with an Economy Principle—the Avoid Pronoun Principle—that favors a null, more deficient form, over an overt one, unless the speaker wishes to signal a topic shift. The neutral interpretation can, however, be cancelled in cases where the pragmatic context or morphological agreement markers favor another reading, as in (3):

- (3) O médico disse à Ana que **pro** estava demasiado magra.
 the doctor told Ann that was too thin.FEM
 “The doctor told Ann that she was too thin.”

Coreferential readings between the embedded null subject and the object antecedent are thus possible, although they are not the unmarked option. Conversely, coreference between an embedded overt subject pronoun and an object antecedent may be disfavored with inanimate entities (Costa, Faria and Matos 1998; Barbosa, Duarte and Kato 2005; Morgado, in preparation).

Studies on the interpretation of subject pronouns in different languages have shown that the interpretation of null subjects is usually more stable than the interpretation of overt pronouns, with less variation both among speakers of a language, and among different null subject languages (Filiaci, Sorace and Carreiras 2013): overt pronouns in Spanish recover a subject antecedent more easily than in Italian, although the interpretation of null subjects is the same in both languages.

Although the explanation for the interpretative differences between null and overt pronominal subjects is far from clear, they are certainly related to the grammatical properties of these forms (deficient weak pronoun vs. strong pronoun), which cause different processing costs (Carminati 2002; Luegi 2012; among others).

Furthermore, other factors may impact the interpretation of the pronoun, namely the position of the antecedent: backward vs. forward anaphora. Sorace and Filiaci (2006) and Serratrice (2007) show that in cataphoric contexts (where the pronoun precedes its antecedent) there is a higher selection of the subject antecedent, independently of the grammatical properties of the subject pronoun, possibly due to processing costs.

In non-null subject languages, as English or French, null subjects are not available. Therefore, an overt subject pronoun may retrieve either a subject or a non-subject antecedent:

- (4) John_i told Peter_j that he_{i/j} was late.
 (5) John_i talked to Peter_j when he_{i/j} came home.
 (6) Jean_i a dit à Pierre_j qu’il_{i/j} était en retard.
 (7) Jean_i a parlé à Pierre_j quand il_{i/j} est arrivé.

There are, however, non-null subject languages where demonstrative pronouns may be used contrastively to personal pronouns to establish interpretative differences and avoid ambiguity. In German, as shown by Bosch, Rozario and Zhao (2003), the personal pronoun *er* recovers subject or topic antecedents more easily than the demonstrative pronoun *der*, which preferentially retrieves a non-topic antecedent:

- (8) Paul wollte mit Peter laufen gehen.
 Paul wanted with Peter run go
 aber {er/der} war erkältet.
 but he/this was sick
 “Paul wanted to go running with Peter but he was sick.”

There is, then, some complementarity between German pronominal forms, but different from the one we find in null subject languages.

Several studies in second language acquisition have focused on the interpretation of subject pronouns in null subject languages and considered whether L2 speakers distinguish null subjects from overt pronominal subjects, and whether the L1 of the speakers has an influence on their judgments.

According to the Interface Hypothesis (Sorace and Filiaci 2006; Tsimpli and Sorace 2006; among others), this is an area that is expected to develop late, since it involves the interface between a grammar-internal module (syntactic component) and an external system (discourse constraints).

Although the results for different languages and different populations (bilinguals, heritage speakers, L2 speakers) are not always coincident, globally it has been found that the interpretation of overt pronouns is harder than the one of null pronouns (Sorace and Filiaci 2006; Margaza and Bel 2006; Serratrice, Sorace and Paoli 2004; Sorace, Serratrice, Filiaci and Baldo 2009; Madeira, Xavier and Crispim 2010, 2012; Kaltsa, Tsimpli and Rothman 2015; Pirkmayr 2015).

As for the role of the L1 on the interpretation of subject pronouns in a non-native language, researchers do not always agree. Margaza and Bel (2006, 2008), among others, have found that L2 speakers whose mother language is also a null subject language also have trouble with the conditions that rule the use of overt and null pronouns. In fact, this is an area that develops late also in L1 acquisition (Serratrice 2007; Papadopoulou et al. 2015; Silva 2012, 2015; Lobo and Silva 2016). There are, however, some studies that report differences between L2 speakers with a different L1, and that the properties of the L1 may have a

crosslinguistic effect in the acquisition of the L2. Madeira, Xavier and Crispim (2012), for instance, have shown that Portuguese L2 speakers whose L1 is Italian perform better (closer to the control group) than the ones whose L1 is Chinese.

Therefore, the impact of the L1 in L2 acquisition, and especially their degree of proximity, is still a matter of debate. In general, it is assumed that properties at the syntax-discourse interface are more vulnerable and more susceptible to crosslinguistic influence than are core grammatical properties.

Taking into account the distribution of null and overt subject pronouns in Portuguese and the hypotheses on L2 development, we investigated how two different groups of Portuguese L2 learners (L1 Italian and L1 German) interpreted null and overt subject pronouns. Since Italian is a null subject language, with similar distributional patterns of null and overt subject pronouns, and German is a non-null subject language, if the L1 has an effect on L2 acquisition, we would expect a better performance by Italian speakers.

3. The Study

We investigated which interpretation L2 Portuguese speakers prefer for null and overt subjects of adverbial clauses in anaphoric and cataphoric contexts with two potential antecedents in the main clause (subject or object). We considered the following questions:

- i) Are there differences between null and overt subject pronouns?
- ii) Does the L1 of the participants (null subject language vs. non-null subject language) have an influence on their performance?
- iii) Is there development from the elementary to the advanced level?
- iv) Are there differences between anaphoric and cataphoric contexts?

3.1. Methodology

We considered two variables: participants' L1 (German L1 – non-null subject language—and Italian L1—null subject language) and proficiency level in Portuguese (elementary, intermediate and advanced). The results were compared with those of a control group of Portuguese L1 adults (tested in Lobo and Silva, 2016). Participants were between 18 and 68 years old. The number of participants in each group is indicated in Table 2-1.

Table 2-1. Participants

| Level | L1 German | L1 Italian | L1 Portuguese |
|--------------|-----------|------------|---------------|
| Elementary | 30 | 35 | — |
| Intermediate | 18 | 16 | — |
| Advanced | 16 | 32 | — |
| Total | 64 | 83 | 35 |

We applied a picture selection task, where participants had to choose the image that better matched the sentence they heard. The test sentences included an adverbial temporal clause with a subject pronoun. The main clause contained transitive verbs and two potential antecedents for the pronoun: the subject or the object. Two linguistic variables were manipulated: a) type of subject pronoun: null vs. overt; and b) position of the pronoun: anaphoric (right-adjoined adverbial clause) vs. cataphoric (left-adjoined adverbial clause). The task included 4 conditions, each with 6 items:

1) Null anaphoric subject:

- (9) A mãe cumprimentou a avó quando Ø entrou na cozinha.
 the mother greeted the grandmother when entered in.the kitchen
 “The mother greeted the grandmother when she entered the kitchen.”

2) Null cataphoric subject:

- (10) Quando Ø subiu à árvore, a menina chamou a mãe.
 when climbed to.the tree the girl called the mother
 “When she climbed the tree, the girl called her mother.”

3) Overt anaphoric subject pronoun:

- (11) A menina viu a bruxa quando ela começou a correr.
 the girl saw the witch when she started to run
 “The girl saw the witch when she started running.”

4) Overt cataphoric subject pronoun:

- (12) Quando ele subiu à árvore, o polícia viu o ladrão.
 when he climbed to.the tree the policeman saw the thief
 “When he climbed the tree the policeman saw the thief.”

For each item, there were two pictures that could match either an interpretation where the pronoun recovered the subject antecedent or the object antecedent (see Figure 2-1). We analyzed the rate of selection of subject or object antecedents in each condition for each group of participants.

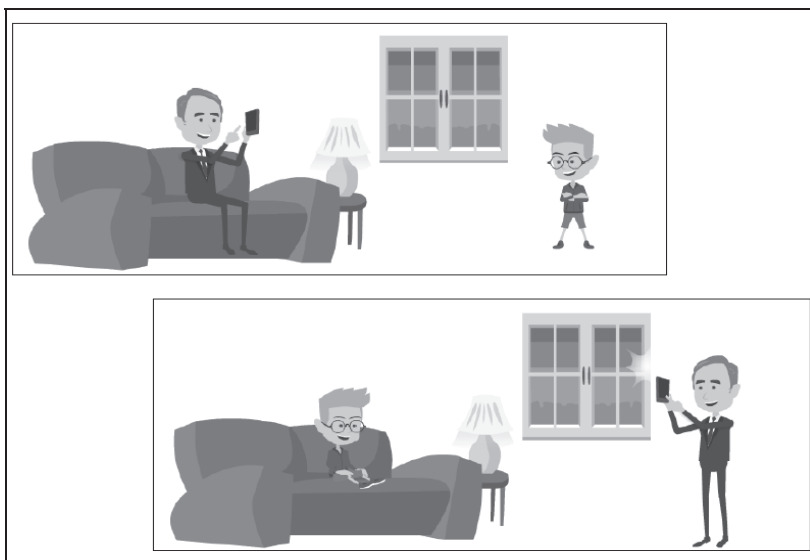


Figure 2-1. Example of images used in the test
(*The father photographed the boy when he sat on the sofa*)

3.2. Results

The results were coded by checking the participant's selection of the antecedent (subject or object). In Figure 2-2, we present the selection rates for the subject antecedent organized by group of participants and by test condition. We complement this information in Table 2-2, which shows the results obtained for the selection of both the subject antecedent and the object antecedent for each group of participants in each of the conditions.²

² The statistical comparisons were made through Pearson's chi square tests, with Yates' continuity correction. In this study, a difference is considered significant when $p < 0.05$.

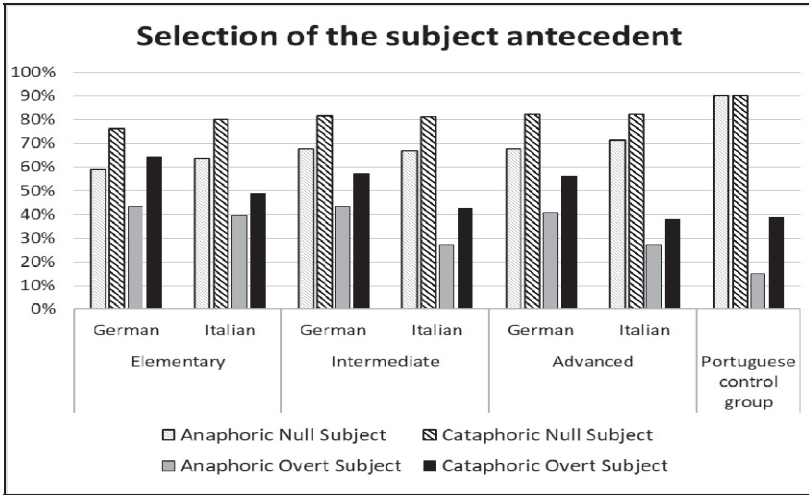


Figure 2-2. Percentage of selection of the subject antecedent by group and by condition

Table 2-2. Results for the selection of subject and object antecedents by group and by condition

| L1 | Level | Anaphoric null subject | | Cataphoric null subject | | Anaphoric overt subject | | Cataphoric overt subject | |
|------------|-------|------------------------|------------|-------------------------|------------|-------------------------|------------|--------------------------|------------|
| | | SUBJ | OBJ | SUBJ | OBJ | SUBJ | OBJ | SUBJ | OBJ |
| German | Elem. | 106/180 | 74/180 | 137/180 | 43/180 | 78/180 | 102/180 | 116/180 | 64/180 |
| | | 59% | 41% | 76% | 24% | 43% | 57% | 64% | 36% |
| | Int. | 73/108 | 35/108 | 80/108 | 20/108 | 47/108 | 61/108 | 62/108 | 46/108 |
| | | 68% | 32% | 81% | 19% | 44% | 56% | 57% | 43% |
| | Adv. | 65/96 | 31/96 | 79/96 | 17/96 | 39/96 | 57/96 | 54/96 | 42/96 |
| | | 68% | 32% | 82% | 18% | 41% | 59% | 56% | 44% |
| Italian | Elem. | 133/210 | 77/210 | 168/210 | 42/210 | 83/210 | 127/210 | 103/210 | 107/210 |
| | | 63% | 37% | 80% | 20% | 40% | 60% | 49% | 51% |
| | Int. | 64/96 | 32/96 | 78/96 | 18/96 | 26/96 | 70/96 | 41/96 | 55/96 |
| | | 71% | 29% | 82% | 18% | 27% | 73% | 38% | 62% |
| | Adv. | 137/192 | 55/192 | 158/192 | 34/192 | 52/192 | 140/192 | 73/192 | 119/192 |
| | | 71% | 29% | 82% | 18% | 27% | 73% | 38% | 62% |
| Portuguese | — | 188/210 | 22/210 | 190/210 | 20/210 | 32/210 | 178/210 | 82/210 | 128/210 |
| | | 90% | 10% | 90% | 10% | 15% | 85% | 39% | 61% |

In the description of the results, we return to the research questions.

i) Are there differences between null and overt subject pronouns?

There is a clear division of labour between null and overt pronouns: null pronouns prefer subject antecedents and overt pronouns prefer object antecedents. This difference is significant in both the Portuguese control group and in all the learner groups, although it is more marked in the former than in the latter ($p < 0.001$ for all comparisons). The preference is stronger with null pronouns.

ii) Does the L1 of the participants (null subject language vs. non-null subject language) have an influence on their performance?

There are differences between the L1 Italian and the L1 German groups with respect to overt pronouns: the L1 German group selects a subject antecedent for the overt pronoun more often than the L1 Italian group. These differences are found at all proficiency levels (elementary ($\chi^2 = 6.78$, $p = 0.009$), intermediate ($\chi^2 = 9.42$, $p = 0.002$) and advanced ($\chi^2 = 13.06$, $p < 0.001$)).

iii) Is there development from the elementary to the advanced level?

There are significant differences among the L1 Italian groups in the overt pronoun conditions:

- a) in anaphoric contexts, between elementary and intermediate ($\chi^2 = 3.92$, $p = 0.048$), and elementary and advanced ($\chi^2 = 6.41$, $p = 0.011$);
- b) in cataphoric contexts, between elementary and advanced ($\chi^2 = 4.52$, $p = 0.034$).

There are no significant differences between the L1 German groups ($p > 0.05$ in the comparison for each pair).

iv) Are there differences between anaphoric and cataphoric contexts?

In general, there are differences with both null and overt pronouns: there is a significantly stronger preference for a subject antecedent for the null pronoun in cataphoric contexts in all the learner groups, but not in the Portuguese control group ($\chi^2 = 0.03$, $p = 0.871$).

In general, there is a preference for an object antecedent for the overt subject in anaphoric contexts in all groups, but this preference is not statistically significant for the intermediate L1 German groups ($\chi^2 = 3.63$, $p = 0.057$) and the elementary L1 Italian group ($\chi^2 = 3.48$, $p = 0.062$).

If we look at the individual results, we can verify the percentage of participants, in each group, that has results superior to chance level in the

choice for the subject antecedent for null subjects and for the object antecedent for overt subjects (see Table 2-3). We considered 5 responses in 6 as above chance.

Table 2-3. Percentage of participants with results superior to chance level for null subjects (preferential interpretation = subject antecedent) or overt subjects (preferential interpretation = object antecedent) by group and by condition

| L1 | Level | Anaphoric null subject | | Cataphoric null subject | | Anaphoric overt subject | | Cataphoric overt subject | |
|------------|--------------|------------------------|-----|-------------------------|-----|-------------------------|-----|--------------------------|-----|
| | | SUBJ | OBJ | SUBJ | OBJ | SUBJ | OBJ | SUBJ | OBJ |
| German | Elementary | 27% | 0% | 63% | 3% | 10% | 20% | 27% | 3% |
| | Intermediate | 33% | 0% | 56% | 0% | 11% | 33% | 28% | 11% |
| | Advanced | 38% | 0% | 63% | 0% | 6% | 38% | 25% | 0% |
| Italian | Elementary | 31% | 0% | 63% | 0% | 3% | 31% | 11% | 14% |
| | Intermediate | 31% | 0% | 56% | 0% | 0% | 56% | 11% | 19% |
| | Advanced | 47% | 0% | 72% | 0% | 6% | 59% | 6% | 28% |
| Portuguese | — | 89% | 0% | 86% | 0% | 0% | 71% | 11% | 29% |

In general, the learner groups have more results at chance level than the Portuguese control group. The results of the learner groups are closer to those of the control group in the cataphoric null pronoun condition: over half the participants select a subject antecedent. In the anaphoric overt pronoun condition, the L1 Italian intermediate and advanced groups are closer to the control group: most participants select an object antecedent.

4. Discussion and Conclusions

The findings of our study corroborate the asymmetries found in previous research both in the performance of adult L1 speakers and in L1 and L2 acquisition between null and overt subject pronouns, on the one hand, and between anaphoric and cataphoric contexts, on the other.

Hence, we observed that the distinction between null and overt subjects is established early, with learners preferring a subject antecedent for the null pronoun and an object antecedent for the overt pronoun (with the exception of the German group, but only in cataphoric contexts). This preference, however, is stronger with null than with overt pronouns. While the performance of the two L1 groups with respect to null subjects stabilizes early, the intermediate and advanced Italian group (in contrast to the German group), nevertheless, becomes gradually more target-like in

the overt pronoun conditions, showing a significant decrease in the selection of a subject antecedent.

These results confirm the findings of previous studies, which, as described in Sections 1 and 2 above, have shown that null subjects are more stable than overt subjects in native grammars and develop earlier in (monolingual and bilingual) L1 and L2 acquisition. This asymmetry between the two pronouns is generally attributed to their different grammatical and interpretative properties. In the case of overt pronouns, their interpretation is particularly dependent on semantic factors and on conditions of discursive adequacy; hence, as an interface phenomenon, the interpretation of overt pronouns involves higher processing costs. This may explain why speakers of non-null subject languages have difficulties in acquiring the interpretative properties of overt pronouns in null subject languages and in determining in which contexts they are discursively adequate.

We also concluded that learners make a distinction between anaphoric and cataphoric contexts: on the one hand, they link the pronominal subject to an object antecedent more frequently in anaphoric than in cataphoric contexts; and, on the other hand, they allow both null and overt pronouns to recover a subject antecedent more easily in cataphoric than in anaphoric contexts. This is also the tendency found with cataphoric overt pronouns in the Portuguese control group, which is similar to that found by Fedele and Kaiser (2014) for native speakers of Italian. In their study on pronoun resolution, Fedele and Kaiser show that, for these speakers, overt pronouns recover subject antecedents more easily in cataphoric than in anaphoric contexts, and propose that the contrast between the two contexts is a consequence both of the position of the pronoun in relation to its potential antecedents and of the closer proximity of the subject antecedent: the parser attempts to find an antecedent for the pronoun as quickly as possible “in order to minimize the cognitive cost of maintaining an unresolved dependency” (Fedele and Kaiser 2014:88); in the case of cataphoric pronouns, the closest antecedent is the matrix subject, leading to the cancellation of the preferred interpretation for the pronoun (of a non-subject antecedent). This processing effect may also explain the results of the learner groups in our study.

Unlike our Portuguese native speakers (and also unlike the Italian native speakers in Fedele and Kaiser’s (2014) study), the Italian native controls in Sorace and Filiaci (2006) and Belletti, Bennati and Sorace (2007) show preference for an extralinguistic referent rather than for a subject or an object antecedent for the overt pronoun. The absence, in our experimental design, of a third potential antecedent in the context

matching the pronoun in gender and number (which may be the preferred interpretation in this context) may explain the higher rates of selection of a subject antecedent in the Portuguese control group. This fact may also explain why this group has a higher rate of results at chance level in this condition.

On the other hand, the results of our learner groups (and, particularly, those of the German learners, whose L1 is a non-null subject language) are similar to what Sorace and Filiaci (2006) found for their English-speaking learners of Italian; however, the rates of selection of a subject antecedent of the L2 Italian learners in the overt pronoun conditions are higher than those found in our study, which, again, may be due to the presence of an extralinguistic referent in the experimental task, on the one hand, and to the fact that the participants in their study are near-native speakers of Italian, on the other hand.

Unlike previous L2 research, which has mainly investigated the acquisition of null and overt subjects by native speakers of non-null subject languages, (one exception, for example, is the study described in Margaza and Bel (2006, 2008) mentioned in Section 2, which found redundant uses of overt pronouns in the L2 Spanish of native speakers of Greek, a null subject language), our study compares speakers of a null subject language with those of a non-null subject language. A comparison of the performance of our two learner groups reveals a clear crosslinguistic effect, but only in the overt pronoun conditions (in fact, no significant differences were found between the two L2 groups in the null subject conditions). We found that the rates of selection of a subject antecedent for the overt pronoun are significantly higher in the German group than in the Italian group, particularly in cataphoric contexts. Furthermore, there is a clear developmental effect in the Italian group regarding choice of a subject antecedent in the overt pronoun conditions, with a significant decrease in the selection of a subject antecedent for the overt pronoun from the elementary to the advanced level, in contrast to the German group.

These findings indicate that the properties of the learners' L1 have an effect at least on their interpretation of overt pronouns in the L2: generally, the Italian learners show results which are closer to those of the Portuguese control group than the results of the German learners, which may be a consequence of the greater proximity of the grammatical systems of Italian and Portuguese; on the other hand, the German learners, whose L1 is a non-null subject language in which overt pronouns may either retrieve a subject or a non-subject antecedent, have results which deviate more widely from those of the native controls in the overt pronoun

conditions. The results of our L1 German group are comparable to those reported by Sorace and Filiaci (2006) and Belletti, Bennati and Sorace (2007) for their L1 English learners of Italian, which also differed significantly from those of the native control group in the overt pronoun condition. Taken together, these findings appear to confirm that the learning task for these learners is harder than the one faced by speakers of null subject languages, given that they have to determine what the division of labor between null and overt pronouns is, what their different interpretative preferences are and in which contexts the overt pronoun is pragmatically more adequate.

Given the evidence of crosslinguistic influence in this domain, it may be surprising to find that the German learners are able to make a clear distinction between null and overt subjects already at the elementary level. Two factors may help explain this finding. On the one hand, although German is a non-null subject language, it has a set of demonstrative pronouns which contrast with personal pronouns with respect to their interpretative preferences—as described in Section 2 above, these demonstrative pronouns preferentially recover non-subject or non-topic antecedents and therefore perform a role which, in null subject languages, is typically ascribed to overt pronouns. The division of labor found between personal and demonstrative pronouns in German may have a determining effect on the early acquisition of the distinction between null and overt subjects observed in this group.

In addition, this may be an effect of the learners' knowledge of other null subject languages. In the German group, 39 learners stated that they had previous knowledge of Spanish (17 in the elementary group, 10 in the intermediate and 12 in the advanced); 17 of these learners considered themselves to be at an advanced or near-native level. Following the view put forward by the Cumulative-Enhancement Model (Flynn, Foley and Vinnitskaya 2004)—which proposes that all previous linguistic knowledge may transfer if it has a facilitating effect on acquisition—and by the Typological Primacy Model (Rothman 2011, 2015)—which predicts that transfer may take place whenever grammatical properties from any of the previously acquired languages are (perceived to be) structurally similar to those of the language being acquired—, we assume that all the languages previously acquired by a learner are potential sources for transfer. Hence, in the case of an L3, as Portuguese appears to be for many of our German learners, either the L1 or the L2, or both, may be transferred. The German learners' knowledge of Spanish, a null subject language, may therefore help account for the distinction which they make between null and overt subjects already at the elementary level; it may also help explain their

higher rates of selection of subject antecedents in the overt pronoun conditions (when compared to the Italian learners), as, according to Filiaci, Sorace and Carreiras (2013), overt pronouns in Spanish recover subject antecedents more easily than in other null subject languages such as Italian (see Section 2 above).

Assuming that the performance of the German learners with respect to the interpretation of pronominal subjects in L2 Portuguese is influenced by properties both of their L1 and of other L2, and considering the differences observed in the results of the German and the Italian groups, we conclude that the learners' overall linguistic knowledge plays a decisive role in their acquisition of the properties investigated in this study.

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CHAPTER THREE

THE INTERPRETATION OF STRONG AND CLITIC PRONOUNS IN L2 PORTUGUESE¹

ALEXANDRA FIÉIS AND ANA MADEIRA

1. Introduction

The goals of this study are twofold: to investigate whether Chinese-speaking intermediate learners of L2 European Portuguese (EP) show difficulties in the interpretation of reflexive and non-reflexive strong and clitic pronouns; and whether there are asymmetries in the establishment of referential dependencies with the long-distance anaphor *si* in local and non-local domains. On the basis of three truth-value judgement tasks, we aim to understand whether the status of the pronoun (strong/weak and reflexive/non-reflexive) and the position of the antecedent (local/non-local) play a role in the interpretation of pronouns in the interlanguage of L1 Chinese speakers, a language which does not have clitics but allows long-distance binding.

The paper is organized as follows: in Section 2, we review some previous studies on the acquisition of referential dependencies in L1 and L2; in Section 3.1, we present the methodology (tasks, procedures and participants) and the hypotheses of the study; in Section 3.2 the main

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results of the study are described; and, finally, in Section 4, we discuss the results and present our main conclusions.

2. Acquisition of Referential Dependencies in L1 and L2

2.1 L1 Acquisition

Many studies have shown that in some languages, typically those with strong pronouns such as English, Dutch and Brazilian Portuguese (BP), children exhibit an asymmetry between reflexive and non-reflexive pronouns: they perform accurately with reflexives (1a), even in biclausal finite contexts (1b), where there are two potential antecedents for the reflexive (Chien and Wexler 1990:236); however, children have difficulties with the interpretation of non-reflexive pronouns, assigning them a bound reading as shown in (1c) (e.g. Chien and Wexler 1990; Philip and Coopmans 1996; Grolla 2006), except with quantified antecedents as in (1d), in which case children tend to reject a bound variable reading for the pronoun (Chien and Wexler 1990).

- (1) a. John_i washed himself_i.
- b. Kitty says that Sarah_i should point to herself_i.
- c. John_i washed him_i.
- d. Every bear_i washes him_j.

This asymmetry may follow from the fact that, while the licensing of reflexive pronouns (anaphors) takes place in the syntax, the licensing of (non-reflexive) pronouns involves both the syntax and discourse/pragmatics. Following Chien and Wexler's (1990) proposal, by age 6 children have knowledge of the (syntactic) binding principles, but not of the pragmatic principles which regulate the interpretation of referential indices: in the case of sentences as in (1c), they have still not acquired the pragmatic principle which excludes coreference between *John* and *him*, although they know that Principle B does not allow the two to be coindexed. Grodzinsky and Reinhart (1993), on the other hand, have argued that this is a performance, rather than a competence, deficit; due to their processing limitations, children have difficulties implementing the procedures which are necessary for the computation of coreference.

However, not all languages present this asymmetry. For example, in languages such as Italian, Spanish, French and EP, which have clitic pronouns, children show no significant difficulties with the interpretation

of both reflexive and non-reflexive clitics (e.g. McKee 1992; Padilla 1990, Hamann et al. 1997; Silva 2015):

- (2) a. O menino_i lavou-se_i
 ‘The boy washed himself.’
 b. O menino_i lavou-o_j
 ‘The boy washed him.’

The reason for this might be the fact that clitics are special pronouns, that is, they are deficient forms which are licensed in the functional domain of the clause, are always referentially dependent (they cannot be used deictically), and are subject to binding and not to coreference. In fact, in clitic languages, children show similar difficulties to those of English-, Dutch- or BP-speaking children with the comprehension of non-reflexive strong pronouns (in prepositional contexts). Silva (2015), for example, has shown that, in EP, 6-year-old children have low acceptance (40%) of coreference readings in these contexts, as shown in (3):

- (3) O menino_i apontou para ele_i
 ‘The boy pointed at him.’

It is interesting to note, however, that in the grammars of adult speakers of EP reflexive and non-reflexive strong pronouns inside a PP do not always appear in complementary distribution, as non-reflexive pronouns can be assigned a coreferential reading (in Silva’s study, the adult control group exhibited a 20% acceptance rate of this reading):

- (4) O Paulo_i só fala dele_j / dele_i (= de si_i)
 ‘Paulo_i only talks about him_j / him_i (= himself_i).’

In these cases, the interpretation of the pronoun depends on the lexical properties of the predicate, namely, on how likely it is for the predicate to favour a reflexive interpretation (see Reinhart and Reuland 1993). See the contrast between the example in (4) with the verb *falar* (*talk*), which has a high degree of inherent reflexivity, and that in (5) below, with the verb *lutar* (*fight*), which does not:

- (5) Maria_i luta contra ela_j / ??ela_i (= si_i), mas o vício é forte
 ‘Maria_i fights against her_j / ??her_i (herself_i), but the vice is strong.’
 (Menuzzi and Lobo 2016:344)

Hence, the interpretation of non-reflexive pronouns in prepositional contexts in EP is subject to both lexical and semantic/pragmatic conditions, which may help explain the delays observed in their acquisition.

2.2 L2 Acquisition

As for the L2 acquisition of anaphors and pronouns, the picture which emerges from the many studies on the development of referential dependencies appears to be that the conditions which determine the distribution and interpretation of both reflexive and non-reflexive pronouns are fully acquirable. However, acquisition appears to be delayed in the case of non-reflexives (as has been shown, for example, in Shirahata's (2007) study on the L2 acquisition of English by Japanese learners), as non-native speakers have difficulties with the integration of the syntactic and pragmatic knowledge required for the interpretation of non-reflexives, particularly in potentially ambiguous contexts as in (6) (Kim, Montrul and Yoon 2014).

- (6) Mickey_i was holding a picture of him_{?i/j}.

One context in which it has been shown that learners exhibit difficulties with the interpretation of reflexive pronouns are biclausal contexts. These difficulties appear to characterise both speakers of languages with long-distance binding acquiring a language such as English, in which long-distance reflexives are disallowed (7), and speakers of languages such as English acquiring a long-distance binding language like Japanese, Korean and Chinese (see the Chinese examples in (8) below).

- (7) Mr. Mask_i dreamed that Mr. Hat_j shot himself_{*i/j}.
(Dominguez et al. 2012:22)

- (8) a. Zhangsan_i renwei Lisi_j xiangxin ziji_{i/j}
Zhangsan think Lisi trust self
“Zhangsan thinks Lisi trusts himself”
(Yuan 1998:324)
- b. Zhangsan_i renwei Lisi_j zhidao Wangwu_k xihuan ziji_{i/j/k}
Zhangsan think Lisi know Wangwu like self
“Zhangsan thinks Lisi knows Wangwu likes himself”
(Cole et al. 2001:34)

As shown in the examples in (8), these sentences are ambiguous, as the reflexive *ziji* may take either a local or a non-local subject antecedent if all DPs agree in person and number. The occurrence of long-distance anaphors has been argued to be subject to parameterization: the variation is associated either with the properties of specific lexical items (Manzini and Wexler 1987) or with different configurations of formal features (Chomsky 2000; Domínguez et al. 2012).

In a previous study with Korean learners of English L2, Domínguez et al. (2012), using a picture selection task, showed that learners exhibit delays in the acquisition of the locality restrictions of anaphors in biclausal contexts in English; a significant effect of proficiency was observed on the rates of preference for the local antecedent for the anaphor in these contexts, as the least proficient learners in their study showed significantly lower preference for the local antecedent than the more advanced learners. Although studies such as these appear to show evidence of L1 effects, the picture on the role of L1 influence in this domain is not clear, as other studies have reported that (at least some) speakers of languages which do not have long-distance reflexives (e.g. Spanish and French) display similar rates of acceptance of long-distance binding in L2 English to those of speakers of languages which allow it (e.g. Chinese and Japanese) (Thomas 1989; White et al. 1997). It is not clear, nevertheless, whether the different conclusions reached by some of these studies may be a consequence of the different experimental methodologies used.

On the other hand, some research has shown evidence of L1 influence in the acquisition of long-distance binding in L2 Chinese by English-speaking learners. These learners show evidence of difficulties in the interpretation of long-distance reflexives, clearly favouring local antecedents; and their behaviour contrasts with that of Japanese and Korean speakers, who appear to have an advantage over English speakers, which indicates that the L1 may have a facilitating effect in the development of knowledge of long-distance binding (e.g. Yuan 1998; Sperlich 2013).

2.3 Research Questions

In face of this, it would be interesting to know whether this facilitating effect holds in cases where the L1 and the L2 both accept long-distance binding but are typologically different, such as Chinese and Portuguese.

Like Chinese, EP also has a long-distance anaphor. In EP, *si* behaves either as a local or as a long-distance reflexive (in both cases also as a formal 2nd person singular pronoun):

- (9) a. A Maria_i falou mal de si_{i/j}
 ‘Maria spoke ill of herself/you.’
 b. A Maria_i disse que o João_j falou mal de si_{i/j/k}
 ‘Maria said that João spoke ill of herself/himself/you.’

The ambiguity that arises in these contexts can be cancelled by adding an anaphorizing expression *mesma(o)*, *própria(o)* (“herself”).

- (10) a. A Maria_i disse que o João_j falou mal de si mesma;
 ‘Maria said that John spoke ill of herself.’
 b. A Maria_i disse que o João_j falou mal de si mesmo;
 ‘Maria said that John spoke ill of himself.’

Long-distance *si* is subject-oriented, as Chinese *ziji* (see (11)), and cannot be replaced by a clitic, as in (12):

- (11) A Maria_i soube diretamente do João_j que alguém tinha falado mal de
 si_{i/*j/k}
 ‘Maria heard directly from João that someone had spoken ill of
 herself/*himself/you.’ (Brito 2003:814)
- (12) *Maria_i soube diretamente do João que alguém se_i tinha difamado
 ‘Maria heard directly from João that somebody maligned her(self).’
 (Menuzzi and Lobo 2016:345)

Bearing in mind the results of L1 acquisition studies indicating that, in clitic languages, children have no problems interpreting clitics but show difficulties with the comprehension of non-reflexive strong pronouns, and, considering, furthermore, the results of studies on the acquisition of L2 English which show that there may be delays affecting the development of non-reflexive pronouns, it would be interesting to investigate whether the grammatical status of the pronoun also plays a role in the L2 acquisition of EP. Adding to this, knowing that there is evidence of difficulties with the interpretation of anaphors in biclausal sentences in the L2 acquisition of languages which allow long-distance binding (e.g. Chinese), but that development of knowledge in this domain may be facilitated by the presence of long-distance anaphors in the learners’ L1, we would be interested in ascertaining whether, in establishing binding dependencies for the anaphor *si*, Chinese L1 learners of L2 EP are sensitive to locality conditions, i.e., whether they develop the knowledge that the anaphor *si* may take either a local or a long-distance antecedent.

Hence our study proposes to address the following research questions:

- (1) Are there asymmetries between strong and clitic pronouns, as well as between reflexive and non-reflexive pronouns, in the acquisition of L2 EP by Chinese-speaking learners?
- (2) Do learners show evidence of difficulties with the interpretation of the anaphor *si* in potential long-distance contexts, and is there evidence that their L1 may have a facilitating role in the development of this knowledge?

In the following section, we describe the study we conducted in order to answer these two questions.

3. The Study

As described in the previous sections, the goal of this study is to examine the acquisition of referential dependencies involving clitics and strong pronouns in L2 EP by Chinese-speaking learners. In particular, we aim to investigate whether there are asymmetries in the interpretation of reflexive and non-reflexive clitic and strong pronouns in local domains, as well as in the interpretation of the *si* anaphor with local and long-distance antecedents in the interlanguage of L1 Chinese learners.

3.1 Methodology

The study was based on three truth-value judgement tasks (adapted from Silva 2015); tasks 1 and 2 tested, respectively, whether Chinese-speaking learners of EP show difficulties in the interpretation of reflexive and non-reflexive clitic pronouns, and which interpretations they assign to reflexive and non-reflexive strong pronouns in simple sentences; task 3 tested whether they are able to identify the potential antecedents of reflexive *si* in biclausal contexts, that is, in sentences where two DP subject antecedents (animate and matched for person, gender and number features) are available to the anaphor.

The tasks, procedures and the participants are described in the following sub-sections.

3.1.1 Tasks

As mentioned earlier, the tasks we used in this study, from Silva (2015), were adapted to our group of adult participants. In task 1, we tested for comprehension of clitic pronouns and, in task 2, for comprehension of

strong pronouns (in prepositional contexts), both in monoclausal sentences. All the pronouns were 3rd person singular.

Task 1 included 40 test items: 20 with reflexive clitics and 20 with accusative non-reflexive clitics. In each condition, half the items were true and the other half were false. The task also included 16 fillers with full DPs, making a total of 56 items. The experimental items are exemplified below: (A) reflexive clitic (true); (B) reflexive clitic (false); (C) non-reflexive clitic (true); e (D) non-reflexive clitic (false).

(A)



Uma rapariga e uma avó. A rapariga está a lavar-se?

“A girl and a grandmother. Is the girl washing herself?”

Reflexive clitic (True) [n=10]

(B)

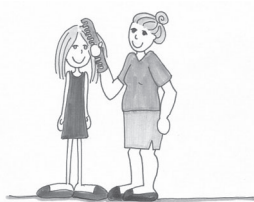


Uma rapariga e uma avó. A rapariga está a secar-se?

“A girl and a grandmother. Is the girl drying herself?”

Reflexive clitic (False) [n=10]

(C)

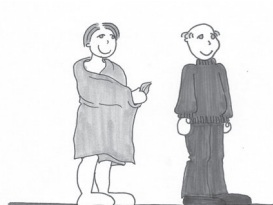


Uma avó e uma rapariga. A avó está a penteá-la?

“A grandmother and a girl. Is the grandmother combing her?”

Non-reflexive clitic (True) [n=10]

(D)



Um rapaz e um avô. O rapaz está a secá-lo?

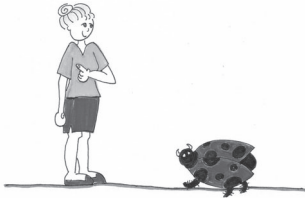
“A boy and a grandfather. Is the boy drying him?”

Non-reflexive clitic (False) [n=10]

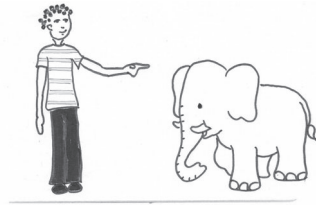
Task 2 also included 40 test items: 20 with strong reflexive *si* (n=20) and 20 with strong non-reflexive masculine and feminine pronouns. All the strong pronouns appeared as complements to a preposition, and the verbs used were verbs of improbable reflexivity: *apontar* ‘point’, *bater* ‘hit’, *disparar* ‘shoot’, *martelar* ‘hammer’ and *tocar* ‘touch’. In each

condition, half the items corresponded to images that favoured the anaphoric interpretation of the pronoun (coreference with the subject), and the other half to non-anaphoric interpretations (disjoint reference). This task also included 16 fillers with full DPs, and a total of 56 items. Items for each of the test conditions are exemplified below: (E) reflexive strong pronoun, coreferential with the subject; (F) reflexive strong pronoun, disjoint reference with the subject; (G) non-reflexive strong pronoun, disjoint reference with the subject; and (H) non-reflexive strong pronoun, coreferential with the subject.

(E)



(F)

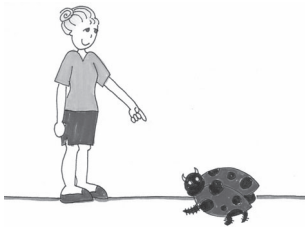


Uma avó e uma joaninha. A avó está a apontar para si?

“A grandmother and a ladybird. Is the grandmother pointing at herself?”

Reflexive strong pronoun (coreference) [n=10]

(G)



Uma avó e uma joaninha. A avó está a apontar para ela?

“A grandmother and a ladybird. Is the grandmother pointing at her?”

Non-reflexive strong pronoun (disjoint reference) [n=10]

Um rapaz e um elefante. O rapaz está a apontar para si?

“A boy and an elephant. Is the boy pointing at himself?”

Reflexive strong pronoun (disjoint reference) [n=10]

(H)



Um pirata e um elefante. O pirata está a tocar nele?

“A pirate and an elephant. Is the pirate touching him?”

Non-reflexive strong pronoun (coreference) [n=10]

Finally, in task 3, comprehension of the reflexive clitic *se* and the reflexive strong pronoun *si* in biclausal sentences was tested. The

experimental variables were type of pronoun (clitic/strong) and position of the antecedent (local/non-local). In this task, 24 test items were used: 6 with a clitic with a local antecedent, 6 with a clitic with a non-local antecedent, 6 with a strong pronoun with a local antecedent, and 6 with a strong pronoun with a non-local antecedent. Task 3 also included 20 DP fillers, in a total of 44 items. The four experimental conditions are exemplified below: (I) clitic with a local antecedent; (J) clitic with a non-local antecedent; (K) strong pronoun with a local antecedent; (L) strong pronoun with a non-local antecedent.

(I)



Um rapaz e o avô. O avô acha que o rapaz está a secar-se?

“Does the grandfather think that the boy is drying himself?”

Clitic with local antecedent [n=6]

(J)

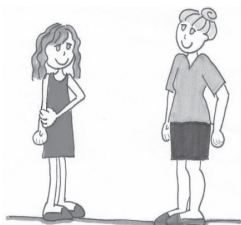


Um rapaz e o avô. O rapaz acha que o avô está a secar-se?

“Does the boy think that the grandfather is drying himself?”

Clitic with non-local antecedent [n=6]

(K)



Uma rapariga e a avó. A avó acha que a rapariga está a tocar em si?

“Does the grandmother think that the girl is touching herself?”

Strong pronoun with local antecedent [n=6]

(L)



Uma rapariga e a avó. A avó acha que a rapariga está a tocar em si?

“Does the grandmother think that the girl is touching herself?”

Strong pronoun with non-local antecedent [n=6]

In all three tasks, both potential antecedents were always introduced in the discourse and corresponded to the characters that were presented in the picture.

3.1.2 Procedure

Participants were shown a picture representing two or three (in the case of the distractors in task 3) characters performing an action. The characters were introduced orally and the researcher asked a question about the action represented in the picture, to which the participant had to answer “yes” or “no”. The question was presented both orally and in writing.

3.1.3 Participants

The 25 L2 learners who participated in the study were all native speakers of Chinese, aged between 17 and 21 years. The study also included a control group, composed of 26 monolingual native speakers of EP. Information regarding their ages is presented in Table 3-1 below.

Table 3-1. Participants in the study (M=Mean; SD=Standard Deviation)

| Group | Age | Age of onset |
|-------------------|----------------------------|----------------------------|
| Chinese L1 (n=25) | 17–21 (M=19.6; SD=1.22) | 16–20 (M=18.2; DP=0.92) |
| EP L1 (n=26) | 22–41 (M=30.3; SD=6.93) | n.a. |

The L2 learners who took part in the study were all attending a study-abroad programme at a university in Portugal. They had arrived in Portugal 1 to 2 months prior to the test and were attending a Portuguese language course at the intermediate level (according to the placement test taken at the beginning of the course). They had all started learning Portuguese in China as teenagers or young adults and had been studying the language for no longer than 2 years. They all had knowledge of English.

3.1.4 Hypotheses

In this study we assume full access to Universal Grammar (UG) in L2 acquisition (White 2003) and predict that grammatical properties, including those which are subject to parametric variation as is the case of

long-distance binding (e.g. Manzini and Wexler 1987), are fully acquirable, similarly to what happens in L1 acquisition.

We also assume that transfer of previous linguistic knowledge plays a role in L2 acquisition (White 2003) and we consider that, in the case of a third language, transfer may occur either from the L1 or from the L2; following the *Cumulative-Enhancement Model* (Flynn, Foley and Vinnitskaya 2004), it is the potential facilitating effect of the knowledge being transferred that determines the choice of language which will be the primary source of influence. Hence, in the case of the non-native speakers in our study, who have Chinese as their L1 and English as their L2, we predict transfer from Chinese, the language which allows long-distance binding, and do not expect these learners, therefore, to show difficulties in their interpretation of anaphors in long-distance contexts.

On the other hand, given that the interpretation of non-reflexive strong pronouns is an interface phenomenon, which involves the integration of syntactic knowledge with other types of knowledge, we predict, assuming the Interface Hypothesis of e.g. Sorace (2011), that it will develop later than the interpretation of clitics and of reflexive strong pronouns, which involve only knowledge of (syntactic) binding properties.

Considering these theoretical assumptions, we propose the following hypotheses:

1. In simple sentences, Chinese learners of L2 EP are expected to:
 - (a) show no asymmetry in the interpretation of reflexive and non-reflexive clitic pronouns, achieving high accuracy rates with both;
 - (b) show an asymmetry in the interpretation of reflexive and non-reflexive strong pronouns: their acceptance of coreferential readings between the reflexive pronoun and the local subject is predicted to be higher than their acceptance of a disjoint reference reading for the non-reflexive pronoun.
2. With biclausal sentences, Chinese learners of L2 EP are expected to:
 - (a) show no difficulties in the selection of an antecedent for the reflexive clitic: it is predicted that they exhibit high rates of acceptance of a local antecedent and high rates of rejection of a non-local antecedent;
 - (b) show no asymmetries in the establishment of a binding dependency between the reflexive strong pronoun and either a local antecedent or a long-distance antecedent: we predict high acceptance rates of both antecedents.

3.2. Results

An analysis of the global results (see Figure 3-1) reveals that the L1 Chinese group performs more accurately with non-reflexive than with reflexive clitic pronouns, although not significantly so ($t(24) = -1.108, p = .279$).² As expected, this group is more accurate in the “true” condition than in the “false” condition, i.e., they are better at accepting target interpretations than at rejecting non-target ones; the difference between the two is significant both for reflexives ($t(24) = 4.334, p < .001$) and for non-reflexives ($t(24) = 3.000, p = .006$).

A comparison of the global results of the two groups reveals that the performance of the Chinese group is significantly worse than that of the native speakers both with reflexive ($t(49) = -5.851, p < .001$) and with non-reflexive clitics ($t(49) = -4.272, p < .001$).

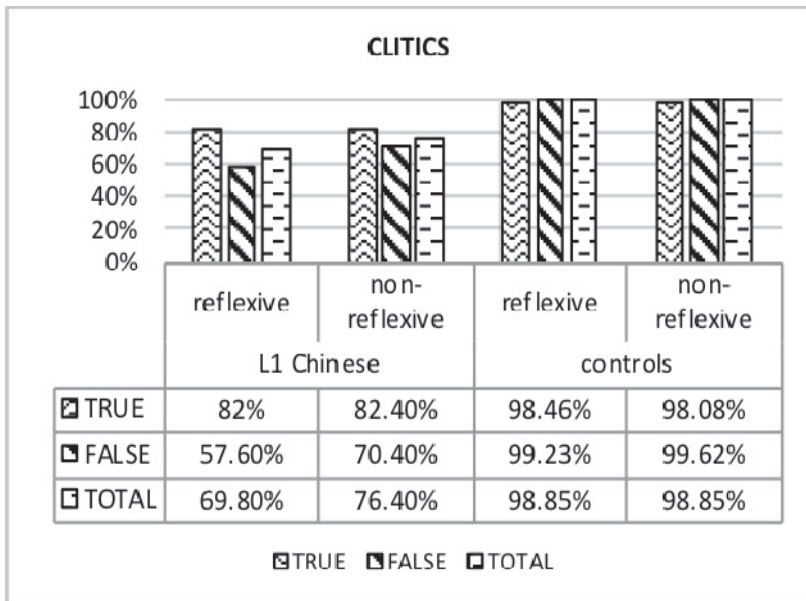


Figure 3-1. Global results of task 1 (accuracy rates for the comprehension of clitics in simple sentences)

² For the statistical analysis, an independent-samples t-test was used for intergroup comparisons, while intragroup comparisons were performed by means of a paired-samples t-test, with the significance level set at 0.05 (5%).

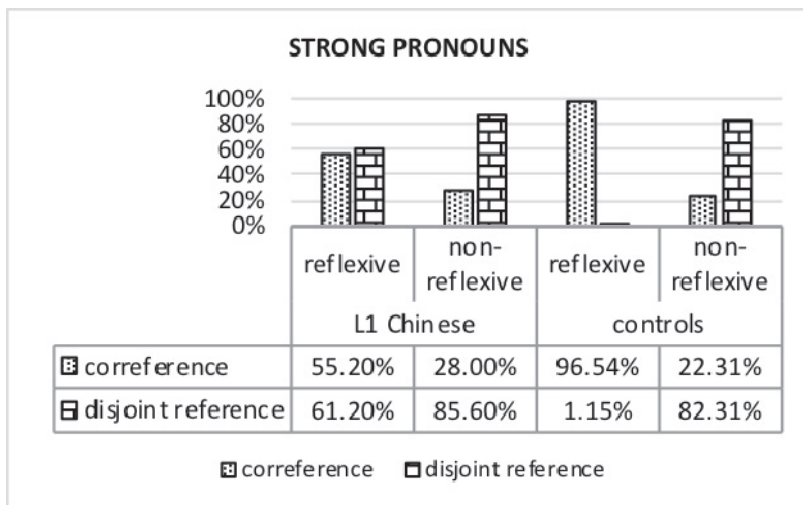


Figure 3-2. Global results of task 2 (acceptance of coreference / disjoint reference between the subject and the strong pronoun in simple sentences)

Regarding task 2, which tested comprehension of strong pronouns in simple sentences, the Chinese group shows an asymmetry in the interpretation of reflexive and non-reflexive strong pronouns, as shown in Figure 3-2.

The Chinese group allows both coreferential and disjoint readings with reflexive pronouns, with no significant difference between the two ($t(24) = -.479, p = .636$). This performance contrasts with that of the native speakers', who show a significant preference for the coreferential reading ($t(25) = 30.770, p < .001$). However, the learners' performance with respect to non-reflexive pronouns comes close to that of the native speakers: both groups exhibit a significant preference for the disjoint reading over the coreferential reading (L1 Chinese: $t(24) = -8.249, p < .001$; controls: $t(25) = -5.725, p < .001$). However, when we compare reflexive and non-reflexive pronouns with respect to acceptance of the coreferential reading, on the one hand, and of the disjoint reading, on the other hand, it is clear that both the Chinese and the control group significantly prefer a coreferential reading with the reflexive (L1 Chinese: $t(24) = 3.974, p = .001$; controls: $t(25) = 12.987, p < 0.001$) and a disjoint reading with the non-reflexive (L1 Chinese: $t(24) = -3.873, p = .001$; controls: $t(25) = -15.309, p < .001$).

If we compare the results of the two tasks, it is evident that, as far as the reflexive pronouns are concerned, the Chinese speakers have significantly higher acceptance rates of anaphoric readings with clitics than with strong pronouns ($t(24) = 4.297, p < 0.001$). As regards the native speakers, there is also an asymmetry, but, in this case, with non-reflexives: this group has significantly higher acceptance of non-anaphoric readings with clitics than with strong pronouns ($t(25) = 3.418, p = .002$).

Given that neither group exhibits categorical judgements regarding the interpretation of non-reflexive strong pronouns, we considered the individual results, in an attempt to identify patterns of preference for each of the interpretations (see Table 3-2).³

Table 3-2. Interpretation of non-reflexive strong pronouns (in simple sentences)–individual results

| | Coreference | | Disjunct reference | |
|-------------------|-------------|-----------|--------------------|-----------|
| | acceptance | rejection | acceptance | rejection |
| L1 Chinese | 4% | 48% | 72% | 0% |
| controls | 7.69% | 57.69% | 80.77% | 7.69% |

15 out of the 26 native participants display a clear preference for the disjunct reference reading and only 2 clearly prefer the coreferential reading. Similarly, in the learner group, 11 participants show a clear preference for the disjunct reference reading; only 1 participant displays high acceptance of both readings.

Finally, let us consider, in Figure 3-3, the results of task 3, which focused on the locality conditions to which reflexive clitic *se* and strong pronoun *si* are subject in biclausal sentences.

³ In this analysis, we considered that a participant clearly accepts one particular reading if the number of “yes” answers for that condition is equal to or higher than 8 (out of 10); and, inversely, a participant clearly rejects a given reading if the number of “yes” answers for that condition is equal to or lower than 2. We also considered that participants show a clear preference for a given reading if they show both a clear acceptance of that reading and a clear rejection of the other reading.

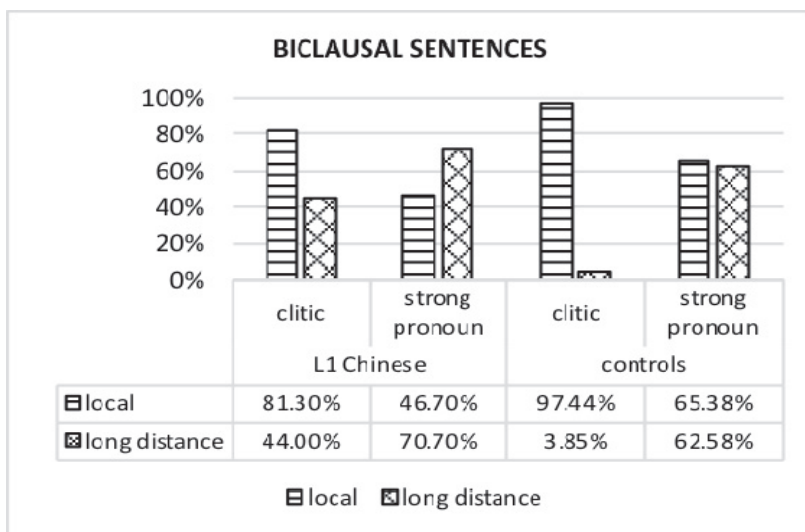


Figure 3-3. Global results of task 3 (acceptance of local and long-distance binding in the comprehension of reflexives in biclausal sentences)

In biclausal sentences, the behaviour of the L1 Chinese participants contrasts with that of the native controls regarding the acceptance of the matrix subject as an antecedent for the reflexive clitic in the embedded clause, which is significantly higher in the Chinese group ($t(49) = 5.831, p < 0.001$). As for the strong pronoun *si*, both groups accept both local and non-local antecedents for the pronoun, and the difference between the two readings is not significant (L1 Chinese: $t(24) = -2.854, p = .009$; controls: $t(25) = -.155, p = .878$). However, the comparison between the results of the two groups reveals a statistically significant difference regarding the acceptance of a local antecedent for the pronoun, which is higher in the control group ($t(49) = -33.074, p = .003$) (no differences were found in the acceptance of a non-local antecedent: $t(49) = 1.054, p = .297$). Interestingly, however, the acceptance rates of a local antecedent for the reflexive pronoun are significantly lower in this context for both groups than those found in simple sentences (L1 Chinese: $t(24) = 6.311, p < .001$; controls: $t(25) = 20.817, p < .001$).

The analysis of the individual results (see Table 13-3) confirms that there is high variability in both groups as far as the interpretation of the *si* pronoun in complex sentences is concerned.⁴

Table 3-3. Interpretation of *si* in complex sentences—individual results

| | Local reading | | Long-distance reading | |
|-------------------|---------------|-----------|-----------------------|-----------|
| | acceptance | rejection | acceptance | Rejection |
| L1 Chinese | 32% | 52% | 60% | 20% |
| controls | 53.84% | 15.38% | 38.46% | 26.92% |

Considering the individual preferences, 5 of the L1 Chinese participants have a clear preference for the local reading and 11 for the long-distance reading. On the other hand, 7 of the native speakers clearly prefer a local reading and 3 a long-distance reading.

4. Discussion and Conclusions

The findings described in Section 3.2. indicate that the grammatical status of the pronoun is relevant in L2 EP. On the one hand, the behaviour of our learner group appears to confirm Hypothesis 1(a), given that no asymmetries were found in the interpretation of reflexive and non-reflexive clitic pronouns in simple sentences. However, the results also show that learners at the intermediate level still show evidence of difficulties with the interpretation of clitics – specifically, we observed that, unlike the native controls, these learners appear to find it harder to reject ungrammatical sentences than to accept grammatical ones, which would suggest that knowledge of these properties has still not stabilised in the interlanguage grammars; and, generally, they perform significantly worse than the native speakers. Hence, these findings lead us to the conclusion that the syntactic properties which determine the distribution of reflexive and non-reflexive clitics may be subject to developmental delays, particularly when the learners' L1 does not have clitic pronouns.

On the other hand, as far as strong pronouns in simple sentences are concerned, the results appear to show that the coreferential reading is

⁴ We considered that a participant clearly accepts one particular reading if the number of “yes” answers for that condition is equal to or higher than 5 (out of 6); and, inversely, a participant clearly rejects a given reading if the number of “yes” answers for that condition is equal to or lower than 2. Moreover, we considered that participants show a clear preference for a given reading if they show both a clear acceptance of that reading and a clear rejection of the other reading.

selected more often with reflexives than with non-reflexives, and the disjoint reference reading is selected more often with non-reflexives than with reflexives. Nevertheless, although learners clearly distinguish the two pronouns, in accordance with hypothesis 1(b), the asymmetry we observed is not exactly the one that was expected, as they appear to be more accurate with non-reflexive than with reflexive pronouns. Hence, our learners experience difficulties with the interpretation of reflexive pronouns, allowing both bound and unbound readings, but not with the interpretation of non-reflexive pronouns, which, similarly to the native speakers, they interpret preferentially as disjoint from the subject (although both groups exhibit great individual variation with these pronouns).

Our findings with respect to strong pronouns contrast both with those found in L1 acquisition (e.g. Silva, 2015) and with those of other L2 studies (e.g. Shirahata, 2007; Kim, Montrul and Yoon, 2014). However, it is not clear whether the difficulties we observed with the interpretation of reflexive pronouns are due to problems with the relevant binding principle, as no similar difficulties were found with reflexive clitics in simple sentences. An alternative explanation for these results may be related to the ambiguity inherent to the reflexive pronoun *si*, which, besides being a reflexive pronoun, may also be a formal 2nd singular pronoun (see 2.3. above)– this is a reading which may be more prominent in a formal learning context (remember that all our participants are formal learners of EP).

As for the biclausal sentences (which contain two potential antecedents for the pronoun), we aimed to understand whether the position of the antecedent (local or non-local) is relevant to the interpretation of reflexives and whether learners show knowledge of the different properties of the clitic *se* (which must be bound locally) and of the pronoun *si* (which may be interpreted either as a local anaphor or as a long-distance anaphor). Our findings show that, contrary to the predictions of hypothesis 2(a), the Chinese group accepts non-local antecedents for the clitic *se*, which suggests that they have still not acquired the locality conditions which the clitic must obey. These results confirm that knowledge of the properties which govern the interpretation of clitic pronouns may develop late, which may be related to the absence of these forms in the learners' L1.

Regarding the strong pronoun *si*, the results also confirm the absence of asymmetries in the establishment of a binding dependency with local and long-distance antecedents, as predicted by hypothesis 2(b). However, the prediction that learners would display high rates of acceptance of both antecedents was not confirmed – the rates of acceptance of local and non-

local antecedents for the reflexive *si* are 46.7% and 70.7%, respectively, in the Chinese group (and 62.6% and 65.4%, respectively, in the control group), and the acceptance of local antecedents is lower in this context than in simple sentences (although, as was observed in section 3.2., there is individual variation in the two groups). The weaker acceptance of the matrix subject as a potential antecedent for the anaphor in embedded sentences is a phenomenon which has also been observed, in some previous studies (e.g. Thomas 1991), with native speakers of languages with long-distance binding, which suggests that the presence of an alternative antecedent (i.e., the matrix subject) may adversely affect the acceptance of a local binding reading.

In the case of the learners in our study, there is a (non-significant) preference for the long-distance reading, which may indicate L1 influence – the presence, in this context, of the conditions which make long-distance binding possible in Chinese (the two potential antecedents are animate DPs, occur in subject position and agree in person and number) may favour this interpretation for the anaphor; the preference for this reading may also be regarded as a strategy adopted by the learners to resolve the ambiguity which is associated with these structures. This is also an effect which has been observed in other studies: for example, the Japanese-speaking learners in Yuan's (1998) study on the acquisition of L2 Chinese also revealed a preference for the long-distance interpretation in equivalent sentences (i.e., sentences without a previous context); on the other hand, Domínguez et al. (2012) showed that their least proficient Korean-speaking learners exhibited low acceptance rates of the local antecedent in these contexts in L2 English (see Section 2.2. above).

One question which remains unanswered relates to the fact that, unlike what is found in the L1 acquisition of EP and what has been observed in the L2 acquisition of other languages, the L2 learners in our study show difficulties in the interpretation of reflexive strong pronouns, but not in that of non-reflexive strong pronouns. Furthermore, it would be interesting to further explore the reasons why both non-native and native speakers of EP show a great deal of variability in the interpretation of the anaphor *si* in complex sentences. This variability may be due to the high processing costs associated with these sentences, as they are potentially ambiguous and are presented without a previous context to guide their interpretation, which makes it harder to identify the potential antecedents of the reflexive pronoun.

In a nutshell, the results of our study show that the grammatical status of the pronoun is relevant in the case of reflexives, with Chinese learners exhibiting difficulties particularly in the interpretation of reflexive strong

pronouns in L2 EP. Moreover, in biclausal contexts, they are more accurate in accepting coreference between *si* and long-distance antecedents than with local antecedents. We suggested that this behaviour may result not only from L1 transfer but also from the strategies adopted by learners to cope with the processing complexity arising from the ambiguity of these contexts.

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CHAPTER FOUR

ANAPHORA RESOLUTION
IN ITALIAN BY CROATIAN-ITALIAN
SIMULTANEOUS BILINGUALS

TIHANA KRAŠ AND
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1. Introduction

Properties at the syntax-discourse interface have proved problematic in different bilingual domains, including bilingual first language (L1) acquisition, second language (L2) acquisition and L1 attrition. A phenomenon particularly well studied in this area is pronominal anaphora resolution in null subject languages. Compared to monolinguals, highly proficient bilinguals, especially those who speak a null subject language (e.g., Greek, Italian, Spanish) and a non-null subject language (e.g., English), have been found to over-accept and overuse overt subject pronouns in contexts that require the use of null subject pronouns (e.g., Serratrice 2007; Serratrice, Sorace, and Paoli 2004; Sorace and Filiaci 2006; Sorace et al. 2009; Tsimpli et al. 2004). At the same time, their interpretation and use of null subject pronouns has been shown to be (mostly) target-like.

Two broad explanations have been proposed. The representational account (Tsimpli et al. 2004) attributes the bilinguals' problems to cross-linguistic influence, i.e., the influence of the language that instantiates a more economical setting with respect to an interface property (e.g., English, which only uses overt subject pronouns) on the language that offers a less economical setting (e.g., Italian, which has both null and overt subject pronouns). In contrast, the processing account ascribes difficulties primarily to bilinguals' hypothesised less-than-optimal processing abilities (Sorace and Filiaci 2006), treating cross-linguistic influence only as a

secondary cause. According to the representational account, difficulties should not arise when two grammatical systems pattern with each other with respect to an interface property. According to the processing account, difficulties should occur even then.

Supporting evidence for the representational account comes from studies of highly proficient L2 learners of Italian who are native speakers of Croatian, in which the use of null and overt subject pronouns is governed by the same discourse-pragmatic principles as Italian. These studies have shown that child (Kraš 2016) and adult (Kraš 2008a) L2 learners resolve ambiguous intra-sentential anaphora with null and overt subject pronouns in a target-like way in Italian. The current study aims to test the predictions of the two accounts by looking at the same linguistic property in Italian in a different group of highly proficient bilinguals speaking the same language combination, namely Croatian-Italian simultaneous bilinguals. Before describing the study, we provide more information about the use of pronominal subjects in Italian and Croatian, and about previous studies on pronominal subjects in bilingual language development.

2. Pronominal Subjects in Italian and Croatian

As null subject languages, Italian and Croatian offer a choice between overt (expressed) or null (omitted) pronominal subjects. The choice is governed by discourse-pragmatic factors: co-reference with a topical antecedent is typically expressed by a null subject pronoun, while co-reference with a non-topical antecedent is normally signalled by an overt subject pronoun. This can be seen in (1) and (2) for Italian and Croatian, respectively. In the second sentence, the null pronoun (*pro*) can only refer to the subject of the first sentence ('Laura'), which is the topical antecedent, while the overt pronoun can either refer to Laura or, more probably, to another female referent, mentioned in previous discourse.

- (1) Laura_i ha firmato il contratto. *pro*_{i/*j} È contenta/Lei_{#i/j} è contenta.
 Laura has signed the contract *pro* is happy she is happy
 'Laura signed the contract. She is happy.'
- (2) Laura_i je potpisala ugovor. *pro*_{i/*j} Zadovoljna je/Ona_{#i/j} je zadovoljna.
 Laura is signed contract *pro* happy is she is happy
 'Laura signed the contract. She is happy.'

Carminati (2002) has shown that in intra-sentential contexts in Italian, null and overt subject pronouns have distinct antecedent biases: the null pronoun prefers an antecedent in the subject position (typically coreferential with the discourse topic), whereas the overt pronoun prefers an antecedent in a non-subject position. This principle, called the Position of Antecedent Strategy (PAS), has also been shown to obtain in Croatian (Kraš 2008b; Kraš and Stipeć 2013). Examples illustrating how the principle operates in Italian and Croatian are given in (3) and (4), respectively.

- (3) Ivano_i ha salutato Bruno_j mentre *pro*_{i/v?}/lui_{?i/j/k} correva.
 Ivano has greeted Bruno while *pro* he was-running
 ‘Ivano greeted Bruno while he was running.’
- (4) Ivano_i je pozdravio Bruna_j dok je *pro*_{i/v?}/on_{?i/j/k} trčao.
 Ivano is greeted Bruno while is *pro* he was-running
 ‘Ivano greeted Bruno while he was running.’

In these examples, the null pronoun in the subordinate clause is more likely to be coreferential with the main clause subject (‘Ivano’) than with the main clause object (‘Bruno’), while the overt pronoun is more likely to take the main clause object as the antecedent. The overt pronoun can also refer to a male antecedent known from previous discourse, i.e., an extralinguistic referent.

3. Related Studies into Pronominal Subjects in Bilingualism

Studies looking into the resolution of pronominal anaphora in Italian in English-Italian and Spanish-Italian simultaneous bilinguals have found differences between bilinguals’ and monolinguals’ interpretation of overt pronouns. Using an aural version of the picture selection task designed by Tsimplici et al. (2004), Serratrice (2007) tested English-Italian bilingual children aged 6-9 (mean age 8;6), age-matched Italian monolingual children and Italian monolingual adults. The bilingual children interpreted the overt pronoun as coreferential with the subject antecedent more often than the monolingual children and the adults in contexts where the pronoun followed its potential antecedents (forward anaphora). In contexts where the pronoun preceded its potential antecedents (backward anaphora), both groups of children chose the subject antecedent for the overt pronoun more often than the adults. Sorace et al. (2009) used a contextualised acceptability judgement task to explore how English-Italian

and Spanish-Italian bilingual children aged 6-7 and 8-10, age-matched monolingual children and monolingual adults interpret Italian subject pronouns referring to (non-)topical antecedents. Both groups of older bilinguals accepted overt pronouns referring to topical antecedents more often than their monolingual peers and the adults. Among younger children, a similar result was obtained for all bilinguals, as well as the monolinguals. It should be noted that overt subject pronouns in Spanish appear to be less biased towards non-topical antecedents than in Italian (Filiaci, Sorace, and Carreiras 2014).

On the other hand, a study looking into the interpretation of Croatian null and overt subject pronouns in 11-year-old Croatian-Italian simultaneous bilinguals, age-matched monolinguals and monolingual adults did not find differences between the bilinguals and the monolinguals (Kraš, Rubčić and Stipeć 2015). The two groups of children patterned alike in a picture selection task also used in Kraš and Stipeć (2013), both accepting more overt pronouns referring to topical antecedents (in forward anaphora contexts) than the adults. This study shows that when two languages overlap with respect to an interface property, bilinguals do not show greater instability at the syntax-discourse interface than monolinguals, providing support for the representational account.

As mentioned above, support for the representational account has also been provided in a pair of studies looking into another bilingual domain: L2 acquisition. Using an adapted version of the picture selection task designed by Tsimpli et al. (2004), Kraš (2008a, 2016) showed that highly proficient L1 Croatian child and adult L2 learners resolved forward and backward anaphora with null and overt subject pronouns in a target-like way in Italian. Moreover, 13-14-year-old child L2 learners tested in Kraš (2016) accepted even *fewer* overt subject pronouns referring to topical antecedents than their age-matched monolingual peers. The present study tests a group of Croatian-Italian simultaneous bilinguals by means of the same task and compares their results to those of the same control participants as in Kraš (2016). The data from the study thus complement the data from Kraš (2008a, 2016).

4. The Study

4.1 Research Questions and Hypotheses

In the study we address the following research questions: Do Croatian-Italian simultaneous bilinguals accept Italian overt subject pronouns

referring to topical antecedents more often than age-matched Italian monolinguals? Do they interpret null subject pronouns in a native-like way? Based on the results of Kraš (2016) and Kraš, Rubčić and Stipeć (2015), we hypothesise that Croatian-Italian simultaneous bilinguals do not accept more Italian overt subject pronouns referring to topical antecedents than age-matched Italian monolinguals. We also hypothesise that they interpret null subject pronouns in a native-like way.

4.2 Participants

Two groups of adolescents took part in the study: Italian monolinguals ($N=48$) and Croatian-Italian simultaneous bilinguals ($N=40$). The monolinguals were attending the third grade in a lower secondary school (It. *scuola media*) in Trieste (Italy), while the bilinguals were in the sixth, seventh or eighth grade in four Italian-medium primary schools in Rijeka (Croatia). The bilinguals were selected based on their general proficiency in Italian, assessed in a non-standardised C-test also used in Kraš (2008a, 2016). Those with the highest scores were included in the study and the approximate cut-off point was set at 66.5%. A Wilcoxon rank-sum test showed that they differed from the monolinguals in their C-test scores ($W=249$, $p<0.001$), suggesting that although highly proficient, they were not near-native in Italian. More details on the participants are given in Table 4-1.

Table 4-1. Participant data

| Participant group | Age at testing | | L2 proficiency | | |
|-------------------|----------------|-------|----------------|-----------|------|
| | Mean | Range | Mean | Range | SD |
| Monolinguals | 13.38 | 13-14 | 85.85 | 71.5-98.5 | 7.16 |
| Bilinguals | 13.28 | 11-15 | 73.3 | 62.5-90.5 | 8.01 |

4.3 Materials and Procedure

To assess the participants' interpretation of null and overt subject pronouns in ambiguous intra-sentential contexts, we used the picture selection task designed by Kraš (2008a, adapted from Tsimpli et al. 2004) and also used in Kraš (2016). The participants were asked to read sentences and to choose one of three pictures that best matched the sentence in meaning. The sentences were complex and consisted of two clauses: the main clause contained a transitive verb and two singular animate gender-matched NPs (half female and half male in the task),

functioning as the subject and the object, and subordinate clauses had a more variable structure, depending on the condition, as detailed below.

An example of a picture set used in the task is shown in Figure 4-1, with corresponding sentences provided in (5) and (6) below. The three pictures showed the main clause subject, the main clause object or an extra-linguistic referent as the performer of the action described in the subordinate clause. Corresponding pictures are numbered 2, 3, and 1 in Figure 4-1. The main clause subject was depicted performing the action described in the main clause in all three pictures. The linear position of the three types of pictures was varied systematically in the experiment.

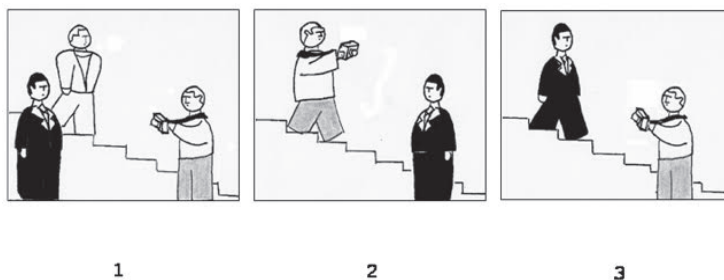


Figure 4-1. Example of a picture set

The task comprised four experimental and four control conditions. Experimental sentences contained an ambiguous third person singular null or overt subject pronoun in the subordinate clause. The overt pronoun matched the main clause subject and object in gender. Subordinate clauses were temporal and introduced by the conjunction, *mentre* ('while/as'). The clause order was either main-subordinate (forward anaphora), or subordinate-main (backward anaphora). Examples are provided in (5).

(5) a. Forward anaphora with a null pronoun

Il giornalista_i fotografa il presidente_j, mentre *pro*_{i/?j} scende
the journalist photographs the president while *pro* descends
le scale.
the stairs

'The journalist photographs the president as he descends the stairs.'

b. Forward anaphora with an overt pronoun

Il giornalista_i fotografa il presidente_j, mentre lui_{i/?j/k} scende
the journalist photographs the president while he descends
le scale.
the stairs

'The journalist photographs the president as he descends the stairs.'

c. Backward anaphora with a null pronoun

Mentre *pro*_{i/?j} scende le scale, il giornalista_i fotografa il
while *pro* descends the stairs the journalist photographs the
presidente_j.
president

‘As he descends the stairs, the journalist photographs the president.’

d. Backward anaphora with an overt pronoun

Mentre lui_{i/?j/k} scende le scale, il giornalista_i fotografa il
while he descends the stairs the journalist photographs the
presidente_j.
president

‘As he descends the stairs, the journalist photographs the president.’

Each experimental condition had an unambiguous control counterpart, corresponding to its predicted interpretation by the control group. Control sentences were included to test whether the pictures clearly portrayed the intended situations and to serve as distractors. These sentences are illustrated in (6). They featured three different types of subordinate clauses: gerundive clauses, shown in (6a) and (6c), restrictive relative clauses, given in (6b), and temporal clauses, illustrated in (6d). The performer of the action described in these clauses was the main clause subject, the main clause object and the extra-linguistic referent respectively.

(6) a. Postposed gerundive clause

Il giornalista fotografa il presidente scendendo le scale
the journalist photographs the president descending the stairs
‘The journalist photographs the president descending the stairs.’

b. Relative clause

Il giornalista fotografa il presidente che scende le scale.
the journalist photographs the president who descends the stairs
‘The journalist photographs the president who descends the stairs.’

c. Preposed gerundive clause

Scendendo le scale, il giornalista fotografa il presidente.
descending the stairs the journalist photographs the president
‘Descending the stairs, the journalist photographs the president.’

d. Temporal clause

Mentre la guardia di corpo scende le scale, il giornalista
while the guard of body descends the stairs the journalist
fotografa il presidente.
photographs the president.
‘As the bodyguard descends the stairs, the journalist photographs the president.’

The task comprised a total of 48 sets of pictures; they were rotated across eight conditions in a Latin square design. Four practice items, having the same structure as the control sentences, were also included.

Participants were tested individually in a quiet room. The task was implemented with SuperLab Pro 2.0 and run on a laptop with a 14.4" screen. We presented the sentences word by word under speeded conditions to elicit the participants' immediate interpretations. The length of time for presenting each word depended on the length of the word: it was 301 ms per word plus 17 ms per letter (e.g., 352 ms for a three-letter word). After the last word of the sentence had disappeared from the screen, the three pictures appeared. The participants selected the picture by pressing the appropriate key on the keyboard. The time for responding was not limited. The presentation order of the sentences was randomised for each participant. Prior to the administration of the experiment, the participants filled in a background questionnaire and a C-test in a group setting.

4.4 Results

The results of the experimental conditions are shown in Figure 4-2. The figure shows the distribution of antecedent choices—main clause subject, main clause object and extra-linguistic referent (marked 'other')—in the four conditions, by participant group. Mean group proportions were calculated by averaging individual response proportions.

As can be seen from Figure 4-2, the two participant groups gave very similar responses in the two conditions with forward anaphora and in the backward anaphora with a null pronoun condition. In the null pronoun conditions, they preferred the subject antecedent (more strongly so in backward anaphora), selecting the object as the second choice. In the forward anaphora with an overt pronoun condition, their preferred antecedent was the object, followed by the subject. The responses of the two participant groups differed somewhat in the backward anaphora with an overt pronoun condition: the monolinguals associated the pronoun to the same degree with the subject and the object antecedent, opting for the extra-linguistic referent less often. The bilinguals, on the other hand, selected the extra-linguistic referent most frequently, followed by the object and then by the subject antecedent. Importantly, the subject antecedent was chosen *less* often by the bilinguals than by the monolinguals in this condition (i.e., in 24.17% vs. 37.5% of the cases).

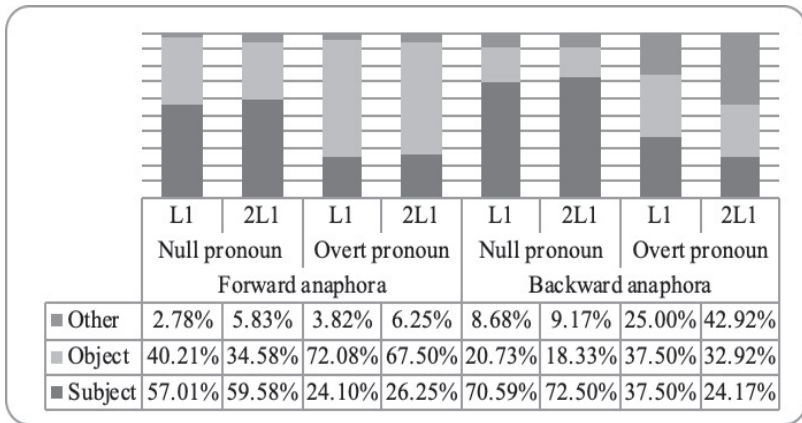


Figure 4-2. Mean responses in the experimental conditions

We checked the statistical significance of these results by means of polytomous logistic regression. The outcome variable was the choice of antecedent (main clause subject, main clause object, extra-linguistic referent), while pronoun type (null vs. overt), anaphora type (forward vs. backward) and participant group (monolinguals vs. bilinguals) were used as predictors, together with three interactions (pronoun type x anaphora type, pronoun type x participant group, anaphora type x participant group). The analysis was performed using the R (<http://www.R-project.org/>) package *polytomous* (Arppe 2013), which permits the analysis of non-binary outcomes.

Table 4-2 summarises the results. The model parameters are expressed in terms of odds in favour of or against a particular antecedent being selected given the predictor variables. The intercept line shows the odds contributed by aggregate default values of the predictors, i.e., the monolinguals' responses in the forward anaphora with a null pronoun condition. Values <1 indicate that the chance of a particular outcome is decreased, while those >1 suggest an increase. Predictors that contribute significantly to the selection of a referent are marked with an asterisk.

Table 4-2. Polytomous logistic regression model results

| Predictor variable | Odds of antecedent selection | | |
|------------------------------|------------------------------|-----------|-----------|
| | Subject | Object | Other |
| Intercept | 1.235 | 0.6673*** | 0.0365*** |
| Pronoun type (overt) | 0.2838*** | 3.876*** | 0.8878 |
| Anaphora type (backward) | 2.11*** | 0.3956*** | 2.4** |
| Group (2L1) | 1.302 | 0.8 | 1.435 |
| Pronoun type x Anaphora type | 0.753 | 0.5818** | 4.455*** |
| Pronoun type x Group | 0.6988 | 0.9938 | 1.647 |
| Anaphora type x Group | 0.7019 | 1.047 | 0.8869 |

* $p < .05$; ** $p < .01$; *** $p < .001$

The reported odds show that the participant group is not a significant predictor of antecedent selection, nor is the interaction between pronoun type and participant group, or the interaction between anaphora type and participant group. This suggests that the two participant groups do not differ with respect to their selection of any of the antecedents for the two types of pronouns to a statistically significant degree. It can also be seen that the default case decreases the odds of object selection and, especially, of extra-linguistic referent choice. The pronoun type is a significant predictor of antecedent choice, with an overt pronoun increasing the odds of object selection and decreasing the odds of subject selection. Anaphora type also has a significant impact on antecedent choice: in backward anaphora, the odds of subject and extra-linguistic referent selection increase and the odds of object selection decrease. In backward anaphora with an overt pronoun, the odds of extra-linguistic referent selection become higher and the odds of object selection become lower.

As for the evaluation of the regression model, the value of Hosmer and Lemeshow's $R_L^2 = .1339$ is not particularly high, but the model's prediction accuracy is 59.84% overall, suggesting that the predictions that the model makes are above chance. The values of accuracy for individual antecedents are 69.56% for the subject, 55.56% for the object and 38.15% for the extra-linguistic referent.

Finally, Table 4-3 shows the results for the control conditions. The choices of both participant groups matched the predicted interpretations, suggesting that the pictures clearly depicted the intended situations. In the gerundive clause conditions, the participants had a strong preference for the subject. In the relative clause condition, they predominantly selected the object, while in the temporal clause condition, they mainly opted for the extra-linguistic referent.

Table 4-3. Mean responses in the control conditions

| Condition | Group | Referent selection (%) | | |
|----------------------------|-------|------------------------|--------|--------|
| | | Subject | Object | Other |
| Postposed gerundive clause | L1 | 82.99% | 12.50% | 4.51% |
| | 2L1 | 70.83% | 24.58% | 4.58% |
| Relative clause | L1 | 17.02% | 79.51% | 3.47% |
| | 2L1 | 18.33% | 77.08% | 4.58% |
| Preposed gerundive clause | L1 | 83.06% | 13.13% | 3.82% |
| | 2L1 | 75.00% | 20.00% | 5.00% |
| Temporal clause | L1 | 16.74% | 14.03% | 69.24% |
| | 2L1 | 12.50% | 15.00% | 72.50% |

5. Discussion and Conclusion

The study aimed to determine whether Croatian-Italian simultaneous bilinguals accept Italian overt subject pronouns referring to topical antecedents more often than age-matched Italian monolinguals and whether they interpret null subject pronouns in a native-like way. Based on the results of Kraš (2008a, 2016) and Kraš, Rubčić and Stipeć (2015), we hypothesised that they would not accept Italian overt subject pronouns referring to topical antecedents more often than age-matched Italian monolinguals and that they would interpret null subject pronouns in a native-like way. These hypotheses were confirmed in the study.

Together with the results of Kraš (2008a, 2016) and Kraš, Rubčić and Stipeć (2015), these results lend further support to the representational account of interface instability, according to which difficulties with interface structures experienced by bilingual speakers result from cross-linguistic influence, whereby the language that instantiates a more economical setting influences the language that offers a less economical setting. This account predicts that difficulties should not arise when two languages do not differ with respect to an interface property, which is the case with Italian and Croatian with regard to the antecedent biases of null and overt subject pronouns in intra-sentential contexts.

To strengthen our conclusions, it would be good to test a group of bilinguals whose other language does differ from Italian in the domain under study by means of the same picture selection task, as we would expect to find over-acceptance of overt subject pronouns referring to topical antecedents in these speakers. It would also be interesting to see how Croatian-Italian bilinguals interpret Italian null and overt subject pronouns in a naturalistic setting, as experimental and naturalistic settings sometimes yield a different behaviour (see e.g. Kupisch 2014); looking at

their production would also be worthwhile. Finally, examining the bilinguals' online comprehension of Italian null and overt subject pronouns could provide us with a deeper insight not only into the sources of instability at the syntax-discourse interface, but also into the limits and nature of bilingual language processing.

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CHAPTER FIVE

ANAPHORA RESOLUTION BY EXPERIENCED AND TRAINEE TRANSLATORS: NATIVE- OR ATTRITION-LIKE?

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1. Translation and Language Attrition

Translated texts have been shown to differ from comparable originals in the same language in areas similar to those designated as problematic in second language (L2) acquisition (see Blum-Kulka 1986; Gaspari and Bernardini 2010). Comparisons have also been made between translation and first language (L1) attrition. Cardinaletti (2004; 2005) discovered instances of overuse of overt pronominal subjects in translations from English and German into Italian and, based on studies of other bilingual domains (see section 3), related them to cases of attrition. Such overuse is illustrated in (1), from Cardinaletti (2004: 137-138), where *loro* “they” in the Italian translation is judged as “surprising”.

- (1) a. if it got out that they were related to a pair of – well, [...] (HP, 11)¹
b. se veniva fuori che **loro** erano parenti di una coppia di ... be' [...] (HP, 11)

Cardinaletti interpreted instances of overuse, such as (1), as indicative of changes to the internal linguistic system of experienced translators. The claim that prolonged contact with an L2 leads to a form of L1 attrition in translators is certainly an interesting one. However, two methodological

¹ HP = J. K. Rowling's *Harry Potter and the Philosopher's Stone*. For full bibliographic details, see Cardinaletti (2004: 135, fn. 6).

points need to be made. First, claims about the translators' internal linguistic system can be reliably made only if experimental studies are conducted too. Second, in order to reliably show attrition effects, the translators' L1 needs to be investigated outside the translation context.

Two studies dealing with translators in an experimental setup typical of L2 acquisition/L1 attrition research were conducted by Miličević and Kraš (2017a, b). In these studies, trainee translators from L2 English into L1 Italian and L1 Serbian did a picture selection task in which they were asked to identify antecedents of null and overt subject pronouns. The translators did not over-accept overt subject pronouns in any of the studies, failing to provide evidence of (incipient) L1 attrition. The study presented in the present paper builds upon this work by looking at an additional null-subject language, Croatian, and by adding a new subject group consisting of experienced translators. Before we present the details of the study, we describe the relevant properties of subject pronouns in Croatian and review in more detail previous work on null and overt subject pronouns in bilingual language development.

2. Null and overt Pronominal Subjects in Croatian

Croatian is a pro-drop language; its pronominal subjects can be either overt or null (omitted). The choice between the two possibilities is governed by discourse-pragmatic constraints: a null pronoun typically expresses co-reference with a topical antecedent, while an overt pronoun normally indicates co-reference with a non-topical antecedent. This principle is illustrated in (2), where the null subject of the second sentence (*pro*) can only refer to the subject of the first sentence (Lucija), which is the topical antecedent, while the overt subject can either refer to Lucija or, more likely, to another female referent, mentioned in previous discourse.

- (2) Lucija_i je položila ispit. Sretna je *pro*_{i/*j}/Ona_{#i/j} je sretna.
 Lucija is passed exam happy is *pro* / she is happy
 'Lucija passed an exam. She is happy.'

In intra-sentential contexts, null pronouns prefer antecedents in the subject position (typically co-referential with the discourse topic), while overt pronouns prefer antecedents in a non-subject position. This principle, known as the Position of Antecedent Strategy (PAS), was formulated by Carminati (2002) for Italian, but it has been demonstrated to hold for Croatian as well (Kraš 2008b), as illustrated below:

- (3) Lucija_i je nazvala Petru_j dok je pro_{i/ʔʔ/onaʔi/ʃ/k} učila.
 Lucija is called Petra while is pro /she studied
 ‘Lucija phoned Petra while she was studying.’

The null subject of the subordinate clause in (3) is more likely to refer to the main clause subject (Lucija) than to the main clause complement (Petra), while the overt subject is more biased towards the complement. The overt pronoun can also be linked to a female antecedent known from previous discourse, i.e., an extra-linguistic referent.

3. Related Work on Pronominal Subjects in Bilingualism

Highly proficient bilinguals have been reported to accept and/or produce overt subject pronouns referring to topical antecedents to a significantly greater extent than monolingual speakers. At the same time, no difficulties have been discovered with the bilinguals’ interpretation and use of null pronouns. This pattern is found in different pro-drop languages, such as Italian, and for different bilingual populations, including simultaneous bilinguals (Serratrice 2007; Sorace, Serratrice, Filiaci and Baldo 2009), adult L2 learners (Sorace and Filiaci 2006), and L1 attriters (Tsimplici, Sorace, Heycock and Filiaci 2004). The other language of the bilinguals in these studies is mostly English, but similar effects are found with Spanish, a pro-drop language with overt pronouns that are less biased towards non-topical antecedents (Filiaci, Sorace and Carreiras 2014).

However, a similar pattern has not been replicated in studies with bilinguals speaking Italian and Croatian, two pro-drop languages that do not differ with respect to antecedent biases of subject pronouns. Croatian-speaking L2 learners of Italian (Kraš 2008a; 2016) and Croatian-Italian simultaneous bilinguals (Kraš, Rubčić and Stipeć 2015) have been found to interpret both null and overt pronouns in Italian and Croatian respectively in a target-like fashion. This lends support to the view, first proposed by Tsimplici, Sorace, Heycock and Filiaci (2004), that the bilinguals’ non-target-like treatment of overt subject pronouns results from cross-linguistic influence, whereby a language in which overt pronouns are used to refer to both topical and non-topical antecedents (e.g., English or Spanish) influences a language in which these forms are typically used for non-topical antecedents (e.g., Italian). In the current study, we look at bilinguals whose L1 (Croatian) and L2 (English) differ in the anaphoric biases of overt subject pronouns, which provides suitable conditions for exploring a possible operation of cross-linguistic influence.

4. The study

4.1 Research Questions and Hypotheses

We address the following research questions: Do translators from L2 English into L1 Croatian accept overt subject pronouns, in contexts in which null subject pronouns are preferred, to a higher extent than non-translators? Do experienced translators differ from trainee translators in this respect? Based on previous work, we hypothesise that, compared to the control group and trainee translators, experienced translators from English into Croatian do over-accept overt subject pronouns in contexts in which null subject pronouns are preferred.

4.2 Participants

Three groups of native speakers of Croatian participated in the study: experienced translators, trainee translators, and a control group of non-translators ($N=24$ in all cases). Experienced translators were recruited through personal connections. The subjects in the trainee translator group were MA-level translation students at the University of Zagreb, while the controls studied different subjects at the University of Rijeka.

The key factor in defining the groups was engagement in translation, present for the experimental groups and absent for the controls. Translation experience was central to the distinction between experienced and trainee translators; the former had a median 10 years of professional experience (ranging from a minimum of 3 to a maximum of 51 years), while the latter were still at the training stage and were thus not asked about experience.

Proficiency in English was also taken into account, as L1 attrition is related to very advanced L2 levels (Tsimplici, Sorace, Heycock and Filiaci 2004: 265). The proficiency test used was the Oxford Quick Placement Test (OQPT). Highly proficient controls were deliberately selected to make sure any differences in the groups' performance were not due to major proficiency dissimilarities (see Christoffels, de Groot and Kroll 2006: 326). The groups were not identical, though, as shown by the median values and as confirmed by statistical tests: a Kruskal-Wallis test ($H(2) = 25.89, p < .001$), which revealed an overall significant difference between groups, and pairwise Wilcoxon rank sum tests, which found the controls to be different from translators (controls : experienced translators $W = 505.5, p < .001$; controls : trainee translators: $W = 487, p < .001$). The

participant proficiency data and biodata are summarised in Table 5-1 below.

Table 5-1. Participant data

| Subject group | Age at testing | | LoE to English | | L2 proficiency | |
|-------------------------|----------------|-------|----------------|-------|----------------|------|
| | Median | IQR | Median | IQR | Median | IQR |
| Experienced translators | 36.50 | 13.25 | 15.50 | 10.75 | 58.00 | 2.00 |
| Trainee translators | 22.00 | 1.00 | 16.00 | 2.00 | 58.00 | 2.25 |
| Controls | 24.00 | 2.25 | 13.00 | 4.25 | 54.00 | 4.25 |

4.3 Materials and Procedure

The main task aimed at assessing the participants' interpretation of null and overt subject pronouns was a modified version of the picture selection task (PST) developed by Kraš (2008b; adapted from Tsimplici, Sorace, Heycock and Filiaci 2004). The task was modified from speeded to a self-paced mode of presentation (parallel to the Italian and Serbian versions used by Miličević and Kraš 2017a,b). The participants were asked to read sentences and to match each sentence to one of three pictures. The sentences contained two clauses: a main clause with a transitive verb and two singular animate gender-matched NPs, acting as the subject and the complement²; subordinate clauses belonged to several types (see below).

Figure 5-1 shows an example of a picture set from the task, with corresponding sentences provided in (4) and (5). In all three pictures, a character A (representing the main clause subject) is shown as the agent of the action described in the main clause. Different characters are shown performing the action described in the subordinate clause: the same character A in one picture, character B (main clause complement) in another, and character C (an extra-linguistic referent) in the third picture. Pictures illustrating these different scenarios are numbered 3, 1, and 2 in Figure 5-1, respectively. To prevent ordering effects, the order in which the three referents were shown in pictures was varied systematically.

² The gender of the two NPs was counterbalanced across the experiment.



Figure 5-1. Example of a picture set used in the main task

There were four experimental and four control conditions. Experimental sentences contained a third person singular null or overt subject pronoun in the subordinate clause and were ambiguous as to the antecedent. The overt pronouns were matched in gender with the subject and the complement of the main clause, as well as the extra-linguistic referent shown in one of the pictures. Some sentences were anaphoric (main-subordinate clause order), and some cataphoric (subordinate-main). Examples are given in (4).

- (4) a. Anaphora with a null pronoun
 Majka_i pokriva djevojčicu_j dok *pro*_{i/?j} gasi svjetlo.
 mother tucks in girl while *pro* turns off light
 ‘The mother tucks in the girl while she turns off the light.’
- b. Cataphora with a null pronoun
 Dok *pro*_{i/?j} gasi svjetlo, majka_i pokriva djevojčicu_j.
 while *pro* turns off light mother tucks in girl
 ‘While she turns off the light, the mother tucks in the girl.’
- c. Anaphora with an overt pronoun
 Majka_i pokriva djevojčicu_j dok ona_{?i/j/k} gasi svjetlo.
 mother tucks in girl while she turns off light
 ‘The mother tucks in the girl while she turns off the light.’
- d. Cataphora with an overt pronoun
 Dok ona_{?i/j/k} gasi svjetlo, majka_i pokriva djevojčicu_j.
 while she turns off light mother tucks in girl
 ‘While she turns off the light, the mother tucks in the girl.’

Each experimental condition had an unambiguous control counterpart representing its predicted preferred reading by the control group. That made for a total of 48 sets of pictures in the task, rotated across eight

conditions (four ambiguous and four unambiguous), in a Latin square design. In this paper, we limit our analysis to the ambiguous conditions.

Participants were tested individually in a quiet room. They first did the OQPT, and then filled in a background questionnaire; the PST, implemented in E-Prime 2.0, was done last. The participants would first read a sentence in a self-paced manner, and then see three pictures, marked with numbers 1, 2, and 3 (see Figure 5-1). They had to choose the picture that best matched the sentence in meaning by pressing the appropriate key on the keyboard. Only one choice was allowed, and the time for making it was unlimited.³ The sentences were presented word by word, in a centre non-cumulative mode. Commas were not used in order to avoid introducing a bias towards a specific interpretation. The order in which the sentences were presented was randomised.

4.4 Results

The results of the experimental conditions are displayed in the figures below, which show the distribution of antecedent choices—main clause subject, main clause complement, and extra-linguistic referent (marked “other”)—by participant group, separately for null and overt subjects.

As can be seen in Figure 5-2, translators and controls give similar responses in the null pronoun conditions: they all clearly prefer the subject antecedent, with the complement as the second choice. The subject preference is slightly weaker in the control group. Figure 5-3, on the other hand, reveals some differences between subject groups. In anaphora with an overt pronoun, all groups mostly select the complement, while in the case of cataphora the controls mainly associate overt pronouns with extra-linguistic referents, while the two translator groups split their preference between extra-linguistic referents and complements. Most importantly for our research questions, the translators provide no evidence of over-accepting subject antecedents in overt pronoun conditions; they actually select them *less* than the controls, in both anaphora and cataphora.

³ Even though reading and response times were recorded, due to the differences in sentence lengths they were not analyzed.

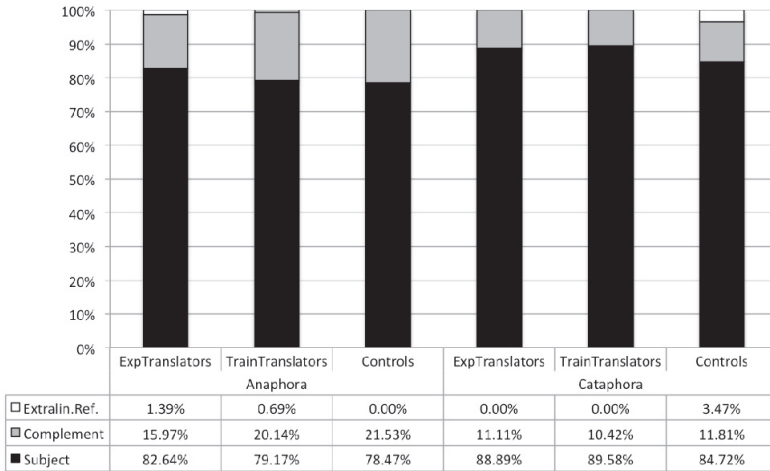


Figure 5-2: Mean responses in the null subject conditions

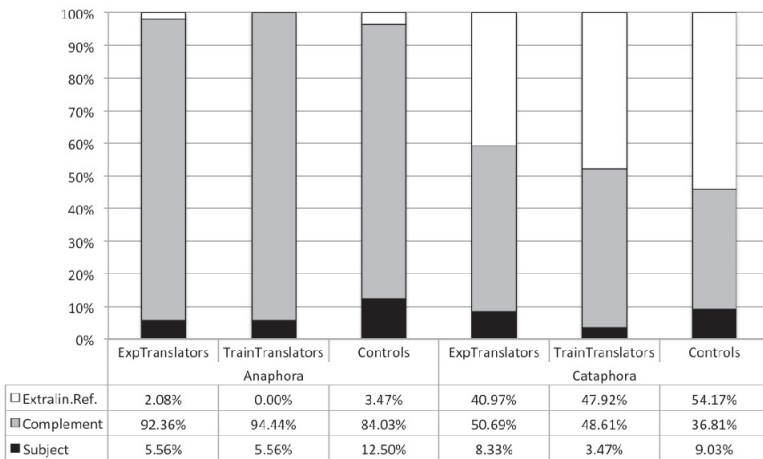


Figure 5-3: Mean responses in the overt subject conditions

Statistical significance of the results was checked through polytomous logistic regression. The outcome variable was the choice of antecedent (main clause subject, main clause complement, extra-linguistic referent), while participant group (experienced translators vs. trainee translators vs.

controls), pronoun type (null vs. overt), and clause order (anaphora vs. cataphora) were used as predictors, together with three interactions (participant group: pronoun type, participant group: clause order, and pronoun type: clause order). The analysis was performed using the R (<http://www.R-project.org/>) package *polytomous* (Arppe 2013), which allows the analysis of non-binary outcomes.

Table 5-2 summarises the obtained statistical results. The model parameters are expressed in terms of odds in favour of or against a particular referent being selected given the predictor variables. The intercept line denotes the odds contributed by aggregate default values of the predictors, i.e., the control group's responses on anaphora with a null pronoun. Values <1 indicate that the chance of an outcome is decreased, while those >1 specify an increase; asterisks signal predictors that contribute significantly to the selection of a given referent.

Table 5-2. Polytomous logistic regression model results

| Predictor variable | Odds of referent selection | | |
|---|----------------------------|------------|----------|
| | Subject | Complement | Other |
| (Intercept) | 3.704*** | 0.254*** | 0.012*** |
| GroupTrainTransl | 1.089 | 1.038 | 0.090 |
| GroupTrainTransl : AnaphoraTypeCataphora | 1.315 | 0.687 | 2.842 |
| GroupTrainTransl : PronounTypeOvert | 0.3166** | 2.478** | 2.842 |
| GroupExpTransl | 1.181 | 0.783 | 0.616 |
| GroupExpTransl : AnaphoraTypeCataphora | 1.423 | 0.997 | 0.449 |
| GroupExpTransl : PronounTypeOvert | 0.443* | 2.451** | 1.966 |
| AnaphoraTypeCataphora | 1.466 | 0.595 | 1.869 |
| PronounTypeOvert | 0.038*** | 22.93*** | 1.869 |
| AnaphoraTypeCataphora : PronounTypeOvert | 0.502* | 0.159*** | 28.8*** |

* $p < .05$; ** $p < .01$; *** $p < .001$

Given the presence of three participant groups, both translator groups are compared to the controls which constitute the baseline. The reported odds at both times are such that they show no significant effect of the group on the choice of any of the referents. The interactions between participant group and clause order are also non-significant, but an important finding concerns the interactions with pronoun type: when

group = experienced or trainee translators, and pronoun type = overt, odds are significantly increased for the choice of the complement, and decreased for the subject. In other words, the subject referent is significantly less likely to be chosen as antecedent of an overt pronoun by the translators than by the control group, while the opposite is true of the complement. The pronoun type has a significant impact on antecedent choice, with an overt pronoun increasing the odds of the complement being chosen, and decreasing the odds of subject selection. Major differences between anaphora and cataphora are not detected. If, however, clause order = cataphora and pronoun = overt, the odds of an extra-linguistic referent being chosen become higher, while those of the other two referents are lowered. Lastly, the default case increases the odds of subject selection, while it decreases those for complement choice, and in particular for extra-linguistic referent selection.

As for the evaluation of the regression model, its prediction accuracy is 77% overall, while for individual referents it reaches 84% for the subject, 74% for the complement, and 54% for the extra-linguistic referent. The value of Hosmer and Lemeshow's $R_L^2 = 0.449$ is an additional indicator of the model's good fit to the data (cf., Han, Arppe and Newman 2017).

5. Discussion and Conclusion

Our study had the goal of testing the interpretation of null and overt subject pronouns in ambiguous intra-sentential contexts in Croatian by three groups of native speakers, experienced and trainee translators from English and a control group of non-translators. We wanted to see whether translators pattern with L2 learners and L1 attriters from related studies in selecting more main clause subject antecedents for overt pronouns than the controls (pointing to (incipient) L1 attrition). The results did not confirm our hypotheses: the translators mostly patterned with the controls and, contrary to expectations, they selected the main clause subject as the antecedent for an overt pronoun to a significantly *lower* extent than the control group. No evidence has thus been found for any changes in their internal linguistic system. Experienced translators did accept subject antecedents slightly more than the trainees in cataphora with an overt pronoun, but overall these two participant groups did not differ.

The findings are in line with the results obtained by Miličević and Kraš (2017a, b), where trainee translators from L2 English into L1 Italian and Serbian showed no indication of L1 attrition. The added-value finding of the present study is that the same conclusion applies to experienced translators, who were the actual target of Cardinaletti's attrition claims.

Keeping in mind that Cardinaletti's work reporting overuse of overt pronominal subjects by experienced translators was based on translated texts rather than experimental tasks targeting L1 use outside translation, one explanation for these results relates to the linguistic task the translators engage in: problems might be limited to the translation process rather than affecting the translators' underlying L1 system.

Another issue that calls for closer inspection is why translators selected overt pronominal subjects *less* than the controls. Miličević and Kraš (2017a, b) proposed this pattern may be due to the translators' prolonged linguistic training and the ensuing heightened metalinguistic awareness, which gives them a vantage point over the controls. Similar results related to the impact of training have been reported for simultaneous interpreters and language teachers, who were found to outperform linguistically untrained monolinguals and bilinguals on different language tasks. For instance, Christoffels, de Groot and Kroll (2006) obtained such a result for lexical retrieval tasks in which they compared Dutch-speaking interpreters from/into English, Dutch-speaking English language teachers, and untrained Dutch-English bilinguals.

To sum up, the current study on anaphora resolution in Croatian did not find evidence of L1 attrition in translators, be they experienced or trainees. This finding opens many new questions and points to a number of additional factors that could be looked at in future studies: these primarily include the participants' linguistic training and metalinguistic competence and the characteristics of the task in which the participants engage (translation vs. non-translation, comprehension vs. production, written vs. oral, timed vs. untimed). Lastly, it could also be interesting to compare translators to control groups with different levels of proficiency in English, in order to fully tease apart specific translation effects from a more general influence of L2 proficiency.

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CHAPTER SIX

REFERENTIAL EXPRESSION AND COGNITIVE CONTROL IN JAPANESE-ENGLISH BILINGUAL CHILDREN

MAKI KUBOTA

1. Introduction

Appropriate use and understanding of referential expressions are essential for successful communication. This is especially relevant when there are two potential referents in the discourse. For example, in sentences such as: *The mother and the daughter were shopping. She...*, the pronoun *she* should be avoided to reduce ambiguity. Instead, the use of a more explicit form such as *The mother* makes the referent clear to the conversational partner.

In the current study, we adopt the bidirectional optimisation view by Hendriks, Koster, and Hoeks (2013: 4) in which “language users not only determine the optimal output from their own perspective but also optimise from the perspective of their conversational partner”. More specifically, choice of referent involves three steps: (1) determining the discourse topic, (2) selecting a form according to the constraint of grammar, and (3) perspective taking of the hypothetical conversational partner (Hendriks, Englert, Wubs, and Hoeks 2008; Hendriks 2016). Refer to example (1).

- (1) A girl is walking along the road.
She looks very happy.
She goes to a candy shop.
She meets an old woman.
The old woman is eating a candy.
She is really hungry.

First, the speaker must determine the discourse topic as *the girl*. In accordance with the constraints of grammar that pronouns refer to the discourse topic and that shorter forms are preferred, *she* is used to refer to *the girl*. However, when the speaker wants to talk about the less prominent referent—*the old woman*—he/she must inhibit the urge to use the default pronoun option and deliberately use a full NP to accommodate the needs of the listener.

2. Cognition and Choice of Referents

Previous studies have shown that there is variation in individuals' choice of referents. Subsequently, the question is: *what can account for such variability?* A possible explanation is that cognitive factors are involved in the comprehension and production of referents. Taking the perspective of others and keeping track of discourse elements involves cognitive capacity, and when this capacity reaches its limit, speakers may produce anaphoric forms that are unrecoverable for the listener (Vogels, Krahmer, and Maes 2014). According to the computational model constructed by Hendriks (2016), working memory (WM) is involved in building one's discourse model. In other words, the higher the WM is, the better one can store goal relevant information (e.g., the subject of the previous discourse). Moreover, the extra step involved in perspective taking is executed at the cost of processing speed. The speaker must first choose a form according to one's own discourse model, and then test to see if this form matches with the best option provided from the listener's point of view.

Relatively few studies have investigated the relationship between cognitive function and choice of referents. Hendriks et al. (2013) revealed that children who have higher working memory scores, measured using word repetition task, also used more full NPs in a reintroduction context, where an explicit form is favored for a mutual understanding between the speaker and the listener. This finding was also confirmed in a study by Kuijper, Hartman, and Hendriks (2015), which examined this relationship among six- to twelve-year-olds monolingual Dutch children. The materials included a picture depiction task, a Theory of Mind task, and cognitive tasks measuring inhibition and WM. They found that WM and Theory of Mind performance predict the choice of referents, however, only in the reintroduction context where the speaker must take the perspective of the listener to produce appropriate referents.

In contrast, Vogels et al. (2014) found in their story continuation task that cognitive load affects referent production only in cases where the speaker must determine the appropriate form based on its saliency. Speakers who were put under significant cognitive pressure as a result of a secondary task produced more pronouns when the referent was less salient. This result was consistent, regardless of whether the information was shared with the listener or not. To account for this finding, we argue that speakers resort to the most economical option, the use of a pronoun, especially when they are under cognitive load. Further investigation is necessary to see how the relationship between referential choice and cognitive control manifests within the bilingual context. Moreover, it remains unclear which aspect of cognitive control (i.e., WM, inhibitory control, shifting) is involved in the choice of referents.

3. Methodology

3.1 Participants

The participants consisted of 38 Japanese-English bilingual children (Mean age = 9;9, range 7;8–12;11, $SD = 1;3$, 23 female), who acquired English as a second language in a foreign country. All of the bilingual children's parents speak Japanese as their native language and the children have been exposed to Japanese from birth. The average age of L2 English acquisition was five years old (range 1;0-9;6, $SD = 2.5$). The participants learnt English through living in a foreign country and attending schools with English as a medium of instruction. The average length of residence in the foreign country was four years (range 2;0-9;9, $SD = 2;0$). The participants were recruited from an English maintenance course offered from JOES (Japan Overseas Educational Services).

3.2 Comprehension Task

The story comprehension task was adapted from Hendriks et al. (2013). The task required participants to listen to short stories, each consisting of six sentences, and answer a question at the end of each story. The story always included two characters with the same gender. In the *non-switch* condition, the topic of the story was consistent, with the first character in the subject position. However, in the *switch* condition, the topic shifted from the first character to the second character in the fourth sentence. This was done by changing the syntactic position and the form. The subject position, which was always occupied by the first character was replaced by

the second character. The first character was moved to the object position and was referred to with a full NP rather than a pronoun. The concluding sixth sentence always included an ambiguous pronoun, in which the referent could be interpreted as either one of the two characters. After each story, the participants were asked to choose the referent of the ambiguous pronoun. There were eight stories in total, with four *non-topic shift* and four *topic shift* stories. The order of presentation of these stories was randomized. See Appendix 1 for examples of each condition.

In the Japanese task, the ‘ambiguous overt pronoun’ in English was replaced by a null pronoun, making the referent also unclear to the listener. Since overt pronouns are hardly used in Japanese, let alone in child language production (Clancy 1992), Japanese null pronouns, like English pronouns, were used to refer to the current topic (Nakahama 2009). Thus, participants listened to sixteen stories in total: eight in Japanese and eight in English. Half of the children did the English task first and the other half in Japanese. Each language task was preceded by a practice session. The participants were only allowed to listen to the story once. The stories were pre-recorded by a simultaneous Japanese-English bilingual for both of the language tasks.

3.3 Executive Function Tasks

The following section describes the three executive function tasks administered in the current study. All of these tasks were administered on a laptop computer (15-inch screen). The experiment was constructed and administered using E-prime.

3.3.1 Advanced DCCS

The Advanced DCCS task (adapted from (Chevalier, Blaye, Dufau, and Lucenet, 2010)) was used to measure how well the children could resolve conflicts, monitor processes, and switch between task sets. The experiment included a total of 84 test trials in three conditions: blocked-color, blocked-shape, and mixed-color and shape. The blocked-color and blocked-shape trials were counterbalanced, but always preceded the mixed condition. A trial involved choosing the picture with either the same color or shape indicated by a simultaneous visual cue. Each blocked condition consisted of 20 trials and five practice trials. The mixed condition included 44 trials divided into two blocks with 22 trials each preceded by 16 practice trials. The mixed conditions included both switch (color-shape or shape-color) and repetition (color-color or shape-shape) sequence. In

addition, a third of the trials were switch trials and the other two thirds repetition trials. The switch cost was calculated by subtracting the average response time on the repetition trials from the switch trials.

3.3.2 Simon

The Simon task measured the ability to suppress unwanted responses and inhibit irrelevant information. The participants were presented with either a picture of a shoe or a frog on the bottom left or the bottom right corner of the screen. Participants had to respond by pressing the two keys “Q” (bottom left corner) or “P” (bottom right corner) according to the position of the matched picture at the top of the screen. There were 13 practice trials. There were 40 experimental trials in total and one third of these trials were congruent and two thirds incongruent. The Simon effect is calculated by subtracting the average reaction time on the congruent trials from the incongruent trials.

3.3.3 N-back

The *N*-back task, adapted from Chevalier (2017), measured the ability to update information in working memory. The participants underwent two difficulty levels of the *N*-back task. All of these levels required the children to detect items that repeat at a given interval. Each level consisted of a series of 32 pictures. There were four different pictures (smiley face, cat, house, airplane) used in each level. These pictures were presented one at a time for 1,500-ms, preceded by a 500-ms fixation cross. The pictures appeared eight times in each level in random order. In the first and easiest level, children were instructed to press the space bar if they saw a picture that was the same as the one presented one trial back (1-back). In the second level, the task became more cognitively demanding, as the children were instructed to press the space bar each time the picture matched the one presented two trials back (2-back). In each level, there were eight target pictures (matched) and 24 non-target pictures (unmatched). The accuracy and reaction time on the accurate responses in the 2-back task are included as a variable in the analysis.

3.4 Procedure

The experiment was conducted either in a JOES classroom or the participants' home. Half of the participants did the English comprehension task first followed by the Japanese comprehension task, and vice versa for

the other half of the participants. All participants undertook the three EF tasks in between the two language comprehension tasks. The experiment lasted about an hour. In the comprehension task, the participants were given as much time as they needed to answer the questions, but they were not allowed to listen to the story twice. In the EF tasks, they were asked to follow the directions provided by the researcher and to respond as quickly and accurately as possible. The order of the EF tasks was counterbalanced across all participants.

4. Results

All the analyses were conducted in R using the package ‘lme4’.

4.1 EF Cost Measures

First, we ran a Mixed Effect Model for each of the EF tasks to see whether the cost effects are significant. Before running the model, an individual’s reaction time was deleted if it deviated more than three standard deviations from the mean reaction time. Each model included RT (reaction time on accurate responses) or Accuracy as a dependent variable and Condition (DCCS: Mixed non-switch, Mixed switch; Simon: Incongruent, Congruent; N-back: 1-back, 2-back) as a predictor. For the models with RT as a dependent variable, a Linear Mixed Effect Model (LME) was used. For the models with Accuracy as a dependent variable, Generalised Linear Mixed Effect Model (GLMM) with logit link was used. The outcome variable for Accuracy was coded in binary form (0 for inaccurate and 1 for accurate response). For all models, Subject was included as a random variable.

All the EF cost effects in reaction times were significant and in the expected direction (DCCS: Non-switch is faster than Switch; Simon: Congruent is faster than Incongruent; N-back: 1-back is faster than 2-back). For accuracy, the effects were significant and in the expected direction on all measures with the exception of Simon switch cost ($Z = -0.23, p > .05$).

4.2 EF and Comprehension Task

In order to examine the relationship between performance on EF and comprehension tasks, we performed GLMM with logit link. In the Simon and Advanced DCCS tasks, smaller values indicate better executive functioning since we subtracted the congruent/non-switch trials (faster

RTs) from the incongruent/switch trials (slower RTs). The outcome variable (i.e., Accuracy on the comprehension task) was coded in binary form (0 for inaccurate and 1 for accurate response). Each of the four EF measures (Simon effect, Advanced DCCS switch cost, 2-back accuracy, 2-back reaction time) was inserted into the model separately. Condition, Language (English or Japanese), and one of the EF measures were added to the model. Contrast coding was applied for factorial predictors. First, a null model was built, and then the model was repeated with the inclusion of intercepts (Subject and Item), slopes, fixed effects, and interactions. All the main effects of the EF tasks are summarized in Table 6-1.

Table 6-1. Estimated coefficients of the effects of EF tasks on accuracy on comprehension task

| | Estimate | Std. Error | z-value |
|------------------------------------|----------|------------|---------|
| Advanced DCCS (Switch Cost) | -2.45 | 2.27 | -1.07 |
| Advanced DCCS (Mixing Cost) | -0.47 | 1.61 | -0.29 |
| Simon | 4.27 | 3.41 | 0.21 |
| 2-Back RT | -0.08 | 1.22 | -0.06 |
| 2-Back ACC | -0.01 | 0.03 | -0.24 |

None of the EF predicted the accuracy on the comprehension task ($Z < 1.07, p > .05$). However, the relationship was in the expected direction with the exception of Simon effect ($E = 4.27, z = .21, p > .05$) and 2-Back Accuracy ($E = -0.007, z = .03, p > .05$). There were no interactions between Language and the four EF tasks.

5. Discussion

The aim of the current study was to examine the relationship between cognitive control and referential choice in bilingual children. Assuming Hendriks' (2016) bidirectional optimization account, it was expected that both processes (i.e., choosing a referent based on one's own discourse model *and* the perspective of the conversational partner) involve cognitive load. More specifically, WM was hypothesized to be involved in the construction of a discourse model and the storage of goal-relevant information. Response inhibition, on the other hand, was predicted to be associated with listener-based choices, as the speaker must inhibit one's own discourse model in order to take the other's perspective. By administering three EF tasks measuring the ability of inhibition, set

shifting, and WM/attention, we expected to see a relationship between performance on the language comprehension and the EF tasks.

5.1 EF Cost Measures

The analysis of the EF cost measures was in line with previous literature. First, the Simon effect was present: the difference in reaction time and accuracy between incongruent and congruent conditions was significant. Second, in the Advanced DCCS task, there was a significant switch cost for both reaction time and accuracy. Lastly, in the N-back task, 1-back had significantly faster reaction times and higher accuracy than 2-back task. The only measure which did not reach significance was the Simon effect for accuracy. All of the EF costs were in the expected direction, which shows that both groups behaved in an expected manner for the EF tasks.

5.2 EF and Comprehension Task

Contrary to our prediction and previous findings, none of the EF tasks predicted the outcome on the comprehension task for both languages. The relationship was in the expected direction (i.e., higher EF cost, lower accuracy) for most of the EF tasks. However, the p -value was far from significant. This result was unexpected, considering the findings of past studies (Hendriks, et al. 2013, Kuijper et al. 2015, Whitely & Colozzo 2013, Vogels et al. 2014). Next, we will examine what factors could account for the discrepancies between the findings from the current study and previous studies.

5.2.1 Comprehension vs. Production

The first and foremost difference between this study and previous studies is that the current study utilised a comprehension task, while the other studies administered a production task. Whitely and Colozzo (2013) used a wordless picture book to elicit production, while Hendriks et al. (2013) and Kuijper et al. (2015) constructed a language production task specifically designed to elicit referential expressions in various contexts. Vogels et al. (2014), on the other hand, manipulated the cognitive load of the speaker within a task by adding a verbal memory task in half of the story completion experiments.

We administered a comprehension task adapted from Hendriks et al. (2013) with two conditions: a topic shift and a non-topic shift. A topic shift was marked by changing the syntactic position and the form of the

referents. In theory, as described by Hendriks et al. (2013: 10), “listeners who are sensitive to the speaker’s referential choices are predicted to interpret the potentially ambiguous pronoun at the end of the structured discourse as referring to the discourse topic”. According to Hendrik’s (2016) bidirectional optimisation view, the processes involved in the comprehension of referents involve the same cognitive processes as in production. In production, the speaker must first determine the current discourse topic and then consider potential candidates (i.e., pronoun or full NP) in order to express the intended referent. According to the constraint of grammar, the most economical form (i.e. a pronoun) is chosen. However, in the third step, the speaker must recognize that the use of a pronoun will be interpreted as the unintended referent to the listener. Thus, the speaker must inhibit the urge to select a pronoun and use a full NP.

It is uncertain, however, whether the same process in production is also involved in the comprehension task constructed by Hendriks et al. (2013), which was adapted in our study. For example, when the participant hears the sentence, “The knight gives the ball to the pirate. *He* went back home”, and is then asked who *he* refers to, the only steps involved in this context are the first two: (1) determining the discourse topic and (2) applying linguistic constraints. In other words, the listener can interpret the correct referent by merely determining the discourse topic in the previous sentence (i.e., knight), and interpreting the pronoun as referring to the discourse topic (i.e., *he*=knight). Although it may make the interpretation of pronouns more difficult if the discourse topic has been switched within a story, the referent of the pronoun can be interpreted *without* taking the perspective of the speaker. Consequently, the interpretation of the pronoun in the current comprehension task does not involve the third step: considering the perspective of the conversational partner. Thus, the interpretation of the ambiguous pronoun in the comprehension task may not have been as cognitively demanding as the production of an appropriate referent. This may be a partial explanation as to why we did not find any relationship between the performance on EF and comprehension tasks. In fact, the comprehension results from Hendriks et al. (2013) revealed that the children who had higher memory scores actually gave more incorrect responses.

5.2.2 Measures of cognitive control

Another factor that may have contributed to the discrepancies in the findings is the diverse measures of cognitive control. Hendriks et al. (2013) used an auditory memory task which required repetition of words

increasing in length and semantic complexity. Vogels et al. (2014) used a verbal memory task to manipulate the cognitive load in the story completion task. These EF tasks both involve the use of language, which may, in turn, increase the chances of finding a significant correlation when associating their performance to a language task. Botting, Jones, Marshall, Denmark, Atkinson, and Morgan (2015) point out that the degree of language content involved in each EF tasks is rarely controlled, which could greatly impact on the outcome of the study. Furthermore, we often assume that different tasks measure the same cognitive mechanism, but this may not always be the case. For example, Whitely and Colozzo (2013) used four EF tasks set to measure updating skills: Sound Monitoring, N-back (1-back and 2-back), and Keep Track. They found that only two of the four tasks (Sound Monitoring and 1-back) predicted the variance in the production of referents. Moreover, in their study examining the cognitive advantages of bilingualism through carefully matched populations, de Bruin, Bak, and Sala (2015) suggested that non-executive components, such as the type of stimuli, processing speed, or language in the EF tasks, could contribute to the inconsistencies in findings regarding the cognitive benefits of bilingualism.

Appendix A

Condition: Switch

A pirate was playing with a ball.
He kicked the ball into a puddle.
He asked a knight to help get the ball out.
The knight brought a big fishing net and got the ball out.
The knight gave the ball to the pirate.
He then went back home.

Condition: Non-Switch

A nurse was watering some flowers.
She loved looking at the beautiful flowers.
She saw a female patient sitting on a bench.
The nurse bent down and pulled one flower out.
The nurse gave the flower to the female patient.
She then walked back to the hospital.

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PART III:

**THE SYNTAX–DISCOURSE AND THE
SYNTAX–SEMANTICS INTERFACES**

CHAPTER SEVEN

IS THE SYNTAX-DISCOURSE INTERFACE A LOCUS OF PERMANENT OPTIONALITY? THE CASE OF LOCATIVE INVERSION IN L2 ENGLISH¹

JOANA TEIXEIRA

1. Introduction

Over the past decade, the interface between syntax and discourse has been the focus of much research in generative second language (L2) acquisition. Although it is now widely accepted that this interface is potentially problematic at the end-state of L2 acquisition (White 2009, 2011), the following questions are still a matter of debate: (i) Is the syntax-discourse interface necessarily a locus of permanent divergence?; (ii) Are the problems at this interface situated at the level of representation or at the level of processing?; and (iii) What factor(s) cause(s) these problems?

At present, there are two competing views on these issues. According to one view, the so-called *Interface Hypothesis* (IH) (Sorace and Filiaci 2006, Sorace 2011), the interface between syntax and discourse is a locus of residual, but permanent, optionality at the best attainable final state of L2 acquisition (i.e., near-native competence), regardless of whether the L1 is similar to or different from the L2. The IH proposes that this optionality arises because L2 speakers/learners (L2ers) are not consistently efficient at integrating syntactic and discourse information in real-time language use as a by-product of bilingualism.² More specifically, it is argued that the

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² The term “bilingualism” is here used in the broad sense of proficiency in more than one language.

inhibition of the other language(s) represented in the bilingual's mind is a costly operation which may take cognitive resources away from other linguistic tasks and, consequently, lead to processing inefficiencies in the tasks that impose high demands on these resources, such as the integration of syntactic and discourse information in real time (Sorace 2011). According to an alternative view, which emerged from work by Slabakova (2015) and Domínguez and Arche (2014), the structures that involve the syntax-discourse interface only generate problems at advanced levels of acquisition when (i) their properties are different in the L1 and the L2, and (ii) they are either infrequent or display great variability in the input. Unlike the IH, this hypothesis, which I label the *L1+Input Hypothesis* (LIH), situates L2ers' interface problems at the level of representation.

With a view to testing the IH against the LIH, the present study investigates the acquisition of locative inversion (LI) structures,³ such as (1), by advanced and near-native speakers of English whose L1s are European Portuguese (EP) and French. The study uses not only the type of tasks employed in most L2 research on the syntax-discourse interface, that is, untimed offline tasks, but also speeded offline tasks. This is because the type of optionality predicted by the IH, i.e., optionality caused by processing inefficiencies, is best tested through tasks that give insights into processing, such as speeded offline tasks (cf., Sorace 2011).

- (1) [In the woods] [lives] [an old woman] (Levin 1993: 92)
Loc(ative) V(erb) S(ubject)

This paper is organised as follows: Section 2 describes the properties of LI in English, French and EP. In Section 3, I present the research questions, predictions, participants and experimental design of the study. Section 4 reports its results. Finally, in Section 5, I discuss the results and summarise the main conclusions of the study.

2. Locative Inversion in English, French and EP

The acquisition of Locative Inversion (LI) in L1 European Portuguese (EP)–L2 English and in L1 French–L2 English is an appropriate testing ground for the IH and the LIH for three reasons. First, English LI is a

³ Some authors, most notably Culicover and Levine (2001) and Rizzi and Shlonsky (2006), defend that English has two structurally distinct types of LI: (i) light inversion, i.e., inversion with a structurally light subject, and (ii) heavy inversion, i.e., inversion with a (very) heavy subject. This study focuses exclusively on light LI. However, for the sake of simplicity, I use the term “LI” to refer to “light LI”.

structure at the syntax-discourse interface. Second, this construction is infrequent in English and rarely taught in English courses. Lastly, as will be shown in the present section, LI is subject to similar constraints in English and French, but, crucially, not in EP.

In English, LI serves the discourse function of introducing a non-presupposed referent in the spatio-temporal scene set by the fronted XP (e.g. Birner and Ward 1998, Bresnan 1994, Ward, Birner, and Huddleston 2002). For this reason, it is only felicitous when the subject is (part of) the focus (e.g. Bresnan 1994, Cornish 2005, Culicover and Winkler 2008) and the pre-verbal XP is a stage topic, i.e., a presupposed XP which denotes a spatio-temporal location (Teixeira 2016), as illustrated in (2).

- (2) a. *Presupposed locative + subject focus:*
They have a great big tank in the kitchen, and [in the tank are sitting a whole bunch of pots]. (Ward, Birner, & Huddleston 2002, 1386)
- b. *Locative focus + presupposed subject:*
They have a whole bunch of pots in the kitchen, and ??[in a great big tank are sitting all of the pots]. (Ward, Birner, & Huddleston 2002, 1386)
- c. *All focus:*
Did you hear the weird report on the evening news?
??In the basement of a department store are living/live a bunch of alligators. (Birner & Ward 1998, 175)

In English LI, verbs are subject to two constraints. On the one hand, they must be or behave like unaccusative verbs (Culicover and Levine 2001, Rizzi and Shlonsky 2006). On the other hand, they must be compatible with the presentational function of LI, which, in practice, means that they must add little or no information beyond the existence/appearance of the subject (Holler and Hartmann 2012, Levin and Rappaport Hovav 1995, Ward, Birner, and Huddleston 2002). In other words, verbs must be “informationally light”.

These lexical-syntactic and discourse conditions are satisfied by unaccusative verbs of existence and appearance, like (3), and by the unergative verbs which express a prototypical activity of the subject referent and are thus pragmatically un-noteworthy in relation to the subject, like (4) (Levin 1993, Levin and Rappaport Hovav 1995). The latter verbs, which I label “redundant unergatives”, do not violate the unaccusative constraint, because they are not typical unergatives. Rather, they are unergatives which have “become” unaccusative-like and express an atelic existential meaning (for details, cf. Mendikoetxea 2006).

- (3) On the horizon *appeared* a large ship. (Levin 1993, 258)
- (4) From the flagpole *waved* a tattered banner. (Levin and Rappaport Hovav 1995, 259)

The verbs which violate the unaccusative constraint and/or the presentational constraint are not allowed in English LI. This is the case of “true” unergative verbs, such as (5), and of the unaccusative verbs which denote a change of state, such as (6). Despite obeying the unaccusative constraint, the latter verbs are typically incompatible with the presentational function of LI, because what melts or breaks usually disappears and what disappears is no longer presentable on the scene (cf. Holler and Hartmann 2012; Levin and Rappaport Hovav, 1995).

- (5) a. * From the roof *waved* a bearded student. (Levin and Rappaport Hovav 1995, 259)
 b. * At the supermarket on the Main St. *shopped* local residences. (Levin and Rappaport Hovav 1995, 222)
- (6) ?? On the streets of Chicago *melted* a lot of snow. (Levin and Rappaport Hovav 1995, 224).

Like English, EP and French require the subject of LI to be (part of) the focus and its fronted XP to be a stage topic (Cornish 2005, Lahousse 2011, Teixeira 2016), as shown in (7). There is, however, a crucial difference between EP and French: while the former language admits LI with all types of intransitive verbs (Pereira 1998), the latter only accepts it with redundant unergatives and unaccusatives of existence and appearance (8), like English (Cornish 2005). Hence, it can be concluded that, overall, LI is governed by similar rules in French and English, but not in EP.

- (7) a. *Presupposed locative + subject focus*
 i. Marie possède une table basse en marbre. Sur la table se trouve un vase de cristal.
 ii. A Maria tem uma mesa de centro em mármore. Em cima da mesa está uma jarra de cristal.
 Lit. Mary owns a marble coffee table. On the table is a crystal vase.
- b. *Locative focus + presupposed subject*
 i. Marie possède un grand vase de cristal. ??Sur la/une table se trouve le vase (de cristal).

- ii. A Maria tem uma grande jarra de cristal. ??Em cima da/ de uma mesa está a jarra (de cristal).
Lit. Mary owns a marble coffee table. On the table is a crystal vase.
 - c. *All focus*
 - i. As-tu lu les faits divers? ??Dans un bidonville habite un ex-président brésilien.
 - ii. Leste isto? ??Num bairro de lata vive um ex-presidente brasileiro.
Lit. Did you read this? In a slum lives a former Brazilian president
- (8) a. *Unaccusatives of existence and appearance*
- i. Dans cette région du monde sont apparus les premiers hommes.
 - ii. Nesta região do mundo apareceram os primeiros homens.
Lit. In this area of the world appeared the first men.
- b. *Unaccusatives of change of state*
- i. ?? Dans la cuisine s'est brisé un verre.
 - ii. Na cozinha partiu-se um copo.
Lit. In the kitchen broke a glass.
- c. *Redundant unergatives*
- i. Dans l'aquarium nageaient des poissons colorés
 - ii. No aquário nadavam peixes coloridos.
Lit. In the tank swam colourful fish.
- d. *Non-redundant unergatives*
- i. * À côté de notre table a vomi un garçon.
 - ii. Junto à nossa mesa vomitou um rapaz.
Lit. Near our table vomited a boy.

4. The Present Study

4.1 Research questions and predictions

Given the properties of LI in English, French and EP, and previous research, the following research questions were formulated: (i) Do near-native and/or advanced L2ers of English exhibit optionality with respect to the discourse-conditioned properties of LI, namely the syntax-discourse conditions which govern the distribution of intransitive verbs, and the discourse conditions which determine whether the subject can occur post-verbally and the locative can be fronted? and (ii) If advanced and/or near-

native L2ers exhibit difficulties regarding LI, are they an effect of bilingual processing and/or of other factors, such as L1 influence?

The IH and the LIH make different predictions with respect to these questions:

(9) *Predictions of the IH*

- a. EP and French L2ers will display some optionality with respect to all the discourse-conditioned properties of LI at advanced and near-native levels, even when their linguistic representations are native-like.
- b. Near-natives' problems will stem from inefficiencies in the integration of syntactic and discourse information, which are an effect of bilingualism. For this reason, all near-natives will exhibit problems, regardless of whether their L1 is similar to or different from the L2. Advanced L2ers' problems may have other sources in addition to this one.

(10) *Predictions of the LIH*

- a. French L2ers of English will behave native-like, particularly at a near-native level, while advanced and near-native EP speakers of English will display divergence with respect to the properties of LI which are different in their L1 and L2 (i.e., the distribution of verbs).
- b. Advanced and near-native L2ers' problems with respect to this infrequent type of inversion will be caused by the influence of their L1 on their L2 representations.

4.2 Participants

A total of 26 monolingual speakers of (British and American) English, 26 French speakers of English and 28 EP speakers of English participated in this study. The native speakers of English were university students, aged between 18 and 52 years old, who lived in Scotland and had no advanced competence in an L2, despite formal language instruction at school. The L2ers of English were university students who were first exposed to English in an instructional context, between the ages of 8 and 13. These speakers were divided into the following four groups: (i) advanced French speakers of English ($n = 15$), (ii) near-native French speakers of English ($n = 11$), (iii) advanced EP speakers of English ($n = 17$), and (iv) near-native

EP speakers of English ($n = 11$).⁴ Details about their linguistic profile are presented in Table 7-1.

Table 7-1. Biographical data of the participants who are L2ers of English

| Group | L1 EP–L2 ENG | | L1 FR–L2 ENG | |
|---|-----------------|-------|-----------------|-------|
| | ADV | NN | ADV | NN |
| Mean age | 24.88 | 31.09 | 21.00 | 21.73 |
| Mean age of onset | 8.94 | 9.09 | 9.33 | 11.09 |
| Mean years of English language learning | 1.06 | 12.64 | 11.27 | 8.36 |
| Mean years of residence in English-speaking countries | 0.60 | 3.47 | 0.93 | 3.73 |

4.3 Experimental Design

All participants completed three experimental tasks on the *types of intransitive verbs* allowed in LI (unaccusative of existence and appearance *vs.* unaccusative of change of state *vs.* redundant unergative *vs.* non-redundant unergative) and two tasks on the *types of discourse contexts* compatible with this inversion (locative topic+narrow focus on the subject *vs.* locative topic+focus on the subject and the verb *vs.* locative focus+topical subject *vs.* all focus). All tasks included 6 items per condition and as many fillers as experimental items. These items included a 3-word definite locative PP, a verb in the simple past and an indefinite subject.⁵ In the tasks on the variable “type of verb”, LI structures were preceded by a context which induced a topical interpretation of the locative and a focal

⁴ Participants’ proficiency was assessed through an adapted version of the screening procedure used by Sorace and Filiaci (2006). L2ers’ spontaneous speech was evaluated for pronunciation, morphology, syntax, vocabulary, fluency and overall impression on a grid which had a 9 cm long straight-line below each criterion, labelled “non-native” at the left end and “native” at the right end. Each 0.5 cm was equivalent to 1 point. The L2ers who the independent evaluators rated ≥ 17 on syntax, morphology and vocabulary and ≥ 16 on the remaining criteria, with a maximum of one exception, were classed as near-natives. Those who were attributed scores ≥ 15 on syntax, morphology and vocabulary and ≥ 13 on the other criteria, with a maximum of one exception, were classed as advanced.

⁵ The subject had 2 words in the priming task and 3 to 4 words in the other tasks. 4-word subjects always included the expression “a lot of”.

interpretation of the verb and the subject. In the tasks on the variable “type of context”, all LI structures included unaccusative verbs of existence and appearance. Sample test sentences are presented in (11) and (12).

- (11) a. *Unaccusative of existence and appearance*: As the music started, our attention was attracted towards the wooden stage of the theatre. Then, at 8 o'clock, the curtain rose and... on the stage appeared a gospel singer.
- b. *Unaccusative of change of state*: Another winter storm hit New York on Monday, causing long traffic jams in the streets of the city. Yesterday the weather conditions improved in the region and ... on the streets melted a lot of snow.
- c. *Redundant unergative*: To the right, I could see the top of one of Portland's many bridges, one I may have crossed once but I can't recall. Above the bridge flew flocks of seagulls.
- d. *Non-redundant unergative*: I have happy memories of my childhood in San Francisco. I lived next to a supermarket owned by a family of Indian immigrants. At this supermarket shopped many old ladies.
- (12) a. *Locative topic + wide focus*: = (11a)
- b. *Locative topic + narrow subject focus*:
 A: Who lived in this house?
 B: In this house lived two old ladies.
- c. *Topical subject + locative focus*:
 A: Why is everybody talking about our 7th-grade students? What happened?
 B: On BBC news appeared some of them.
- d. *All focus*:
 A: You look surprised at what you're reading in the newspaper. What happened?
 B: On the street lived two French ministers.

The experimental tasks used in this study were of three types: (i) speeded acceptability judgement tasks (SAJT), (ii) syntactic priming tasks (SPT), and (iii) drag-and-drop tasks (DDT). In the SAJTs, participants were required to quickly make an acceptability judgement, on a scale of 1 (totally unacceptable) to 5 (totally acceptable), in response to a sentence presented word by word at a rate of 400 ms per word. The sentence to be judged was preceded by a context, which was presented as a whole

without any time constraints. In the SPT,⁶ participants were also put under time pressure. As shown in Figure 7-1, they first had to repeat a stimulus sentence—the prime—that appeared on the screen for 4 seconds. Then, a picture appeared and participants had to indicate within 4 seconds whether the sentence and the picture matched. After pressing Y for “yes” or N for “no”, a semantically unrelated picture appeared on the screen. Participants had to describe it within 5 seconds, thereby producing the primed construction or not.⁷ Unlike the SPT and the SAJTs, the DDTs were completely untimed. Here, participants had to create a minimum of 1 and a maximum of 4 continuations to the context presented to them by ordering three blocks of words: a subject, a verb, and a locative.

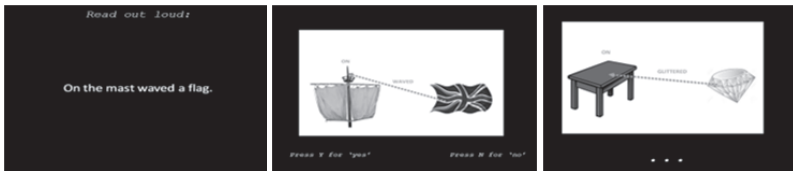


Figure 7-1. Sample item from the SPT.

The three types of tasks used in this study thus placed different demands on participants’ resources. While in the DDTs, participants had sufficient time to carefully integrate information from multiple domains, consciously reflect on their answers and modify their initial intuitions, in the SAJTs and in the SPT, the time pressure to which they were subject prevented complete reanalyses of the stimuli and put extra load on their cognitive resources. For this reason, the latter tasks may capture inefficiencies at the syntax-discourse interface which a untimed offline task like the DDT may not be able to detect.

5. Results

L2 and L1 speakers of English did not behave alike in the present study. While L1 speakers consistently distinguished the conditions under which LI is acceptable in English from the ones under which it is not (tasks on the type of verb: DDT est. = -3.6198 , SE = $.4019$, $p < .001$; SPT est. = $-$

⁶ This task followed the structure of the priming tasks designed by Schütter (2013).

⁷ The assumption is that if the syntactic structure in the prime sentence were possible for the participant, he/she would be likely to be primed into producing it at this point. Conversely, if it were impossible, he/she would not produce it.

3.2130, SE = 1.0609, $p = .00246$, SAJT est. = -1.61859 , SE = .18224, $t = -8.88$; tasks on the type of context: DDT est. = -3.8341 , SE = .6251, $p < .001$; SAJT est. = -1.4867 , SE = .1813, $t = -8.198$), L2ers' behaviour varied across tasks.^{8 9}

Let us first examine L2ers' results in the production tasks which focused on the variable "type of verb". In the DDT, all L2 groups produced significantly more LI structures with redundant unergative verbs and unaccusative verbs of existence and appearance than with the other intransitive verbs tested ($p < .001$ within all groups), thus converging with the group of English monolinguals (cf., Figure 7-2). However, in the SPT, only one L2 group was able to distinguish the verbs which admit LI from those which do not, that is, the group of French near-natives (est. = -1.6847 , SE = .6198, $p = .00657$). The other groups displayed an indeterminate behaviour (cf., Figure 7-3). On the one hand, the French speakers who had an advanced level of English treated all verbs alike ($ps \geq .19846$) with the exception of non-redundant unergatives, which were significantly less accepted than all the other verbs (non-redundant unergatives vs. the other verbs $ps \leq .0271$). The groups of EP native speakers, on the other hand, made no distinction between redundant unergatives, which admit LI, and the verb classes which are incompatible with this structure ($ps \geq .197$).

⁸ Est.=estimate and SE= standard error

⁹ Statistical analyses were conducted on R using mixed effects models. Analyses included random intercepts for subjects and items, by-subject random slopes for within-subjects variables, and by-item random slopes for group (in between-group analyses only). We used the function *lmer* for analyzing the results from the SAJT, and the function *glmer*, with the specification "family=binomial", for analyzing the results from the DDT and the SPT. This is because the latter tasks had a binary outcome—absence/presence of LI (codified as LI=1 and no LI=0). As the function *glmer* generates output with p values and the function *lmer* provides t values but not p values, in this study, p and t values were used as measures of significance. A fixed effect was considered significant if the p -value was $\leq .05$ or if the absolute t -value was ≥ 2.0 (cf. Linck and Cummings 2015).

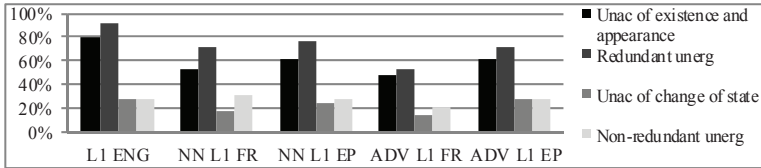


Figure 7-2. % of L1 structures produced in the DDT 1.

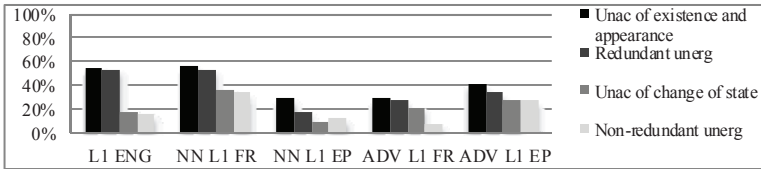


Figure 7-3. % of L1 structures produced in the SPT.

As shown in Figure 7-4, in the SAJT that tested the variable “type of verb”, all L2 groups accepted LI considerably more often with redundant unergatives and unaccusatives of appearance than with the other verb classes tested, just as the English monolinguals did (NN FR: $est. = -1.4318$, $SE = .2957$, $t = -4.843$; ADV FR: $est. = -.8167$, $SE = .2309$, $t = -3.536$; ADV EP: $est. = -.9510$, $SE = .2252$, $t = -4.224$; NN EP: $est. = -1.0833$, $SE = .2824$, $t = -3.836$). However, the analysis of individual results reveals that, contrary to what group results suggest, there was considerable optionality within all L2 groups. In the groups of French speakers, 45% of the near-natives and 47% of the advanced L2ers had median¹⁰ ratings above 3 across all conditions, which means that they accepted (albeit to varying degrees) LI with all the verb classes tested. In the groups of EP speakers, the percentages of L2ers with median ratings above 3 across conditions were even higher: 47% in the advanced group and 64% in the near-native one. Crucially, this optionality was not found in the group of English monolinguals. Only 8% of these speakers had median ratings above 3 across all conditions. Given that mixed logit models¹¹ confirmed the differences between the control group and each L2 group are statistical (ADV FR: $est. = 2.351$, $SE = 1.137$, $p = .0387$; NN FR: $est. = 2.3026$, $SE = .9687$, $p = .01746$; ADV EP: $est. = 2.3671$, $SE =$

¹⁰ The median is a measure of central tendency which shows what the “likeliest” response of a participant is.

¹¹ Data were codified as 1=has a median >3 across conditions, 0=has a median ≤ 3.

1.0634, $p = .0260$; NN EP: est. = 23.334, SE = 6.818, $p < .001$), it can be concluded that all L2 groups exhibited optionality regarding the types of verbs that are compatible with LI.

Let us now consider the results of the experiments on the variable “type of discourse context”. In the DDT, the group of French near-natives and the group of advanced Portuguese L2ers were the only ones that consistently distinguished all the contexts where LI is felicitous in English from the ones where it is not (ADV EP: est. = -3.8106 , SE = $.7911$, $p < .001$; NN FR: est. = -5.248 , SE = 1.683 , $p = .00182$). As Figure 7-5 illustrates, the other L2 groups treated alike two contexts which are not equally compatible with LI for English native speakers: narrow subject focus contexts and all focus contexts (ADV FR: est. = $.6996$, SE = $.5924$, $p = .23765$; NN EP: est. = $.699$, SE = 1.068 , $p = .513$). They therefore exhibited optionality.

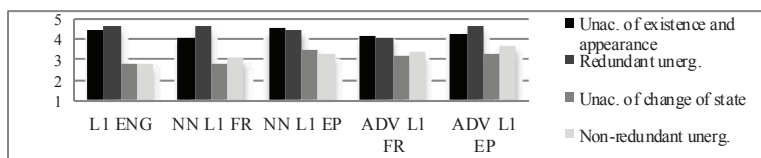


Figure 7-4. Average acceptance rating of L1 in the SAJT1 (scale 1-5)

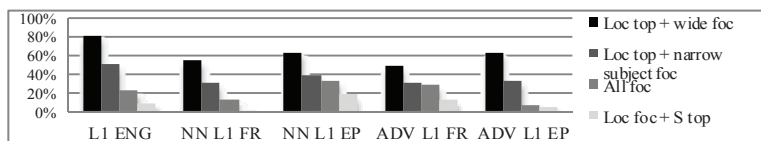


Figure 7-5. % of L1 structures produced in the DDT2.

In the SAJT, all groups of L2ers exhibited optionality with respect to certain contexts which are not considered equally felicitous by the monolingual group, notably: (i) all focus contexts and locative topic+wide focus contexts, in the case of the group of advanced Portuguese L2ers (ADV EP est. = $.6078$, SE = $.3396$, $t = 1.69$), and (ii) all-focus contexts and narrow subject focus contexts, in the case of the other L2 groups (NN FR est. = $-.1212$, SE = $.3214$, $t = -.377$; ADV FR est. = $.2333$, SE = $.3302$, $t = .707$; NN EP est. = $.5758$, SE = $.3823$, $t = 1.506$). All L2 groups were, however, sensitive to the infelicity of LI in the context where the locative has a focal interpretation and the subject is the sentence topic (difference

between this context and the others: $t_s \geq 3.492$ within each group), as shown in Figure 7-6.¹²

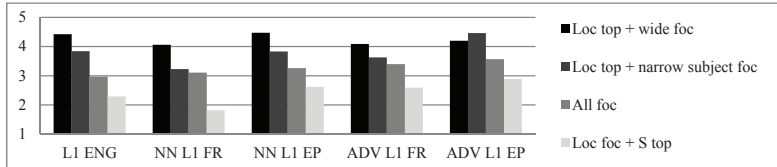


Figure 7-6. Average acceptance rating of LI in the SAJT2 (scale 1-5)

In sum, all L2 groups exhibited some optionality regarding the types of verbs and discourse contexts that are compatible with LI in at least one task. Given that the group of monolingual English speakers consistently distinguished the conditions which allow LI from those which do not, including in speeded tasks, it can be concluded that the variability observed in L2ers' performance was not caused by the methodological options included in the present work, but rather by real differences between L2ers and monolingual L1 speakers at the syntax-discourse interface.¹³

6. Discussion and Conclusions

Taken together, the results of the present study disconfirm the LIH and support the predictions of the IH about the end-state of L2 acquisition at the syntax-discourse interface. On the one hand, the fact that Portuguese and French near-natives exhibited optionality regarding the types of verbs and discourse contexts compatible with locative inversion indicates that, as predicted by the IH, the syntax-discourse interface is a locus of permanent optionality in L2 acquisition, even when L1 and L2 are similar in the

¹² Individual results are in line with group results in that they show that, within each L2 group, there is a high percentage of L2ers who had median ratings above 3 across all conditions where the subject is interpreted as focus (ADV FR = 60%; NN FR = 45%; ADV EP = 71%; NN EP = 64%). Crucially, mixed logit models indicate that the difference between L1 and L2 speakers in this respect is significant (all $p_s \leq .00761$) in all but one case—that of French near-natives. Nevertheless, the difference between them and the controls is nearly significant ($p = .0703$).

¹³ The types of tasks used in the present study do not induce optionality across all domains. This is proven by the fact that the near-natives tested here behaved native-like in an identical experimental study on two syntactic properties: the unavailability of null subjects and “free” inversion in English (Teixeira in prep).

relevant respects. On the other hand, the fact that L1-L2 similarity did not prevent optionality at the syntax-discourse interface, together with the fact that near-natives displayed optionality almost only in the tasks that put extra cognitive load on their processing resources suggest that this non-target behaviour is (primarily) caused by processing inefficiencies associated with bilingualism, as predicted by the IH.

Note that as LI, in general, and the proprieties tested in this study, in particular, are not typically taught in English courses, L2ers are unlikely to possess explicit knowledge about them. Consequently, their convergent performance in DDTs is unlikely to result from the fact that these tasks give participants sufficient time to access explicit knowledge. If the differences between the untimed and speeded tasks used in this study cannot be explained by their different permeability to explicit knowledge, then the most plausible cause for the differences between these tasks is the fact that they are not equally demanding in terms of processing. As Sorace (2011) suggests and the results of this study confirm, the more demanding the task is, the less efficient L2ers are in the integration of syntactic and contextual information and the more likely they are to exhibit optionality.

The processing load of the task is not the only factor which influences L2ers' efficiency at integrating syntactic and contextual information in real-time language use. The results obtained in this work suggest that there are three additional factors which influence L2ers' efficiency. The quantity and/or distance of the contextual information the speaker needs to process is one of them. It appears that the greater the quantity and/or the distance of the relevant pieces of contextual information are, the less efficient L2ers tend to be in the integration of syntactic and contextual information.¹⁴ Evidence for this claim comes from the fact that L2 groups exhibited more optionality in the tasks on the variable "type of discourse context" than in the ones on the variable "type of verb". Note that to decide whether a verb is felicitous in LI, the speaker only needs to consider the meaning of the verb in the intra-sentential context where it occurs. In contrast, to decide whether a discourse context is compatible with LI, the speaker always has to take into account the inter-sentential context in which the structure occurs to determine whether in that particular context, the locative has a topic status and the subject is part of the focus. The processing cost of integrating syntactic information with contextual information may

¹⁴ Since the speaker has to process pieces of contextual information which are simultaneously more distant and larger in number to decide whether LI is felicitous in a given context, the differences between the tasks on the "type of verb" and the ones on the "type of discourse context" may be due to the distance of the contextual information or to its quantity or even to both factors.

therefore be higher in the tasks which focus on the variable “type of discourse” than in the ones which concentrate on the variable “type of verb”. Logically, the costlier a task is, the more likely it is to exceed L2ers’ available cognitive resources and cause processing inefficiencies.¹⁵

The level of proficiency in the L2 is another factor which influences L2ers’ performance at the syntax-discourse interface. The fact that in the present study, advanced L2ers tended to exhibit optionality in more tasks and to a larger extent than near-natives¹⁶ suggests that the less proficient L2ers are, the less likely they are to be consistently efficient at integrating syntactic and discourse information. Assuming Sorace’s claim (2011, 2016) that the integration of syntactic and discourse information (in part) draws on the same pool of cognitive resources used to inhibit the L1, the difference between advanced and near-native L2ers may be explained as follows: the L1 is more dominant at an advanced level than at a near-native level and, consequently, requires more cognitive resources to be inhibited. As a result, advanced L2ers have fewer resources at their disposal to integrate syntactic and discourse information than near-natives, which, in turn, leads them to be less efficient in this process.

Finally, there is another factor associated with L2ers’ linguistic profile which appears to influence their performance at the syntax-discourse interface: the (dis)similarity between the L1 and the L2. By showing that the groups of Portuguese L2ers exhibit more optionality than the groups of French L2ers, particularly at a near-native level, the results of the present study suggest that highly advanced L2ers are less efficient at integrating syntactic and discourse information when the L1 and L2 are different than when these languages are similar. I tentatively propose that this is because when a structure has different properties in the L1 and L2, the inhibition of the competing L1 structure may require more cognitive resources. For this reason, when the L1 differs from the L2, there may be fewer resources available for the integration of syntactic and contextual information. Consequently, the cognitive load of this integration task may exceed the available resources, leading to inefficiencies and optionality.

¹⁵ The fact that L2ers were able to consistently reject LI in the context *locative focus + topical subject* does not contradict this proposal. Given that, in the items which tested this context, the subject always included a pronoun, the participant could infer that the subject was more presupposed than the locative, even without taking into account the previous context. In the other contexts, in contrast, he/she had to consider the inter-sentential context to assess the (in)felicity of LI.

¹⁶ The behaviour of the speakers of L2 English–L1 EP in the DDT 2 is an exception to this rule, which we are unable to explain at this point.

In conclusion, this study on the acquisition of LI in advanced and near-native English shows that the syntax-discourse interface is necessarily a locus of optionality in L2 acquisition, even when the L1 is similar to the L2, as predicted by the IH (and contra the LIH). Results, however, suggest that the level of optionality exhibited by L2ers varies according to, at least, three interacting factors, which have not been (sufficiently) considered by the IH: (i) the quantity and/or distance of the pieces of contextual information the speaker needs to process, (ii) the level of proficiency in the L2, and (iii) the similarity between the L1 and the L2.¹⁷ Given that L2ers exhibit varying degrees of optionality at the syntax-discourse interface, in certain cases, untimed offline tasks can capture their optionality, but, in other cases, only the tasks that give insights about processing abilities are able to detect it. This fact may help explain why the studies conducted over the past decade (which are, in most cases, offline and untimed) have produced very contradictory results regarding the end-state of L2 acquisition at the syntax-discourse interface.

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¹⁷ Unlike the LIH, the hypothesis raised here does not predict that, when the L1 and the L2 are similar, (highly) advanced L2ers will behave target-like. Rather, it predicts that, in this case, L2ers will experience fewer difficulties in integrating syntactic and contextual information and will exhibit less optionality as a result.

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CHAPTER EIGHT

THE ROLE OF INPUT IN THE ACQUISITION OF ENGLISH GENERICS BY L1 NAJDI ARABIC SPEAKERS¹

MAY ABUMELHA

1. Introduction

Research in generative second language acquisition investigates the relationship between Universal Grammar (UG), L1 transfer and L2 acquisition, offering fine investigations of language structures on concepts such as feature variability and acquisition difficulties. Yet these findings are not easily delivered to the language classroom. Recent calls from many researchers in the field inspired the current study to find applications in classrooms and to investigate the role of classroom input in relation to learnability, input and L1 transfer (de Garavito 2013; Whong 2013).

Within a generative Minimalist approach, research on the acquisition of articles has defined universal semantic features usually mapped onto articles, such as definiteness, specificity, familiarity, referent tracking, and the focus of this study: genericity. Difficulties in the acquisition of features that are mapped onto articles have been investigated by many researchers (e.g. Hawkins et al 2006; Ionin, Ko, and Wexler 2004; Slabakova 2009). One of the proposed hypotheses to explain these difficulties is Lardiere's (2009) feature reassembly framework.

The present study examines the acquisition of English articles by L1 Arabic speakers to clearly predict acquisition difficulties. This information

¹ This research was conducted under a joint split site PhD program between the University of Leeds (UK) and King Saud University (Saudi Arabia). The data reported in this paper on generics is part of the author's thesis which covered more indefinite contexts such as specificity and the use of articles with relative clause contexts.

is used in a classroom setting to provide two types of input targeting the difficult generic contexts to accelerate the process of feature reassembly.

2. Theoretical Background: A Feature-based Contrastive Approach to L2 Acquisition

Following the Minimalist approach, Lardiere (2007, 2008: 173) proposed the Feature Reassembly Hypothesis, defining features as “primitive, elemental units that make up the lexical items of every language”. The process of reassembly is proposed to be more difficult than feature selection because it involves more complex steps of disentangling features and feature combinations realised differently by the L1. While agreeing with the basic premise of feature reassembly, Slabakova (2009) proposed looking at the universal constraints involved in the process, to allow more concrete predictions on L2 learnability. Cho and Slabakova (2014: 160) note that “feature reassembly may be slow to occur or may not occur at all if the relevant evidence for the formal or semantic feature is rare or contradictory in the linguistic input.”

3. Generic Marking in English and Najdi Arabic: A Contrastive Analysis

English has two overt articles (*the* and *a*) and one covert article (\emptyset) (Radford 2004). Non-standard spoken Arabic varieties have an overt definite article as a bound prefix form (*al*) and an indefinite null covert article (\emptyset) (Bardeas 2009; Ryding 2005). Generic readings of an NP in English can be possible through all three articles *the*, *a*, and \emptyset (Lyons 1999). A comparison between the mapping of the [definite] and [generic] features in English and Najdi Arabic is summarized in Table 8-1. Note that the major contrast is that English allows indefinite NPs to have generic readings while Arabic requires a definite NP.

Table 8-1: Mapping of features onto articles in English and Najdi Arabic

| English | | Najdi Arabic | |
|-------------|---------------------------------------|--------------|---------------------------------------|
| Morpheme | Features | Morpheme | Features |
| <i>the</i> | [+definite], [+generic], [-plural] | <i>al</i> | [+definite], [+generic], [±plural] |
| <i>a</i> | [-definite], [+generic], [-plural] | – | – |
| \emptyset | [-definite], [+generic], [+plural] | \emptyset | – |

4. Predictions:

The Learning Task and a Proposed Difficulty Cline

Many studies on the acquisition of English articles by L1 Arabic learners have indeed found positive L1 transfer in definite contexts and difficulties in indefinite contexts that require reassembly (Almahboob 2009; Azaz 2014; Sarko 2009). Sarko's (2009) study on L1 Syrian Arabic learners found persistent difficulties with indefinite singular generics. Azaz (2014) points out that there is a straightforward difference in mapping between English and Arabic in the generic interpretation of abstract concepts and non-count nouns, as English requires bare plurals while Arabic requires definite plurals. However, for *singular* generics there is the added optional choice, as English allows definite or indefinite nouns (*the lion, a lion*), which may complicate things for Arabic L1 learners of English trying to figure out the L2 rule. I would also add that a complex reassembly process is required, as L1 Arabic learners have to acquire the use of the indefinite article *a* - which doesn't exist in the L1 in indefinite contexts - and then acquire the fact that it could also be used in generic reference similarly to the definite article *al*. Accordingly, this study proposes that the reassembly task facing L1 Najdi Arabic learners of English will involve the feature combinations [±definite] [±plural] and [+generic].

The learning task is not predicted to involve a very complex mapping process, because both languages express the feature with morphemes. Yet the reassembly of features onto different morphemes paired with little evidence in the input is expected to result in a slower acquisition rate with indefinite generics. To illustrate the difficulty levels, I will borrow Slabakova's (2009) diagram, putting the proposed feature combinations in display from easier to harder as shown below in Figure 8-1.

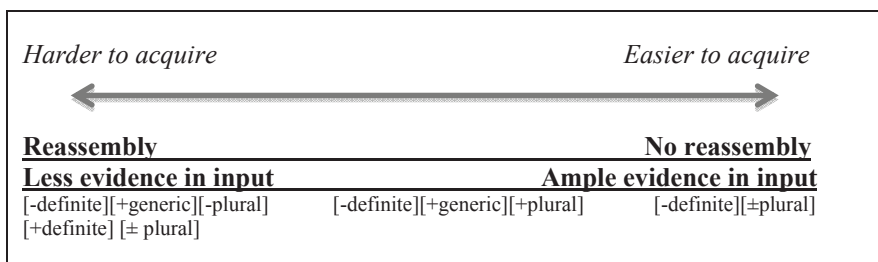


Figure 8-1: A proposed difficulty cline of acquiring English indefinite generics by L1 Najdi Arabic speakers

5. The Study

5.1 Instruction

This study will investigate if the results of L1 Najdi Arabic learners of English reflect the levels of difficulty of the proposed difficulty cline, if classroom input will result in improvement from the pre-tests and, if so, which *type* of input is more effective in the long run: implicit or explicit.

The Modular On-line Growth and Use of Language (MOGUL) model (Truscott & Sharwood Smith 2004) suggests that linguistic items acquired naturally are part of the modular store, while instructional input can help in making learned items part of an automatic and effortless non-modular store. Following this assumption—based on Whong’s (2007) recommendation—two trends in English language teaching are used: implicit input, by using Swales’ (1990) genre analysis on texts that are reinforced with the target generic structures, and explicit input, by adding grammatical explanations following Long’s (1991) focus on form.

The genre analysis of extensive authentic samples of text served as reinforced input, priming the learner for the following focus on form. The learners listened to the texts read by a native speaker following a stress pattern that stressed the nouns. The instructional period lasted five weeks and students were given 12 class hours of instruction. Five lessons started with the text, genre analysis, grammar focus, and then grammatical activities². The next five lessons targeted production through individual

² To control the study, all grammatical focus, feedback and error correction followed this pattern, but the implicit instruction group received explicit rules, exercises, feedback, and error correction on *verb tenses only* while receiving implicitly reinforced input on generic nouns.

and group activities. Two more lessons and three home assignments aimed at giving students the chance to look at a variety of texts to analyse.

5.2 Participants, Instruments and Procedures

The study was conducted on 54 college-level L1 Najdi Arabic learners of English. The Oxford Quick Placement Test (OQPT) (Oxford 2001) placed the participants into three proficiency categories: elementary, lower intermediate and upper intermediate.

The procedure started with three pre-tests on English articles, followed by 12 hours of instruction, then immediate post-tests and delayed post-tests eight weeks later. Data was collected using two instruments: A forced choice task and a sentence repetition task. The forced choice task (Ionin, Ko, & Wexler 2004) included 16 items and 3 contexts: one definite non-generic and two indefinite plural & singular generics (example 1).

- (1) Generic Indefinite Singular (Answer: indefinite *a*):
 A: My daughter is doing postgraduate work at university.
 B: What is she studying?
 A: She's studying _____ rare bird found only in Scotland.
 Ø *an* *a* *the*

The repetition task involved listening to sentences produced by a native speaker as many times as needed then writing down the sentences on paper (Pierce and Ionin 2011; Snape and Yusa 2013). The instrument included 18 sentences with 24 nouns (examples 2a-b) which were modified for the purpose of this study to involve four contexts: two non-generic (definite and indefinite), and two generic (definite and indefinite).

- (2) a. I know that a trainer (gen. sing.) usually gives dogs (gen. pl.) a reward that is exciting.
 b. I wonder if the doctors (def. pl.) of this hospital always ask a patient (gen. sing.) specific questions before surgery.

5.3 Results

A linear regression model was conducted for each task, with the categories of the test held as dependent variables³. Regression analysis was conducted in line with the formula:

$$Y_{in} = \beta_0 + \beta_1 G_j + \beta_2 T + \beta_3 I + \varepsilon_i$$

Y_{in} - a set of the dependent variables (the feature combinations)

β_0 - intercept;

β_1 - regression coefficient for the group variable (G_j - control group, implicit and explicit groups);

β_2 - regression coefficient for the time variable (T - pre-test condition, immediate post-test and delayed);

β_3 - regression coefficient for the interaction effect between group and time (I);

ε_i - error term, normally distributed with mean zero and independent of predicted values ($N(\mu=0; \sigma^2)$).

Table 8-2: Regression estimates for the forced choice task

| | Total score | [+generic] [-plural] | [+generic] [+plural] | [+definite] [±plural] |
|--|----------------------------|----------------------------|----------------------------|----------------------------|
| | Estimate (t-value) | Estimate (t-value) | Estimate (t-value) | Estimate (t-value) |
| Model 1 | | | | |
| Proficiency | 0.667*** (11.33) | 0.334*** (4.488) | 0.419*** (5.833) | 0.534*** (7.993) |
| Adjusted R-squared | 0.442 | 0.106 | 0.170 | 0.281 |
| Model 2 (reference categories: control group and pre-experiment measurements) | | | | |
| Group implicit | -0.125 (0.769) | -0.163 (-0.768) | -0.064 (-0.341) | 0.084 (0.446) |
| Group explicit | 0.054 (0.328) | -0.103 (-0.478) | 0.521** (2.749) | -0.161 (-0.841) |
| Time post | 0.453** (3.233) | 0.250 (1.370) | 0.548*** (3.392) | 0.146 (0.898) |
| Time delayed | 0.292 (2.083) | 0.054 (0.294) | 0.520** (3.219) | 0.209 (1.282) |
| Adjusted R-squared | 0.471 | 0.099 | 0.295 | 0.283 |

³ The dependent variables and the control variable were mean centered prior to the regression analysis.

| Model 3 (reference categories: control group & pre-experiment measurements) | | | | |
|--|--------------------|---------------------------------|-----------------------------------|------------------------------------|
| Group implicit X Time post | 0.041 (0.103) | 0.246 (0.484) | -0.006 (-0.016) | -0.436 (-0.974) |
| Group explicit X Time post | 0.436 (1.108) | 1.079* (2.126) | 1.166** (2.672) | -1.282** (-2.865) |
| Group implicit X Time delayed | 0.047 (0.119) | 0.158 (0.311) | -0.159 (-0.364) | -0.036 (-0.080) |
| Group explicit X Time delayed | 0.496 (1.260) | 0.684 (1.348) | 0.877* (2.008) | -0.420 (0.940) |
| Adjusted R-squared | 0.379 | 0.113 | 0.331 | 0.341 |
| Model 4 (reference categories: implicit group & post experiment measurements) | | | | |
| Group explicit | 0.293 (1.332) | 0.44 (1.552) | 1.023*** (4.190) | -0.681** (-2.722) |
| Time delayed | -0.181 (-0.826) | -0.088 (-0.309) | 0.000 (0.000) | -0.051 (-0.205) |
| Group explicit X Time delayed | 0.053 (0.172) | -0.308 (-0.765) | -0.138 (-0.400) | -0.462 (-1.305) |
| Adjusted R-squared | 0.379 | 0.113 | 0.345 | 0.312 |

Note: unstandardized regression coefficients are reported.

Significance codes: “*” p<0.001; “**” p<0.01; “*” p<0.05.**

The results of the forced choice task are detailed in Table 8-2 above. The first model shows a positive relationship between language proficiency and the results across groups and times. The second model shows significant improvement at the post-test of the two categories: [+generic] [-plural] ($p<0.05$) and [+generic] [+plural] ($p<0.01$). This effect was only maintained in the delayed post-test results for the [+generic] [+plural] ($p<0.05$). The third model shows that the explicit group’s results increased on the [+generic] [+plural] only.

The effect of explicit instruction on the generic plural (Figure 8-2) is found on both post-tests, and the results of the other two groups remained lower in comparison. This is not the case with the generic singular (Figure 8-3), as the results of the explicit instruction decreased at delayed post-test, showing a non-significant difference with the other groups in delayed scores.

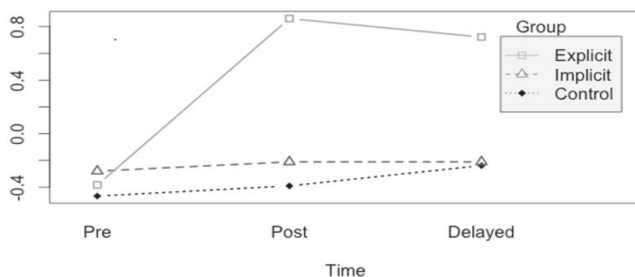


Figure 8-2: Forced choice task interaction between time & group for [+generic] [+plural]

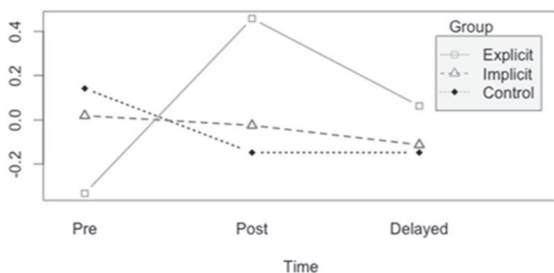


Figure 8-3: Forced choice interaction between time & group for [+generic] [-plural]

The analysis of the sentence repetition task (Table 8-3) shows the same positive relationship between language proficiency and accuracy scores. The second model shows significant improvement in the explicit instruction group’s post-test in the [+generic] [-plural] ($p < 0.01$) only, and this is not found in the delayed results (Figure 8-4). The third and fourth models show no difference between the results of the groups.

Table 8-3: Regression estimates for the sentence repetition task

| | [+generic] [-plural] | [+generic] [+plural] | [-definite] [±plural] | [+definite] [+plural] |
|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Estimate (t-value) | Estimate (t-value) | Estimate (t-value) | Estimate (t-value) |
| Model 1 | | | | |
| Proficiency | 0.538*** (8.079) | 0.465*** (6.651) | 0.464*** (6.632) | 0.370*** (5.031) |
| Adjusted R-squared | 0.285 | 0.212 | 0.211 | 0.131 |

| Model 2 (reference categories: control group and pre-experiment measurements) | | | | |
|--|----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| Group implicit | 0.271 (1.453) | -0.413* (-2.134) | 0.001 (0.005) | -0.149 (-0.722) |
| Group explicit | 0.135 (0.712) | -0.383 (-1.954) | -0.100 (-0.516) | -0.340 (-1.632) |
| Time post | 0.466** (2.932) | 0.486** (2.945) | 0.644*** (3.941) | 0.394* (2.248) |
| Time delayed | 0.338* (2.123) | 0.520** (2.745) | 0.566** (3.457) | 0.478** (2.725) |
| Adjusted R-squared | 0.317 | 0.266 | 0.278 | 0.170 |
| Model 3 (reference categories: control group & pre-experiment measurements) | | | | |
| Group implicit X Time post | 0.576 (1.315) | 0.146 (0.319) | -0.422 (-0.913) | 0.006 (0.012) |
| Group explicit X Time post | 1.207** (2.757) | 0.607 (1.322) | -0.394 (-0.853) | 0.328 (0.665) |
| Group implicit X Time delayed | -0.142 (-0.324) | -0.363 (-0.791) | -0.244 (-0.529) | -0.569 (-1.152) |
| Group explicit X Time delayed | 0.331 (0.757) | 0.450 (0.979) | -0.466 (-1.010) | -0.158 (-0.321) |
| Adjusted R-squared | 0.341 | 0.275 | 0.267 | 0.163 |
| Model 4 (reference categories: implicit group & post experiment measurements) | | | | |
| Group explicit | 0.126 (0.515) | 0.066 (0.259) | -0.009 (-0.035) | -0.113 (-0.410) |
| Time delayed | -0.197 (-0.806) | -0.271 (-1.055) | 0.055 (0.215) | -0.058 (-0.213) |
| Group explicit X Time delayed | -0.158 (-0.456) | 0.352 (0.970) | -0.250 (-0.684) | 0.088 (0.225) |
| Adjusted R-squared | 0.341 | 0.275 | 0.267 | 0.163 |

Note: unstandardized regression coefficients are reported.

Significance codes: ‘***’ $p < 0.001$; ‘**’ $p < 0.01$; ‘*’ $p < 0.05$.

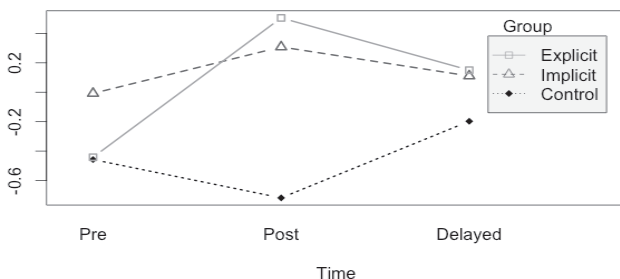


Figure 8-4: Sentence repetition task interaction between time & group for [+generic] [-plural]

6. Discussion

6.1 Theoretical & Pedagogical Implications

The findings of the forced choice task support the predictions of the feature-based contrastive model by showing non-target performance in indefinite generic contexts and target performance in definite non-generic contexts. The overall results of the instruments show a significant increase in the post-tests of the two experimental groups when compared to the control group, suggesting that the reassembly process might indeed have been accelerated. However, a closer look at the results shows that improvement was not found in all targeted contexts. On one hand, the results show improvement in the accuracy scores of the explicit instruction group at the post-test for the indefinite generic singular and plural. Yet this improvement was only sustained at the delayed post-test for the generic plural. But two facts must be considered: a) the higher proficiency level of the explicit instruction group; and b) the nature of the task itself, which demands some kind of explicit knowledge.

The findings of the sentence repetition task show that the explicit instruction group only improved at post-test for the generic singular. But when looking at the results of the delayed post-test, we find that all groups - including the uninstructed control - improved on this category, with no significant difference in favour of the explicit instruction group. These results allow us to draw a developmental path of the control group that received no instruction, as they were shown to have improved significantly on the generic singular at delayed post-test, suggesting that feature reassembly was happening, but at a slower pace when compared to the explicit instruction group.

Another developmental sequence is found with the results of the explicit instruction group in the forced choice task. When the group received grammatical instruction, they improved in the post-test for generics, but this was paired with a significant decrease in the results of the definite non-generic contexts. The reason behind this may be that learners had gone through a developmental stage in which they successfully reassembled the [-definite], [+generic] and [+plural] features onto the target article *Ø* and disentangled those features from the article *the*. However, at this stage they may have overgeneralized this to non-generic definite plural combinations as well. It is possible that after this initial stage they then developed their accuracy - similarly to natural phases of acquisition - to recover and assemble the appropriate features onto the correct articles.

The present study also has implications for teaching English articles in language classrooms. First, it should be noted that both instructed groups improved on overall accuracy when compared to the uninstructed control group. However, when comparing the total scores of the delayed post-test conducted eight weeks after the intervention to the pre-tests, we find that only the explicit instruction group sustained a significant improvement in the forced choice task ($p=.03$) and the sentence repetition task ($p=.02$). This provides initial support for explicit instruction over implicit instruction in the classroom.

The aim is to find out whether the instructional treatment led to the development of knowledge that could be described as effortless and part of a permanent knowledge store. To answer this question, we must relate the type of instruction to L2 knowledge. We could look at three conditions: 1) significant improvement from pre-test; 2) faster improvement in areas outlined in the difficulty cline; and 3) long-term improvement. Table 4 summarizes how those conditions were met with each type of instruction and task:

Table 8-4: Conditions on the type of targeted knowledge as achieved by the instruction groups

| | Explicit instruction | | Implicit instruction | | Uninstructed control | |
|---|----------------------|---|----------------------|---|----------------------|---|
| | FC | R | FC | R | FC | R |
| Significant improvement from the pre-test | ✓ | ✓ | ✓ | ✓ | × | × |
| Faster improvement in areas outlined in the difficulty cline | ✓ | ✓ | × | × | × | × |
| Long term improvement (overall score) | ✓ | ✓ | × | × | × | × |

As shown in Table 8-4, the explicit instruction group was the group that generally met the three conditions. The detailed results of the contexts did show some discrepancies, yet the overall improvement signals a positive effect that advocates more investigation into classroom instruction to further refine the type and amount of input. As such, this study suggests that explicit instruction following an analytic focus on form in reinforced texts is indeed recommended to improve learners' interlanguage grammatical development. The amount of instruction could benefit from an increase in the lessons provided and more details on English generic interpretation.

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PART IV:
ACQUISITION OF SYNTAX

CHAPTER NINE

INVESTIGATING CO-ACTIVATION OF L1 SYNTAX DURING PROCESSING OF WH-QUESTIONS: EYE-TRACKING EVIDENCE FROM L1 GERMAN–L2 ENGLISH¹

TOM RANKIN, THERES GRÜTER
AND HOLGER HOPP

1. Introduction

Generative approaches to Second Language Acquisition (SLA) have devoted considerable attention to the study of first language (L1) syntactic transfer in the acquisition and use of a second language (L2). It is generally agreed that “at least part of the L1 grammar (namely, L1 parameter settings) determines how the learner initially approaches the L2 data” (White 2003: 58). “Approaching” here means parsing: the L1 grammar is used to assign syntactic representations to L2 input. Indeed, previous research has identified patterns of L1-influenced parses of wh-questions in L1 English-L2 German (Grüter 2005/6) and L1 German-L2 English (Rankin 2014). In this paper, we explore potential patterns of online co-activation of the L1 syntax that may give rise to L1-influenced comprehension patterns.

Language co-activation during online processing has been extensively studied in bilingual processing. Yet while co-activation at the lexical level

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is well supported by existing studies, evidence for potential co-activation of *syntactic* properties during sentence processing has been less clear (see Roberts 2013). We add to the growing body of literature which investigates online syntactic co-activation by reporting the results of a visual-world eye-tracking study examining L1 German-L2 English learners' processing of English wh-questions. The next section discusses studies of syntactic co-activation in L2 processing.

2. Syntactic Co-activation in L2 Sentence Processing?

L2 learners have two options for assigning representations during incremental processing: the L1 or the L2 grammar. Often, only the L2 grammar is compatible with the input and can license a grammatical parse, or both the L1 and the L2 grammar license the same parse. However, L1 and L2 grammars may also assign conflicting parses to the same input string, because the string is compatible with option A in the L1 and option B in the L2. In these cases, we may see co-activation either in terms of L1 parses or processing difficulty.

Kaan et al. (2015) illustrate this logic by investigating 'cross-linguistic conflicts' in the processing of number agreement in English relative clauses by L1 Dutch-speaking learners. Dutch relative clauses share the same linear order as English *object* relative clauses. But the Dutch structure is globally ambiguous without number agreement. When agreement on the auxiliary in Dutch disambiguates to a *subject* relative as in (1), the word-by-word translation into English is ungrammatical, as in (2). A co-activated Dutch grammar could accommodate the anomalous agreement pattern in (3) and license a subject interpretation of the relative clause. Thus, co-activation predicts that learners will be less sensitive to this ungrammaticality, as it can be licensed by Dutch syntax.

- (1) Mark kent misschien de leraar die de studenten heeft vermeden sinds het afgelopen semester.
- (2) *Mark may know the instructor who the students **has** avoided since last semester.

However, a self-paced reading study with advanced L1 Dutch learners of English found no online effects of cross-language conflict. After controlling for reading speed, the L2 learners did not read the ungrammatical auxiliary significantly faster than native speakers, indicating no online L1 interference. However, there were effects in

participants' final sentence interpretation. L2 learners provided the target object-first interpretation significantly less frequently than native speakers. Instead, they displayed a subject-first reading more often for ungrammatical sentences such as (2), seemingly indicating L1 influence on parsing.

In a study building on the same logic, Jacob (2009) sought to explore cross-linguistic conflicts in L1 German-L2 English by investigating processing of full and reduced relative clauses as in (3). (Hopp 2017 is a recent extension of this work with similar findings, and additional investigation of cognate facilitation effects).

- (3) When the barmaid (who) Damian deceived and betrayed attempted to steal the spoons nobody paid attention.

A sentence-initial reduced relative in English represents a cross-linguistic conflict with a German SOV embedded clause (*Als die Bardame Damian hinterging und betrog... When the barmaid deceived and betrayed Damian ...*). A full relative with an overt relative pronoun does not. Co-activation of the German grammar while learners read these sentences would be indexed by longer reading times in the region after the reduced relative, when the clause is no longer amenable to a German parse. Jacob found a significant interaction of type of relative clause (reduced vs. full) and type of clause beginning (subordinate vs. main). Reading times were longer on the initial reduced relative: the structure for which a co-active German grammar can assign a competing parse. He interpreted this finding as a cross-linguistic conflict effect, as neither native English speakers nor L1 French-speaking learners of English showed this pattern. However, this was only significant in code-switching versions of the experiment, where sentences alternated between German and English. In a monolingual experiment, the interaction was not significant.

These studies illustrate limited degrees of co-activation in cross-linguistic conflicts with complex syntax. While there does appear to be some evidence of effects of L1 syntactic properties in L2 parsing, there is no consistent evidence of *general* co-activation. Co-activation of the L1 may surface only under certain circumstances, such as code-switching or with non-cognates. Similarly, processing difficulty due to encountering ungrammaticality might lead learners to access the L1 syntax as a last resort to save a parse (Kaan et al., 2015: 823).

We focus on canonical syntax of simple wh-questions, rather than complex syntax, to address whether late L1 German-speaking L2 learners of English access L1 representations while they listen to sentences which present potential cross-linguistic conflicts but do not involve additional

processing complexity. Next, we review the relevant syntactic properties of English and German, and how these have been used in offline studies of L1 influence in comprehension.

3. Word Order in German and English Wh-questions

Word order distinctions consistently mark thematic interpretation in English. Fronting a subject wh-phrase maintains the basic SVO word order (see 4 and 6), while fronting an object wh-phrase leaves a gap immediately following the thematic verb (see 5 and 7).

- (4) Which animal_{SUBJ} ___ bites the cat_{OBJ}?
- (5) Which animal_{OBJ} does the cat_{SUBJ} bite ___?
- (6) Which animal_{SUBJ} has ___ bitten the cat_{OBJ}?
- (7) Which animal_{OBJ} has the cat_{SUBJ} bitten ___?

By contrast, word order in German wh-questions is ambiguous without disambiguating case or agreement marking. Due to case syncretism, sentences with feminine and neuter NPs, which do not overtly mark distinctions between nominative and accusative case, remain globally ambiguous, as illustrated in (8) and (9).

- (8) Welches Tier beißt die Katze?
 which_{NEUT.NOM/ACC} animal bite_{3PS} the_{FEM.NOM/ACC} cat
 = Which animal is biting the cat? / Which animal is the cat biting?
- (9) Welches Tier hat die Katze gebissen?
 which_{NEUT.NOM/ACC} animal has the_{FEM.NOM/ACC} cat bite_{PP}
 = Which animal has bitten the cat? / Which animal has the cat bitten?

These cross-linguistic differences are captured in parametric analyses according to which each language has different settings for headedness and verb movement parameters (den Besten, 1983). German is head-final (OV) while English is head-initial (VO). Finite verbs move to C° in German main clauses, resulting in a verb second (V2) order. English has no lexical verb movement but requires subject-auxiliary inversion in object questions. Such differences in the underlying syntactic representations are not always manifest in the surface order of constituents

in *wh*-questions, resulting in superficial similarity, and thus cross-linguistic conflicts.

The relevant point for L2 processing is that the word orders of some English *wh*-questions are identical to German. However, given different syntactic structures, the corresponding German orders are ungrammatical or susceptible to different parses, as in the pairs (10)–(13).

- (10) a. Which animal bites the cat? (SUBJ Q)
 b. Welches Tier beißt die Katze? (AMBIGUOUS)
- (11) a. Which animal does the cat bite? (OBJ Q)
 b. *²Welches Tier tut die Katze beißen?²
- (12) a. Which animal has bitten the cat? (SUBJ Q)
 b. *Welches Tier hat gebissen die Katze?
- (13) a. Which animal has the cat bitten? (OBJ Q)
 b. Welches Tier hat die Katze gebissen? (AMBIGUOUS)

These cross-linguistic conflicts have been used to examine whether L1 syntax is involved in parsing L2 input by Grüter (2005/6), Grüter and Conradie (2006), and Rankin (2013, 2014). We review these studies now as they were adapted and extended for the present study.

Grüter (2005/6) and Grüter and Conradie (2006) exploit the different status of cross-linguistic conflicts between German, English and Afrikaans to test Full Transfer at the initial state in L2 German. If L1 syntax is implicated in parsing, the present tense question (10b) would be parsed as a subject question by L1-English speaking learner relying on English syntax as in (10a), whilst the perfect tense (13b) would be parsed as an object question (13a). Afrikaans shares the same V2/OV properties as German, meaning that L1 Afrikaans-speaking learners should pattern similarly to German native speakers in their comprehension.

The results of a picture interpretation task were in line with these predictions. L1 English-speaking learners had subject interpretations for present tense questions at a rate of 71.2%, while native German controls,

² German *tun*-support presents an issue. It is considered prescriptively “bad” but occurs in many dialects. For simplicity, we consider it a non-conflict. Should it present a conflict to the speakers in the study due to presence in their native dialect, it would be ambiguous without morphological marking as with the other clauses.

and L1 Afrikaans-speaking learners preferred an object interpretation or indicated the question was ambiguous. L1 English-speaking learners showed a strong preference for object interpretation of perfect tense questions (97.6%). This was less marked for the L1 Afrikaans learners (67.2%) and the native German controls (47.3%), with the latter frequently interpreting the question as ambiguous (45.3%). These patterns strongly suggest that learners were drawing on their full L1 syntax to parse L2 input.

Rankin (2013, 2014) explored the same effects in L1 German-L2 English learners at higher proficiency. The logic in this case was that accessing German syntax would result in ambiguous parses only of those English structures which have a grammatical German counterpart, resulting in an interaction of tense and question type on response accuracy. This was partially confirmed by the results. Interpretations of simple tense subject questions were in line with predictions, with misinterpretation of these structures at rates between 15-26%, depending on factors such as wh-phrase animacy. Object questions in simple and in periphrastic tenses were consistently target-like with misinterpretation rates of maximum 8%.

Overall, these studies provide some evidence that the L1 syntax is accessed to parse L2 wh-questions, where the input is amenable to the L1 representation. The study presented below seeks to investigate whether these patterns of L1 influence in interpretation are evident during online processing, i.e. processes leading up to final sentence interpretation. Further, L1 effects should become visible in conflict conditions (simple tense subject and periphrastic tense object questions) but should not lead to different processing patterns in non-conflict conditions (simple tense object/periphrastic tense subject questions).

4. Visual-World Eye-Tracking Study

4.1 Participants

Participants were 41 L1 German-speaking L2 learners of English (36F/5M) and 27 native English speakers (12F/15M, *M* age 23 yrs). Participants were all university students: the L1 group at a US college, the L2 group students of English at a German university. They provided background information prior to testing and completed the LexTALE proficiency test (Lemhöfer & Boersma 2012). Performance on LexTALE placed the learners at the upper-intermediate to advanced range of proficiency (Table 9-1).

Table 9-1: Learners' biographical data

| | Age (years) | Age of onset (years) | Length of Instruction (years) | LexTALE Scores (percent) |
|--------------|------------------------|-------------------------------------|--|---|
| <i>M</i> | 20 | 9 | 11 | 74 |
| <i>Range</i> | 18-26 | 3-14 | 6-17 | 55-94 |
| <i>SD</i> | 1.8 | 2.4 | 2.6 | 9.7 |

4.2 Methods & Materials

Materials were created which drew on a cast of 12 animals involved in four actions (*carrying, biting, painting or pushing*). For each animal, a quadruplet of sentences crossing the factors Word Order (subject vs object) and Tense (present vs perfect) was created (as in 14-17), yielding 48 items.

- (14) Which animal pushes the camel?
- (15) Which animal does the camel push?
- (16) Which animal has pushed the camel?
- (17) Which animal has the camel pushed?

The visual materials had a two-level factor Disambiguation-Type (lexical vs syntactic). In lexical disambiguation trials (Fig. 9-1), the animal name in the question was a sufficient cue to picture-selection, because there was only one representation of this animal. In syntactic disambiguation trials (Fig. 9-2), the animal in the question was depicted twice, as an agent or patient of the action, requiring attention to syntax to select target pictures. For instance, in the context of the question in Figure 2, it is English SVO syntax which disambiguates to the scene on the right. Thus, the experiment conformed to a 2 (Disambiguation Type) x 2 (Question Type) x 2 (Tense) factorial design.

The lexical-disambiguation trials provide a baseline measure of how quickly and consistently listeners orient towards the target when syntax does not need to be considered. Given well-known differences in overall processing speed between L1 and L2 speakers (e.g. Hopp 2010), we expect differences between the two groups in this regard which are not relevant for the questions of interest here. For this reason, we formulate our predictions in terms of differences in performance between the lexical

and syntactic disambiguation conditions within each group rather than direct comparisons between L1 and L2 speakers' performance. Specifically, we predict that, in conflict conditions, we will see greater differences in performance between syntactic and lexical trials in the L2 than in the L1 group. In non-conflict conditions, we predict that any differences in performance that we may see between syntactic and lexical trials will be similar in both groups.

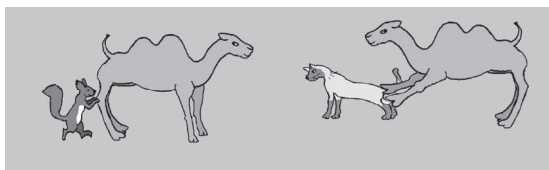


Figure 9-1: Visual scenes in a lexical disambiguation trial - *Which animal pushes the cat*

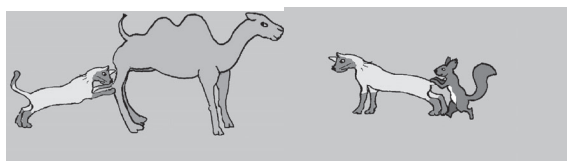


Figure 9-2: Visual scene in a syntactic disambiguation trial - *Which animal pushes the cat?*

Items were distributed across two lists and counterbalanced for disambiguation type; a syntactically disambiguated subject question in List 1 was lexically disambiguated in List 2, and vice-versa. Each list consisted of a present tense block, presented first, and a perfect tense block, presented second. Each tense block was preceded by a short explanation which created a pragmatic context for the simple present and perfect tenses, as in *You will see what these animals usually do / In the following scenes you will see what the animals have been doing recently*. Four practice questions preceded each block. Stimuli were pseudorandomised with 12 fillers in each tense block, yielding a total of 72 questions per participant. Fillers were questions of the same form as experimental items, but in the context of a display which depicted different pairs of animals in each scene or different actions.

Participants were tested individually in the lab. They saw the pictures and heard recordings of the questions. Each picture was displayed for 3000 ms before the onset of the question. The picture remained on screen for

2000 ms after the end of the question. Participants were instructed to listen to the questions and press colour-coded keys on a computer keyboard to indicate in which of the two scenes in the display the answer was to be found. Eye-movements were recorded using the same SMI-RED 250 eye-tracking system in both labs, collecting data at 250Hz.

5. Results

5.1 Comprehension Accuracy

Accuracy on lexical trials was at ceiling for both groups (all $M_s > 90\%$), hence lexical trials were not included in analyses of variance. Syntactic trials are relevant for assessing L1 influence in comprehension accuracy as this is where the L1 syntax may be implicated in parsing. The key prediction is for an interaction between Question Type and Tense in the L2 group, as present tense subject questions and perfect tense object questions represent cross-linguistic conflicts. All else being equal, the tense and order manipulations should not impinge upon the L1 group's comprehension accuracy, which should lead to a 3-way interaction between Group, Question Type and Tense.

Figure 9-3 summarises comprehension accuracy for each tense and order condition. The 3-way ANOVA yielded a marginal main effect of Group, $F(1,66) = 8742, p = .06$, a marginal Tense-by-Group interaction, $F(1,66) = 3.4, p = .07$, and a significant interaction between Question Type and Tense, $F(1,66) = 15.86, p < .001$. No other effects or interactions were significant. Follow-up Group x Question Type ANOVAS were conducted for each tense condition. This yielded just a main effect of Group, $F(1,66) = 6501.83, p = .006$ in the present tense, indicating that the L1 group had better comprehension accuracy overall. For the perfect tense, there was a main effect of Question Type, $F(1,66) = 11.49, p = .001$, indicating lower comprehension accuracy of object questions. Thus, the overall interaction seems to be driven by a stronger effect of Question Type in the perfect tense. This effect is particularly clear for the L1 group, whose comprehension accuracy is markedly lower on perfect tense object questions (see Discussion).

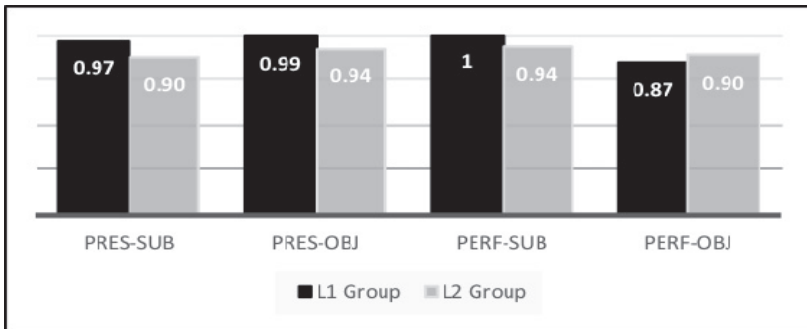


Figure 9-3: Response accuracy for syntactic disambiguation trials

Looking at each group separately, the pattern of comprehension accuracy in the L2 group broadly reflects previous findings and may indicate influence of the L1 syntax (see Rankin 2014). The results of a Tense x Question Type ANOVA for the L2 group yield the predicted interaction, $F(1,40) = 5.01, p = .03$. Accuracy is numerically lower on subject questions in the present tense and on object questions in the perfect tense. The same analysis of the L1 group's responses yields a main effect of Question Type, $F(1,26) = 5.02, p = .03$, qualified by an interaction with tense, $F(1,26) = 10.77, p = .003$. This is driven by the L1 group's unexpectedly low accuracy on perfect tense object questions.

Overall, the L2 group shows the predicted pattern, with lower rates of target interpretations in response to questions which are cross-linguistic conflicts. However, in the absence of a significant 3-way interaction involving Group, this can only be taken as suggestive of potential L1 influence (see Discussion). We turn next to the eye-gaze data to examine how any L1 influence is reflected in online processing.

5.2 Eye Movements

Figures 9-4 to 9-7 illustrate participants' proportion of fixations on the target picture for each tense and question-type condition over the entire trial. Within each condition, trials were aligned to the onset of the second noun. For subject questions, this was the last word in the sentence, and the definitive disambiguation point between the scenes in both lexical and syntactic trials (*Which animal pushes/has pushed the camel?*). We thus expect rapid increases in looks to the target scene in both disambiguation types and groups after this point. However, in present tense subject questions, which constitute a conflict condition for the L2 group, we

predict fewer and potentially later target fixations in syntactic than in lexical disambiguation trials. In the L1 group, by contrast, we do not expect substantial differences in looking behaviour between the two trial types. In perfect tense subject questions, which do not constitute a conflict condition, we predict the two groups to show similar looking behaviour.

For object questions, the situation is more complex. Here the second noun is not the last word of the clause. It presents the definitive disambiguation point in lexical trials, but this is not the case in syntactic trials (*Which animal does/has the camel push/pushed?*). Note that the sentence could in principle still conclude so as to refer to the other scene: *Which animal does/has the camel get/got pushed by?* We thus expect more rapid increases in looks to the target in lexical vs. syntactic trials for object questions. Importantly, we predict these differences to be similar for L1 and L2 listeners for object questions in the present tense (non-conflict), but greater for L2 than L1 listeners in the perfect tense (conflict condition).

Since we did not have a priori hypotheses about when exactly potential effects of cross-linguistic conflict might manifest in eye-gaze patterns, we conducted exploratory quantitative analyses over one large time window, from the onset of the second noun extending until the end of the trial. We report the results from four separate 2 (disambiguation-type) x 2 (group) ANOVAs over proportion of looks to the target scene for each tense and question type.

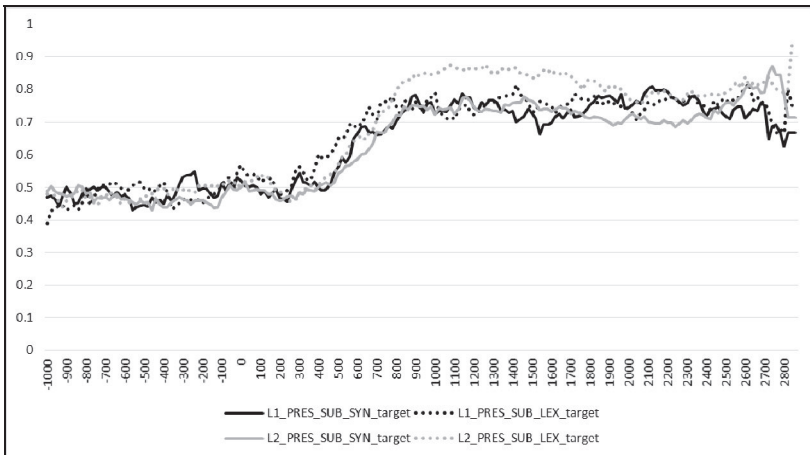


Figure 9-4: Rates of fixations on target picture in present tense subject questions (conflict condition). 0 ms = onset of second noun.

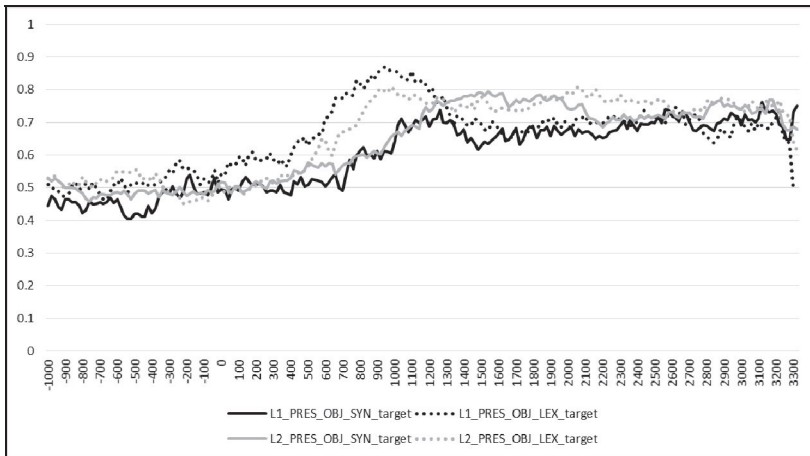


Figure 9-5: Rates of fixations on target picture in present tense object questions (non-conflict condition). 0 ms = onset of second noun.

Visual inspection of Figures 9-4 and 9-5 indicates some support for our predictions from present tense questions. Subject questions evinced no clear differences between lexical and syntactic trials in L1 listeners' eye gaze patterns, whereas L2 listeners appeared to fixate the target scenes more consistently in lexical than in syntactic trials. This is the predicted pattern for conflict conditions. The ANOVA showed a significant main effect of Disambiguation Type, $F(1,66) = 6.39, p = .01$, with more looks to the target scene in lexical (M fixation rate target = .73) compared to syntactic trials ($M = .68$). The predicted interaction with Group was marginal, $F(1,66) = 2.92, p = .09$, providing limited support for greater differences between the syntactic and lexical conditions in the L2 compared to the L1 group.

For object questions, we see clear evidence of overall earlier looks to the target scene in lexical than in syntactic trials, as expected. Visual inspection indicates no clear differences between the L1 and L2 groups in terms of differential looking behaviour on the two trial types in present tense object questions. This is the predicted overall pattern for non-conflict conditions. It is also reflected in the ANOVA, which yielded a main effect of Disambiguation Type, $F(1,66) = 13.19, p = .001$, and no interaction with Group, $F(1,66) = .17, p = .14$.

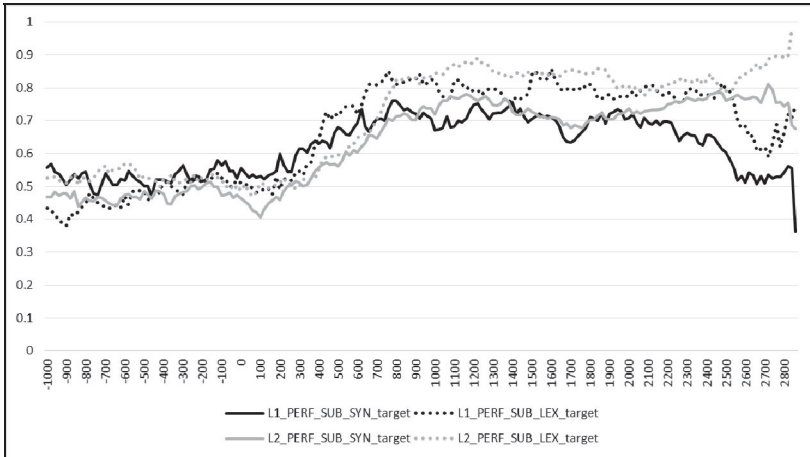


Figure 9-6: Rates of fixations on target picture in perfect tense subject questions (non-conflict condition). 0 ms = onset of second noun.

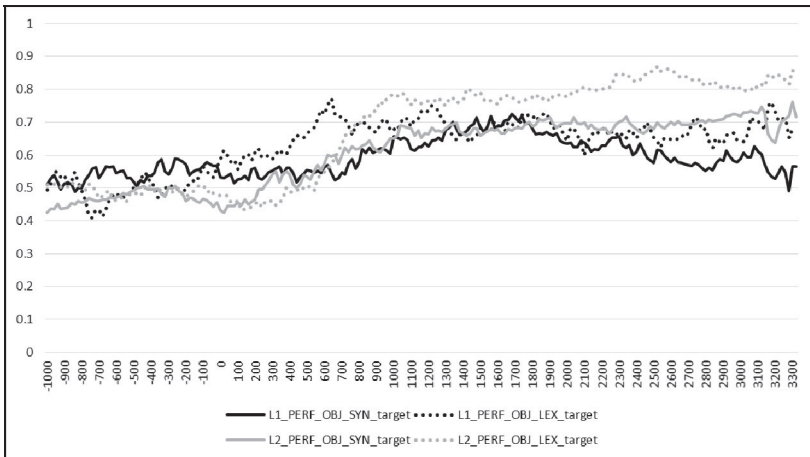


Figure 9-7: Rates of fixations on target picture in perfect tense object questions (conflict condition). 0 ms = onset of second noun.

Looking patterns for questions in the perfect tense (Figs. 9–6 and 9–7) appear more variable. For subject questions, we see relatively rapid and similar increases in looks to the target on both lexical and syntactic trials in both groups. Looks to the target appear to be more consistent on lexical

than syntactic trials. This is reflected in the ANOVA, which showed a main effect of Disambiguation Type, $F(1,66) = 0.19$, $p < .001$, and no interaction with Group, $F(1,66) = .00$, $p = .99$.

For perfect-tense object questions, visual inspection indicates earlier looks to the target on lexical than syntactic trials in the L1 group. In both trial types, L1 listeners' looks appear to plateau at a similar level, indicating no sustained differences in processing difficulty between the two trial types. The L2 group also shows the expected earlier orientation to target on lexical than on syntactic trials. Unlike in the L1 group, however, looks to the target appear to remain at a higher level in lexical than in syntactic trials quite consistently for the rest of the trial. Descriptively, this pattern is suggestive of L2ers' greater processing difficulty due to cross-linguistic conflict, in line with our predictions. However, the ANOVA over the single large time window did not provide statistical support for this interpretation. While it yielded a main effect of Disambiguation Type, $F(1,66) = .12$, $p = .001$, the predicted interaction was not significant, $F(1,66) = .006$, $p = .44$. It is possible that our broad analysis over this large time window was too coarse to capture potentially relevant effects of cross-linguistic conflict. More sophisticated timecourse analyses will be needed to investigate this further.

6. Discussion

The goal of this eye-tracking study was to explore possible online signatures of L1 syntactic transfer in L2 comprehension. We built on existing evidence that German learners of English misinterpret cross-linguistic conflicts in line with the L1 syntax. In a visual-world eye-tracking study, we manipulated English wh-questions' cross-linguistic conflict status with German syntax by varying the type and tense of questions.

The overall pattern of comprehension accuracy in the L2 group was as predicted. The status of English questions as cross-linguistic conflicts with German seems to impinge upon learners' interpretation. However, quantitatively, group differences were not as predicted due to the unexpected performance of the L1 group on perfect tense object questions. This may be explained in terms of a subject-object asymmetry in the acquisition and comprehension of wh-structures. The greater complexity of object wh-structures presented both native and non-native speakers with higher processing costs, leading to lower response accuracy in comprehension. However, it remains unclear why such difficulty was restricted to the perfect tense condition.

In line with previous research, our study suggests that the degree of L1 influence on L2 on-line processing is limited. In this study we found only suggestive effects of L1 activation in the fixation data. In the present tense, there seemed to be a persistent pattern of misinterpretation of English subject *wh*-questions by German-speaking learners (see also Rankin, 2014). This is striking as this is the least complex structure tested. Recall from the studies by Kaan et al. (2015) and Jacob (2009) that their cross-linguistic conflicts involved a complex L2 structure competing with a simpler L1 structure: English object relatives vs. Dutch subject relatives, English reduced relatives vs. canonical German SOV. In our study, a simple SVO structure is susceptible to a more complex OVS L1 parse. Given that it is known that object-first interpretations of ambiguous *wh*-clauses are dispreferred in German (Schlesewsky et al., 2000), the consistent interpretation difficulties that this structure presents for L1 German speakers is particularly noteworthy. An explanation based on structural complexity or limited processing resources could not give a clear account of this result. For object interpretations of subject questions, the learners' comprehension would seem to require computing a more complicated parse than is necessitated by the L2 input. Likely, these effects reflect the influence of the L1 grammar in L2 processing.

In addition to linguistic and processing issues, methodological points require some discussion. The use of a perfect form is pragmatically somewhat unusual in the context of a static picture, making perfect-tense questions somewhat less felicitous. One might speculate that this contributed to the unexpected performance by the L1 group in this condition. But it is difficult to see how aspectual infelicity could induce native speakers to assign non-target thematic interpretations, and nor would it explain the subject-object asymmetry in this tense condition. Further methodological aspects may have attenuated the degree of L1 influence in our study. We presented displays depicting two scenes with incompatible interpretations. Previous studies (e.g. Grüter & Conradie, 2006; Rankin, 2014) used displays in which a sequence of animals performed the same actions on each other in a single scene. Such a visual arrangement may be more conducive to measuring L1 effects as participants perceive less categorical distinctions between subject and object interpretations. Using the visual displays from previous studies may amplify the amount of fixations on potential competitors in the conflict conditions.

In sum, the present study found some suggestive evidence of co-activation of the L1 syntax in L2 processing among advanced L2 learners, although further analysis and experimentation will be needed to better

understand the nature and strength of these effects. When interpreting simple wh-questions, German learners of English occasionally appear to recruit the L1 grammar for parsing the L2 input. These findings suggest that L1 parametric settings are not completely expunged in interlanguage grammars in the course of L2 acquisition, and persist as parsing options in advanced stages of adult L2 acquisition.

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CHAPTER TEN

THE L2 ACQUISITION OF ENGLISH VP-ELLIPSIS AND ADVERB PLACEMENT¹

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1. Introduction

This study examines the second language acquisition (L2A) of English verb phrase ellipsis (VP-ellipsis) and adverb placement by highly proficient L2 learners whose first language (L1) is Saudi Arabic. These two properties were tested as interrelated properties which show verb movement effects triggered by uninterpretable features. Unlike English, Arabic is a verb movement language which does not allow VP-ellipsis.

VP-ellipsis refers to the deletion of the VP in a conjunct clause under parallelism with the VP antecedent so that its meaning can be recovered. This study focuses on two aspects of VP-ellipsis: the licensors and the parallelism requirement governing the form of the antecedent verb and the elided verb. In English, VP-ellipsis can be licensed by aspectual auxiliaries and modals, as in (1-2). Examples are from Aelbrecht (2010: 166).

(1) Uriel was drinking coffee and Aviad **was** [~~drinking coffee~~] too.

(2) Jasmin can draw an elephant, but Ryan **can't** [~~draw an elephant~~].

In English, it is assumed that the licensors (in bold) are hosted by Tense through movement, as in the case of auxiliaries, or base-generation, as in the case of modals (Aelbrecht 2010). In contrast, English lexical verbs are banned from moving to Tense because of their weak verbal

¹ I would like to extend my appreciation to the audience of *GASLA 14* at the University of Southampton for their valuable comments and suggestions.

uninterpretable features (Pollock 1989, Lasnik 1999), and therefore lexical main verbs cannot license ellipsis, as in example (3) from Aelbrecht (2010: 167).

(3) *Ed doesn't like cats and dogs, but Chris **likes** [~~eats and dogs~~].

Regarding the parallelism requirement, English VP-ellipsis does not always require strict morphological parallelism between the antecedent verb and the elided verb. Lexical main verbs can ignore morphological parallelism, as in (4), whereas copula *be* cannot, as in the contrast between (5) and (6). Examples are taken from Lasnik (1999, 109).

(4) John *sleeps* (every afternoon), and Mary should [~~sleep~~] too.

(5) *John *is* here, and Mary will [~~be here~~] too.

(6) John will *be* here, and Mary will [~~be here~~] too.

Lasnik (1999) explained these examples by proposing that lexical verbs are inflected in the syntax through morphological Merge, whereas auxiliaries are inflected in the lexicon. In (4), the verbal root *sleep* in the antecedent and the elided site is identical. For lexical main verbs, what appears to be deletion under partial parallelism at the surface is deletion under strict parallelism at the root level. In contrast, copula *be* enters the derivation fully inflected and thus the antecedent verb *is* and the elided verb *be* are non-identical forms in (5). To generate a grammatical structure, the antecedent and elided verbs must be identical forms, as in (6).

Although there has been considerable research on the parallelism effect in VP-ellipsis in the L1A and L2A literature (e.g. Matsuo and Duffield 2001, Duffield and Matsuo 2009), the contrast in the parallelism effect between lexical main verbs and copula *be* has received little attention (Al-Thubaiti 2010). Also, the relationship between verb movement and VP-ellipsis deserves much attention, especially when there is evidence from the L1 literature that acquiring verb movement is a prerequisite for VP-ellipsis (Santos 2009). A recent study by Santos and Flores (2016) tested adverb placement and VP-ellipsis in European Portuguese as two properties which depend on verb movement effects. Among other groups, they tested L2 learners with L1 German. Their results showed that although the L2 learners successfully recognized target-like adverb

placements, they did not produce enough structures of VP-ellipsis in a production task.

The present study contributes to the current literature by examining: (a) how far the licensing of VP-ellipsis is dependent on acquiring target-like adverb placements, as an indicator of verb movement; (b) the contrast in verb movement effects implicated in the licensing of ellipsis (stranded auxiliary vs. *stranded lexical verb), and (c) the contrast in the parallelism effect between lexical verb and copula *be* ellipsis (strict vs. partial parallelism).

2. A Parametric Account of VP-ellipsis

Unlike English, Arabic is a verb movement language which does not allow VP-ellipsis. This difference can be captured in terms of two parameters - the licensing parameter and the verb movement parameter - as follows.

2.1 The Licensing Parameter

Cyrino and Matos (2005) proposed a parameter distinguishing verb movement languages which do not allow VP-ellipsis. This parameter is based on a locality constraint governing the relationship between the licenser and the elliptical site. They stated the ‘licensing condition’ as follows: “the elliptical vP is licensed, under local c-command by the lexically filled functional head with V-features that merges with it” (106).

For Cyrino and Matos (2005), the licensing of VP-ellipsis correlates with the degree of aspect grammaticalization, and thus the projection of an independent aspectual functional category (AspP) between Tense and the elliptical site. In the case of verb movement languages which lack VP-ellipsis (most Romance languages and German), the verb raised to Tense does not locally c-command the elliptical site because of the intervening AspP, as in (7):

(7) $[_{CP} C [_{TP} T [_{Asp} Asp \dots [_{vP} vP]]]]$ (Cyrino and Matos 2005; 103)

In contrast, for English, they assume that AspP is an extension of the vP (i.e. Asp/vP) and thus Tense maintains a local c-command relation over vP, as in (8). Therefore, VP-ellipsis is allowed in English (see (1) & (2)).

(8) $[_{CP} C [_{TP} T [_{Asp/vP} Asp/v \dots [vP]]]]$

For Arabic, as a verb movement language, it is assumed that AspP projects as an independent functional category (see Fassi-Fehri 2004) because it shows aspect grammaticalization (Rubin 2004). Saudi Arabic does not allow VP-ellipsis, as in (9), but does allow TP-ellipsis (i.e. stripping), as in (10). These examples are from a Hejazi variety of Saudi Arabic.

(9) *Nizaar kaan yiktub bass Omar maa kaan [yiktub].
 Nizar was writing but Omar not was writing
 ‘Nizar was writing, but Omar wasn’t.’

(10) Nizaar katab attagriir wu Omar [katab attagriir] kamaan.
 Nizar wrote the-report and Omar wrote the-report too
 ‘Nizar wrote the report, and Omar too.’

As shown in (9), Saudi Arabic verbs are not VP-ellipsis licensors and thus cannot be stranded. Instead, the whole TP including the raised verb needs to be elided, as in (10). Under Cyrino and Matos’s proposal, VP-ellipsis is not allowed in Saudi Arabic because the projection of an independent AspP violates the locality relation between Tense and the elliptical site.

2.2 The Verb Movement Parameter

Verb movement is another parameter that governs English VP-ellipsis. As illustrated earlier, the licensors must be hosted by Tense through movement or base-generation (Aelbrecht 2010). Unlike Arabic, English demonstrates a case of restricted verb movement where only auxiliary verbs can move to Tense. Following Lasnik (1999), English main verbs cannot move to Tense because of their weak affixal tense, whereas auxiliaries must move because of their strong featural tense requiring feature checking and valuation.

In the L2A literature, adverb placement is a classic diagnostic test for properties of verb movement (White 1991, Trahey and White 1993 among others). The distribution of VP-adverbs (manner and frequency) in languages can indicate whether the verb has moved to Tense or remained in situ (Pollock 1989). An adverb in a post-verbal position usually indicates that the verb has moved over that adverb to reach Tense.

In English and Saudi Arabic, adverbs are allowed in a post-auxiliary position, as in (11), because auxiliary verbs in both languages should move to Tense:

- (11) a. John is *always* complaining about his stomach.
 b. Nizaar kaan *daayman* yiftaki min baTnu.
 Nizar was always complaining about his-stomach
 ‘Nizar was always complaining about his stomach.’

Conversely, both languages contrast when a simple lexical verb is involved, as in (12):

- (12) a. John *always* drinks coffee in the morning.
 b. Nizaar yifrab *daayman* gahwa fi-S-SubuH
 Nizar drinks always coffee in-the-morning
 ‘Nizar drinks always coffee in the morning.’

Unlike Saudi Arabic, the occurrence of the adverb in a post-verbal position in English is ungrammatical, as in (13), because English lexical verbs cannot move to Tense:

- (13) *John drinks *always* coffee in the morning.

To summarise, unlike English, Saudi Arabic allows adverbs in a post-verbal position with auxiliaries and lexical verbs due to being a verb movement language. When testing English, the crucial contrast is that of VP-adverbs in a post-lexical verb position (ungrammatical) vs. a post-auxiliary position (grammatical). These conditions show whether the contrast in verb movement constraints between English lexical verbs and auxiliaries has been acquired.

3. Research Questions

Based on the parametric difference between Arabic and English, three questions were examined, with regard to highly proficient English L2 speakers whose L1 was Saudi Arabic:

1. Can they restrict verb movement to auxiliary verbs and thus distinguish (un)grammatical positions of VP-adverbs in relation to lexical and auxiliary verbs?
2. Can they identify auxiliary verbs and modals as possible syntactic licensors for VP-ellipsis as opposed to non-raising lexical verbs?
3. Can they acquire the contrast in parallelism effects between lexical verb and copula *be* ellipsis?

4. Method

4.1 Participants

The study sample consisted of a control group of 15 English native speakers (NSs) and two proficient English L2 groups with L1 Saudi Arabic (15 very advanced and 19 advanced). The L2 groups' English proficiency was assessed using the Oxford Placement Test and Nation's vocabulary test.

4.2 Materials

An Acceptability Judgment Task (AJT) with 164 items was designed, with a balanced distribution of grammatical and ungrammatical items. Among other properties, it contained 48 items on adverb placement and 48 on VP-ellipsis.

Adverb placement was tested in declarative sentences. The following are examples of the test items with manner adverbs:

1. Transitive: SadvVO vs. *SVadvO (12 manner x 12 frequency)
 - (a) The teacher *easily* explains the theory. ($k=4$)
 - (b) *The secretary types *quickly* the letter. ($k=4$)
 - (c) The kids were *happily* eating their lunch. ($k=4$)
 - (d) *The librarians were arranging *quietly* the books. ($k=4$)
 - (e) The judge has *publicly* released the verdict. ($k=4$)
 - (f) *The chef has cooked *poorly* the food. ($k=4$)
2. Intransitive: SadvVPP vs. SVadvPP (12 manner x 12 frequency)
 - (a) The man *hastily* drives through the woods. ($k=4$)
 - (b) The child plays *happily* in the park. ($k=4$)
 - (c) The hiker is *quietly* hiding from a bear. ($k=4$)
 - (d) The horse is standing *calmly* in the meadow. ($k=4$)
 - (e) The plane has *suddenly* landed at the airport. ($k=4$)
 - (f) The patient has died *suddenly* during the operation. ($k=4$)

Testing adverb placement in verbal constructions with auxiliary verbs was crucial for distinguishing adverbs in post-auxiliary (Aux adv V) and post-lexical verbs (*V adv) in transitive structures. The inclusion of intransitive structures was crucial for verifying that the L2 speakers could distinguish the underlying structure of post-verbal adverbs which occur inside and outside the VP and thus indicate verb movement effects (see Schwartz and Gubala-Ryzak 1992).

VP-ellipsis was tested in conjunct structures. This paper reports on a subset of the VP-ellipsis stimuli which relate to the licensing condition and parallelism effects. The following are examples of the test items:

1. Three licensors for ellipsis with identical antecedents
 - (a) *Auxiliary*: John is watching TV, but Mary *isn't* yet. ($k=8$)
 - (b) *Modal*: John will be here, and Mary *will* too. ($k=8$)
 - (c) *Lexical verb*: *Neal grows vegetables, and his wife *grows* too. ($k=8$)
2. Parallelism effects on VP-ellipsis with non-identical antecedents
 - (a) *Lexical verb*: Mike revises his work, and Jennifer should as well. ($k=4$)
 - (b) Copula *be*: *John is happy, and Mary will soon. ($k=4$)

The participants had to rate the sentences on a five-point scale, where (1) was 'definitely impossible' and (5) was 'definitely possible'. The items were presented aurally and in writing in a PowerPoint slide presentation. The transition of the slides was timed to control the response time; the participants had eight seconds to rate the sentences on the answer sheet.

5. Results

5.1 Adverb Placement

Figure 10–1 shows the groups' mean ratings on pre-/post-verbal adverbs with transitive verbs followed by NP objects (SadvVO vs. *SVadvO). The results of paired *t*-tests showed that all groups distinguished between (un)grammatical adverb positions with manner and frequency types. As expected, the acceptance ratings of the NSs on SadvVO were significantly higher than their rejection ratings on *SVadvO with manner adverbs, $t(14) = 13.80$, $p < .001$, and frequency adverbs, $t(14) = 16.69$, $p < .001$. The (very) advanced L2 groups also showed target-like judgments on the pre/post-verbal pairs. The ratings of the very advanced group showed that they significantly distinguished between SadvVO and *SVadvO with manner adverbs, $t(14) = 9.04$, $p < .001$, and frequency adverbs, $t(14) = 17.53$, $p < .001$. The advanced group also showed similar results on the same pair with manner adverbs, $t(18) = 5.86$, $p < .001$, and frequency adverbs, $t(18) = 10.52$, $p < .001$.

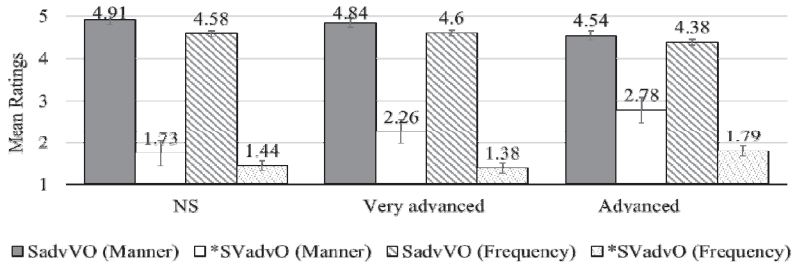


Figure 10-1: Mean ratings for SadvVO and *SVadvO in transitive sentences

Turning to intransitive verbs with PP adjuncts, Figure 10–2 shows the groups' mean ratings on pre/post-verbal adverbs (SadvVPP vs. SVadvPP) with manner and frequency adverbs. The results of paired *t*-test comparisons showed that all the groups recognized that adverbs can appear in pre/post-verbal positions with intransitive verbs. As expected, the NSs showed comparable acceptance ratings for manner adverbs in SadvVPP and SVadvPP, $t(14) = 1.07, p = .301$, but gave significantly higher acceptance ratings to frequency adverbs in SadvVPP over [?]SVadvPP, $t(14) = 7.49, p < .001$. In target-like judgments, the very advanced group gave comparable acceptance ratings to SadvVPP and SVadvPP with manner adverbs, $t(14) = .328, p = .748$, as did the advanced group, $t(18) = .123, p = .904$. On the other hand, with frequency adverbs, the very advanced group showed significantly higher acceptance of SadvVPP than [?]SVadvPP, $t(14) = 7.55, p < .001$, and this was also true of the advanced group, $t(18) = 5.06, p < .001$. Like the NSs, the L2 groups showed that frequency adverbs are less preferable in the post-verbal position, unlike manner adverbs which are equally acceptable in pre- and post-verbal positions with intransitive verbs.

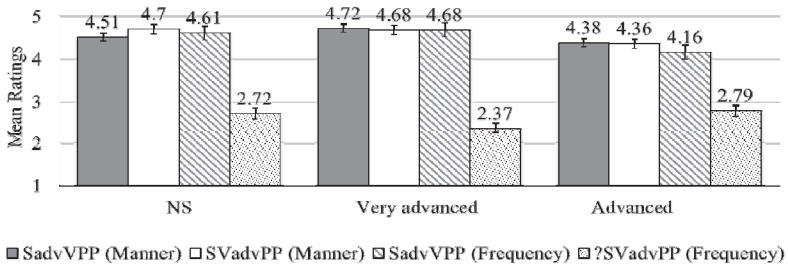


Figure 10-2: Mean ratings for SadvVPP and SVadvPP in intransitive sentences

Next, the ratings on post-verbal adverbs with intransitive verbs (SVadvPP) and transitive verbs (*SVadvO) shown in the above Figures 10–1 and 10–2 were compared. The purpose of this comparison was to validate that the L2 groups could distinguish the underlying difference between adverbs inside and outside VPs, and that they were not just rejecting post-verbal adverbs on the surface. As expected, the NSs gave significantly lower ratings to *SVadvO compared with SVadvPP with manner adverbs, $t(14) = 12.989, p < .001$, and frequency, $t(14) = 9.846, p < .001$. In target-like judgments, the very advanced group were also categorical in their judgments, showing lower ratings on *SVadvO compared with SVadvPP with manner adverbs, $t(14) = 8.643, p < .001$, and frequency adverbs, $t(14) = 5.076, p < .001$. Comparable results were shown by the advanced group on the same paired condition with manner adverbs, $t(18) = 5.658, p < .001$, and frequency, $t(18) = 7.103, p < .001$.

Having analysed the L2 speakers’ judgments on adverb placement in relation to the distinction between transitive and intransitive verbs, the next step was to analyse their judgments on (un)grammatical adverb placements for lexical and auxiliary verbs. Therefore, their mean ratings on structures with transitive verbs (combining manner and frequency adverbs) were broken down into three verbal constructions with and without auxiliaries: simple verbs (adv V vs. *V adv), and the aspectual auxiliaries *be* and *have* (Aux adv V vs. *Aux V adv). Figure 10–3 shows the mean ratings on pre/post-verbal positions within the three verbal constructions.

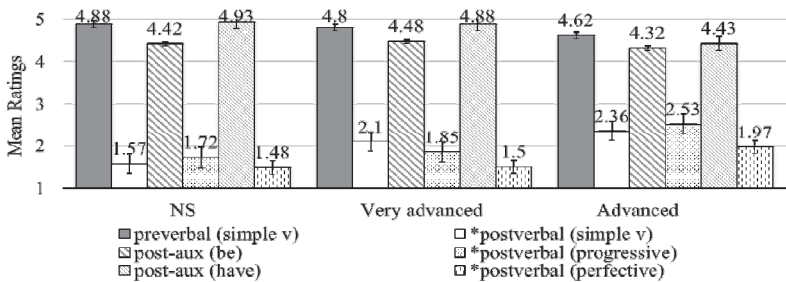


Figure 10-3: Adverb placement by three verbal constructions

The results of paired *t*-tests on (un)grammatical pairs showed that all groups were categorical in their ratings with all three construction types. The NSs were statistically categorical in distinguishing (un)grammatical adverb positions with simple verbs ($t(14) = 13.99, p < .001$), progressive

be ($t(14) = 11.00, p < .001$), and perfective *have* ($t(14) = 16.99, p < .001$). The very advanced group also showed target-like distinctions on (un)grammatical pairs with simple verbs ($t(14) = 9.89, p < .001$), progressive *be* ($t(14) = 9.90, p < .001$), and perfective *have* ($t(14) = 17.49, p < .001$). The advanced group showed a categorical distinction on the same pairs with simple verbs ($t(18) = 8.96, p < .001$), progressive *be* ($t(18) = 6.12, p < .001$), and perfective *have* ($t(18) = 8.15, p < .001$).

To summarize, the results provided evidence that the L2 groups of (very) advanced proficiency distinguished between (un)grammatical adverb positions with (in)transitive verbs. Most importantly, the results showed that they distinguished between adverbs in grammatical post-auxiliary and ungrammatical post-lexical verb positions.

5.2 VP-ellipsis

First, the results on the licensors are reported. Figure 10–4 shows the groups' mean ratings on three types of licensors: modals, auxiliaries, and *lexical verbs. The results of repeated measures ANOVAs showed a significant main effect of the licensor type on the ratings of the NSs ($F(2,28) = 54.71, p < .001$), the very advanced group ($F(2,28) = 55.72, p < .001$), and the advanced group ($F(2,36) = 67.16, p < .001$). In Bonferroni pairwise comparisons, the results for all groups consistently showed that the mean ratings on stranded *lexical verbs were significantly lower than those of stranded modals ($p < .001$), and stranded auxiliaries ($p < .001$). Additionally, the results showed no significant differences between the acceptance ratings of stranded modals and auxiliaries by the NSs ($p = .17$), the very advanced group ($p = .75$), and the advanced group ($p = 1.0$). These results showed that all groups significantly distinguished between stranded modals and auxiliaries, on the one hand, and stranded *lexical verbs, on the other.

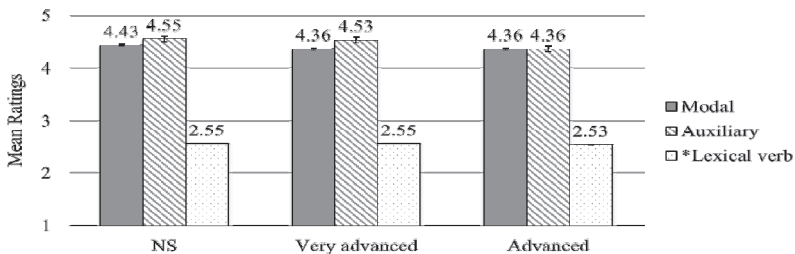


Figure 10-4: Mean ratings for three licensors (modals, auxiliaries, and *lexical verbs) for ellipsis with identical antecedents

Having shown that the L2 groups recognized VP-ellipsis as possible in English and distinguished (un)grammatical licensors, the results on the parallelism effect are now reported. Figure 10–5 shows the mean ratings on copula *be* and lexical verb ellipsis with non-identical antecedents. As shown, all groups accepted lexical verb ellipsis but rejected copula *be* ellipsis in the same condition. The results of paired *t*-tests showed that there was a significant difference reflecting higher acceptance of lexical verbs by the NSs ($t(14) = 11.59, p < .001$), the very advanced group ($t(14) = 10.98, p < .001$), and the advanced group ($t(18) = 8.73, p < .001$).

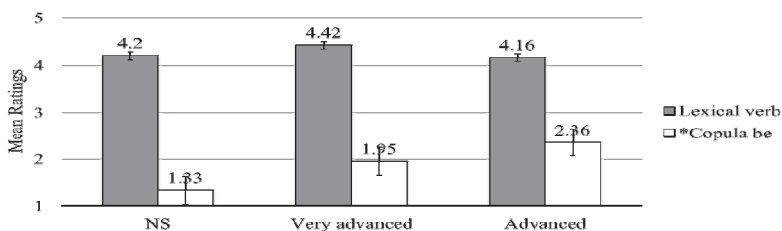


Figure 10-5: Parallelism effects on VP-ellipsis with non-identical antecedents

In summary, these results provide some evidence that the L2 learners could recognize auxiliary verbs and modals as VP-ellipsis licensors. They also distinguished between copula *be* and lexical verbs in terms of the parallelism requirement.

6. Discussion and Conclusion

The aim of this paper was to test three issues in the L2A of English VP-ellipsis: (a) how far the licensing of VP-ellipsis is dependent on acquiring target-like adverb placements as an indicator of verb movement; (b) the contrast in verb movement effects implicated in the licensing of VP-ellipsis (stranded auxiliary vs. *stranded lexical verb); and (c) the contrast in the parallelism effect between lexical verb and copula *be* ellipsis (strict vs. partial parallelism). These issues were tested with highly proficient L2 speakers whose L1 was Saudi Arabic. Recall that unlike English, Saudi Arabic is a verb movement language which lacks VP-ellipsis.

The results from adverb placement indicated that the (very) advanced L2 groups successfully acquired the verb movement constraints which differentiate lexical verbs from aspectual auxiliaries, and thus have reset the strength of verbal uninterpretable features on Tense. Although their L1 Saudi Arabic allows verb movement with all verbs, they have successfully

learnt to restrict verb movement to auxiliaries in English. Evidence from a set of paired (un)grammatical conditions is summarized as follows. First, they categorically rejected post-verbal adverbs but accepted pre-verbal adverbs in transitive structures with manner and frequency adverbs alike. Second, they judged pre-verbal and post-verbal adverbs in intransitive structures as equally acceptable with manner adverbs, but showed target-like preference for pre-verbal frequency adverbs. Third, they categorically rejected post-verbal adverbs with transitive verbs but accepted post-verbal adverbs with intransitives. Fourth, they categorically rejected adverbs in the post-lexical verb position but accepted adverbs in the post-auxiliary position. These results are compatible with those of Al-Thubaiti (2010), Ayoun (2005) and Yuan (2001).

The results on the licensors provide further evidence that the L2 groups could distinguish the verb movement constraints implicated in the licensing of VP deletion. They highly accepted VP-ellipsis with a stranded auxiliary but gave significantly lower ratings to structures with a stranded lexical verb. They also highly accepted VP-ellipsis with a stranded modal to the same degree that they accepted a stranded auxiliary. Their performance here is taken to indicate that they recognized Tense as the syntactic licensor for VP-ellipsis. However, further testing is required with a wider range of possible licensors to confirm this conclusion.

The results on the parallelism effects between copula *be* and lexical verbs provide more evidence that the L2 groups had acquired VP-ellipsis on the one hand, and the contrast between lexical verbs and auxiliaries on the other. With morphological non-identical antecedents, they accepted ellipsis of non-finite lexical verbs but rejected ellipsis of non-finite copula *be*. Their judgements are taken to indicate that they had learned that morphological parallelism can be overlooked with lexical verbs because they are inflected in the syntax, whereas auxiliaries cannot tolerate morphological mismatch because they are inflected in the lexicon.

Overall, the combined results on adverb placement and VP-ellipsis corroborate the position that acquiring verb movement constraints is a prerequisite for the L2A of VP-ellipsis (see Santos 2009, Santos and Flores 2016). More evidence is required from L2 performance across proficiency levels to confirm the pre-requisite condition in their development.

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CHAPTER ELEVEN

ANAPHOR RECONSTRUCTION IN L1 AND L2 JAPANESE RELATIVE CLAUSES

YUNCHUAN CHEN AND SHIN FUKUDA

1. Introduction

When an anaphor that must be locally bound occurs within the head NP of relative clauses (RCs), its interpretation has been considered to help diagnose whether the head NP is raised or base-generated (e.g. Schachter 1973; Bhatt 2002; Aoun and Li 2003). For Chinese relative clauses (CRCs), it has been argued that the head NP is raised from within the RC because the anaphor within the head NP can be co-referential with the RC subject (Aoun and Li 2003), as in (1). However, for Japanese relative clauses (JRCs) such as (2), whether the anaphor *jibun* within the head NP can refer to the RC subject has been controversial. While many studies claim that the co-reference between the anaphor and the RC subject is impossible (e.g. Hoji 1985; Murasugi 2000), several other studies argue that the co-reference is actually acceptable (e.g. Hoshi 2004; Ishizuka 2010).

- (1) [Zhangsan_k kanjian-le [[Xiaoming_i kai t_j lai de]
Zhangsan see-PST Xiaoming drive over DE
[ziji_{i/k} de chezi]_j]] (Chinese)
Self GEN car
'Zhangsan_k saw self_{i/k}'s car that Xiaoming_i drove over.'
(Aoun and Li 2003, 132)
- (2) Hanako_j-ga [[Taroo_k-ga e_i arat-ta] [jibun_j/_γ_k-no booshi]_j]-o
Hanako-NOM Taroo-NOM wash-PST self-GEN hat-ACC
yogoshi-ta. (Japanese)
stain-PST
'Hanako_j stained self_j/_γ_k's hat that Taroo_k washed.'

The above controversies raise the following questions in the context of second language (L2) acquisition. If Japanese and Chinese RCs are different in terms of the possible interpretation of an anaphor inside the head NP, can native speakers of Chinese who study Japanese as an L2 acquire the difference? The target knowledge is underdetermined because it cannot be directly derived from input, classroom instruction or learners' L1. Thus, L1 Chinese learners of L2 Japanese are faced with a challenging task: to unlearn some knowledge that is licensed in their L1 without any direct evidence from the input. If they manage to do so, the operation of UG in L2 acquisition would be motivated.

2. Design of Experiment 1

First of all, we conducted a Truth Value Judgment Task (TVJT) with L1 Japanese speakers to address the following research question:

- (3) Can the anaphor *jibun* within the head NP of JRCs be co-referential with the RC subject?

The core implications of the results of Experiment 1 for the derivation of the head NP in JRCs are the following: if the anaphor can refer to the RC subject, it must be the case that the head NP reconstructs within the RC at LF, which implicates that the head NP is raised from within the head NP. However, if the anaphor cannot refer to the RC subject, we can infer that the head NP does not reconstruct within the RC so it is base-generated externally to the RC.

A total of 28 L1 Japanese speakers participated in Experiment 1. They were undergraduate students from one university in Japan. The experiment was done with a computer in a computer lab and each participant received an extra course credit after finishing the experiment. All participants finished the experiment within 20 minutes.

The task was a picture-matching TVJT. Four Disney characters, *Mickey*, *Minnie*, *Donald* and *Daisy*, were used in the materials. For each experimental stimulus, participants saw a picture and a sentence on a computer screen. One item with its two conditions is shown below as an example:



The Japanese sentence under the pictures is below:

- (5) Daisy_j-ga Mickey_k-ga arat-ta jibun_{j/?}_k-no booshi-o
 Daisy-NOM Mickey-NOM wash-PST self-GEN hat-ACC
 yogoshita
 stain-PST
 ‘Daisy_j stained self’_{s_j/?}_k hat that Mickey_k washed.’

Participants were informed that all Disney characters like to put their face photos on their belongings. In (4a), the picture features a hat with a face photo of *Mickey*, which indicates that the hat is owned by *Mickey*. Participants then judged whether the sentence and the picture matched by selecting one of two choices: ‘match’ or ‘mismatch’. Importantly, in order for (5) to match (4a), *jibun-no booshi* ‘self’s hat’ in (5) must be interpreted as *Mickey*’s hat. In other words, the antecedent of the anaphor must be the RC subject. In contrast, (4b) indicates that the hat is owned by *Daisy*. Thus, in order for (5) to match it, *jibun-no booshi* must be interpreted as *Daisy*’s hat. Therefore, within each item, the intended antecedent for the anaphor is either the matrix subject or the RC subject, depending on the picture. This factor of *Antecedent Position* results in two critical conditions: (i) a picture is such that the anaphor *jibun* must refer to the matrix subject (*Jibun-Matrix*) and (ii) a picture is such that the anaphor *jibun* must refer to the RC subject (*Jibun-RC*).

There were 24 sentences of different lexicalizations. Each of the 24 sentences was then combined with a picture that requires the matrix subject as the antecedent of the anaphor and another picture that requires the RC subject as the antecedent of the anaphor, resulting in 48 sentence-picture pairs. These 48 pairs were distributed into two lists so that each list contained only one condition from the same lexicalization. Thus, there were 24 critical stimuli in total in each list and each condition had 12 stimuli. Moreover, 36 fillers were included. The order of all the items in each list was pseudo-randomized.

3. Findings of Experiment 1

A total of 28 L1 Japanese participants’ data were examined and analyzed. First, the mean frequency of ‘match’ answers with its standard deviation (SD) and standard error (SE) out of 12 items in each critical condition was calculated, which is summarized in Table 11-1.

Table 11-1. L1 Japanese speakers' means, SDs and SEs of the two critical conditions in Experiment 1

| Conditions | Mean (SD) | SE |
|----------------------|--------------|------|
| <i>Jibun</i> -Matrix | 11.25 (1.11) | 0.21 |
| <i>Jibun</i> -RC | 1.25 (1.55) | 0.29 |

The mean difference between *Jibun*-Matrix and *Jibun*-RC clearly shows that the matrix subject is preferred to the RC subject as the antecedent of *jibun*. Pairwise comparison confirmed this observation: the mean difference between *Jibun*-Matrix and *Jibun*-RC is significant: $t(27) = 22.76$, $p < .01$. In addition, each individual's judgments were also examined. Based on binominal distribution, if a participant allowed/rejected 9 items or more in each condition, we will be sure that she did not make random choices. It shows that 27 out of 28 participants accepted 9 items or more in *Jibun*-Matrix and 1 participant accepted 8 items. Meanwhile, 24 out of 28 participants rejected 9 items or more in *Jibun*-RC¹. Thus, the co-reference between *jibun* and the RC subject seems impossible for L1 Japanese speakers. Thus, our findings suggest that the anaphor *jibun* within the head NP of JRCs cannot refer to the RC subject, which supports the proposal that the head NP of JRCs is base-generated externally to the RC and does not reconstruct within the RC at LF (e.g. Murasugi 2000). With this conclusion, we will continue to investigate whether L1 Chinese speakers of L2 Japanese can acquire the knowledge that the anaphor *jibun* within the head NP of JRCs cannot refer to the RC subject. If they can, the POS issue in L2 acquisition would be implicated.

4. Poverty of stimulus (POS) in L2 acquisition

Of central concern in second language (L2) acquisition is: (i) whether UG is still accessible to L2 acquisition and if so, (ii) whether L2 grammars are constrained by UG. In the late 1960s and early 1970s, researchers such as Corder (1967) and Selinker (1972) found that L2 learners make systematic rather than random errors, which indicates that learners' grammar is rule-governed. Since then, there have been different hypotheses concerning whether UG is accessible to L2ers. First, several researchers propose that UG is not accessible in adult L2 acquisition (e.g. Clahsen and Muysken 1986; Bley-Vroman 1990). They argue that L2 acquisition is not constrained by UG at all or only constrained by the properties of learners'

¹ All participants rejected 7 items or more in *Jibun*-RC.

L1. For example, by examining the naturalistic L2 acquisition of German by adult native speakers of various languages such as Italian, Portuguese, and Spanish, Clahsen and Muysken (1986) showed that learners move nonfinite verbs rightward in their L2 German, which is prohibited by UG. Based on this finding, Clahsen and Muysken argue that L2 learners' grammar is unconstrained and L2 acquisition is not constrained by UG. Nevertheless, Schwartz and Sprouse (2000) state that Clahsen and Muysken's "wild" L2 data is actually constrained by UG, if the data is analyzed under the revised syntactic structure proposed in du Plessis et al. (1987) and Schwartz and Tomaselli (1990). Another study arguing that UG does not constrain L2 acquisition is from Klein (1993, 1995). She observed that many languages allow omission of prepositions in RCs, which is called *null prep*. However, the null prep is prohibited in English because the ECP would be violated. Klein investigated whether native speakers of the languages that permit the null prep are able to acquire the knowledge that the null prep is prohibited in English. With a series of experiments, Klein found that even highly advanced L2 learners of English whose L1 belong to the relevant type of languages accept null prep in English, based on which she argues that L2 grammar can be unconstrained.

Although the UG-incompatible data seem to suggest that UG does not constrain L2 acquisition, Schwartz and Sprouse (2000) argue that the UG-incompatible data itself cannot be an argument against the availability of UG in L2 acquisition. There are two arguments. First, many known languages also show UG-incompatible data (e.g. Tomaselli and Schwartz 1990). Second, to argue that UG is not accessible in L2 acquisition, UG-incompatible data itself is not sufficient and should be supplemented by the evidence that L2 acquisition is not underdetermined by input. Since the POS is one of the core arguments to argue for the operation of UG in L1 acquisition, if we could show that the POS argument also holds for L2 acquisition, we would motivate the operation of UG in L2 acquisition (Schwartz and Sprouse 2000). Thus, to argue that UG remains active in L2 acquisition, the POS should be the focus. In addition, White (2003) states that the POS exists even if L2 learners do not acquire the same knowledge as native speakers. She claims that it is sufficient to demonstrate the POS as long as L2 learners could show complex grammatical knowledge that cannot be derived from their L1, input or any explicit instruction.

Indeed, many previous studies have shown that the POS does occur in L2 acquisition, which means there has been evidence that complex grammar can be learned by L2 learners in the absence of positive evidence in the input and L1. In the following sections, we will investigate whether

L1 Chinese learners of L2 Japanese can acquire the underdetermined knowledge that the anaphor *jibun* within the head NP cannot refer to the RC subject, with the aim to see whether the operation of UG in L2 acquisition can be further supported.

5. Research Questions

In Chinese relative clauses (CRCs), it has been argued that the anaphor *ziji* ‘self’ within the head NP of CRCs can take either the RC subject or the matrix subject as its antecedent (Aoun and Li 2003), as in (1a). In contrast, in Japanese relative clauses (JRCs), the results of Experiment 1 have confirmed the claim the anaphor *jibun* ‘self’ within the head NP of JRCs cannot refer to the RC subject (e.g. Hoji 1985), as in (1b). This difference can be accounted for by analyzing that these two languages use different strategies to derive the head NP of RCs in the two languages: in Chinese, the head NP is raised from within the RC (Aoun and Li 2003) while in Japanese, the head NP is base-generated externally to the RC (e.g. Murasugi 2000).

As the co-reference between the anaphor and the RC subject is prohibited in Japanese but is allowed in Chinese, L1 Chinese learners of L2 Japanese are faced with a challenging task of unlearning the knowledge that is licensed in their L1. The constraint that the anaphor *jibun* cannot refer to the RC subject is underdetermined for L1 Chinese learners due to the following three reasons: (i) there is no input directly exhibiting that the anaphor *jibun* within the head NP cannot refer to the RC subject; (ii) this constraint is not taught in Japanese classes, based on our consultation with instructors of Japanese in China, (iii) this constraint cannot be derived from Chinese. Thus, we aim to address the following research questions:

- (6) a. Can L1 Chinese learners of L2 Japanese acquire the underdetermined constraint that the anaphor *jibun* within the head NP cannot refer to the RC subject?
- b. Are there L1 transfer effects when L1 Chinese learners of L2 Japanese interpret the anaphor *jibun* within the head NP of JRCs?

6. Design of Experiment 2

All L2 participants completed two tasks in Experiment 2: (i) a Japanese TVJT, which is the same as Experiment 1, that the L1 Japanese speakers participated in and (ii) a Chinese TVJT equivalent to the Japanese TVJT, where each item was closely translated from Japanese to Chinese.

Participants did the Chinese TVJT 3 weeks after the Japanese TVJT. Both TVJTs were done with a computer in a computer lab. Each participant spent about 1 hour in total to finish the two tasks and was given extra course credits after the experiment.

A total of 81 L1 Chinese learners of L2 Japanese were recruited to participate in this experiment. They were undergraduate students majoring in Japanese language at 3 universities in southwest China. According to a short background information survey, none of them started learning Japanese before the age of 17 and they did not have any extended stay outside China before entering college at the age of 17 or 18. Some participants studied in Japan as exchange students for one year in their third year in college.

The items in the Japanese TVJT and the Chinese TVJT were equivalent. There were 2 critical conditions: (i) a picture is such that the anaphor must refer to the matrix subject (*Jibun/Ziji*-Matrix) and (ii) a picture is such that the anaphor must refer to the RC subject (*Jibun/Ziji*-RC), as in (4) and (5). The Chinese sentence equivalent to the Japanese sentence (5) is below:

- (7) Daisy_j nongzang-le Mickey_k xi de ziji_{j/k}-de maozi.
 Daisy stain-PST Mickey wash DE self-DE hat
 ‘Daisy_j stained self_{j/k}’s hat that Mickey_k washed.’

Since the Chinese anaphor *ziji* can refer to either the matrix subject or the RC subject under Aoun and Li’s (2003) proposal, participants were expected to accept items in both *Ziji*-Matrix and *Ziji*-RC in the Chinese TVJT. Further, 34 fillers were used as a screening test to monitor whether the participants were careful enough in reading sentences and a total of 12 participants were excluded. The procedure in Experiment 2 is the same as that in Experiment 1. Moreover, each participant was given the same type of list in Chinese and Japanese. That is to say, the participants who had seen List 1 of the Japanese TVJT were given List 1 of the Chinese TVJT and those who had seen List 2 of the Japanese TVJT were given List 2 of the Chinese TVJT. Two-way repeated measures ANOVA were used and pairwise comparisons were also conducted. We also examined the individual participants’ judgments.

7. Findings of Experiment 2

The data of a total of 69 L2 participants were analyzed. First, the mean frequency of ‘match’ answers with its standard deviation (SD) and

standard error (SE) for each condition in the Japanese and Chinese TVJTs was calculated, which is summarized in Table 11-2 and Figure 11-1.

Table 11-2. L2 participants' means, SDs and SEs of the critical conditions in the Japanese and Chinese TVJTs

| Conditions | Mean (SD) | SE |
|----------------------|--------------|------|
| <i>Jibun</i> -Matrix | 9.83 (2.94) | 0.35 |
| <i>Ziji</i> -Matrix | 9.97 (2.29) | 0.28 |
| <i>Jibun</i> -RC | 8.62 (3.63) | 0.44 |
| <i>Ziji</i> -RC | 10.20 (2.57) | 0.31 |

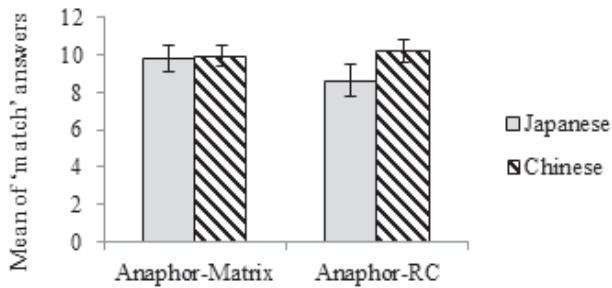


Figure 11-1. L2ers' judgments on the critical conditions of the Japanese TVJT and the Chinese TVJT

Since each participant saw the same list in both Japanese and Chinese, the type of language can also be considered as a factor. There were two factors: (i) *Language Type* (Japanese or Chinese) and (ii) *Antecedent Position* (whether the intended antecedent is the matrix subject or the RC subject). Two-way repeated measures ANOVA revealed an interaction between the two factors: $F(1, 68) = 5.44, p = .02$. Pairwise comparison shows that the difference in the mean frequency of the 'match' answers between *Jibun*-Matrix and *Ziji*-Matrix is not significant: $t(68) = 0.433, p = .666$. However, the mean frequency of the 'match' answers of *Jibun*-RC is significantly lower than that of *Ziji*-RC: $t(68) = 3.348, p < .01$, which suggests that the L2 participants did make a distinction between the Chinese anaphor *ziji* and the Japanese anaphor *jibun* regarding their co-reference with the RC subject: *jibun* is less likely to take the RC subject as its antecedent than *ziji*.

In addition, the individual participants' judgments were examined. Based on binominal distribution, if a participant accepted/rejected 9 items or more in one condition, we would be confident that she did not make

random judgments. By checking their judgments in *Jibun*-RC, we found that 42 out of 69 participants accepted 9 items or more, which suggests that they allow the co-reference between *jibun* and the RC subject. However, 7 participants rejected 9 items or more, which indicates that they have the native-like knowledge to reject the co-reference between *jibun* and the RC subject.

8. Discussion and Implications

Our findings suggest that the L2 participants know there is a difference between Chinese and Japanese concerning the available interpretations of the anaphor within the head NP of RCs. That is, *jibun* is less likely to take the RC subject as its antecedent than *ziji*. Acquisition of this knowledge implicates the operation of UG because this particular knowledge about JRCs cannot be directly derived from input or learners' L1. But how can such knowledge be acquired even if it is underdetermined?

Although there is no direct evidence showing the information that the co-reference between the RC subject and the anaphor *jibun* is prohibited, there must be some clues in the input that trigger acquisition of the syntactic knowledge that the head NP is base-generated in JRCs. One potential piece of evidence is from the scope interaction between the head NP and the universal quantifier *subete* 'all' within the RC. (8a) and (8b) are two equivalent examples from Japanese and Chinese:

- (8) a. [_{CP} subete-no-sensei-ga yon-da] [_{NP} hon] (Japanese)
 all-GEN-teacher-NOM read-PST book
 'the books that all teachers read.'
 (indefinite reading: books>all; *all> books) (definite reading: books>all)

- b. [_{CP} suoyou de laoshi kan de] [_{NP} shu] (Chinese)
 all-GEN-teacher read DE book
 'the books that all teachers read.'
 (indefinite reading: all>books; *books>all) (definite reading: books>all)

In (8a), the bare noun *hon* 'book' could have either an indefinite reading or a definite reading (Tawa 1993; Nemoto 2005). When it is definite, the NP *hon* 'book' always takes a wider scope than the universal quantifier *subete* 'all' while when it is indefinite, *hon* 'book' also takes a wider scope than *subete* 'all.' Thus, *subete* 'all' can never take a wider scope than *hon* 'book.' Whenever this sentence is used, the *book* must refer to the same set of books that each teacher read. The wider scope of

the indefinite *hon* ‘book’ can be accounted for by the head external analysis of JRCs. When the head NP is base-generated externally to the RC, we predict it takes a wider scope than a universal quantifier *subete* ‘all’ within the RC.

On the other hand, in the Chinese sentence (8b), the bare noun *shu* ‘book’ could also have either an indefinite reading or a definite reading (e.g. Li 2011; Jiang 2012). When it is definite, the NP *shu* ‘book’ always takes a wider scope than the universal quantifier *suoyou* ‘all.’ But when it is indefinite, *suoyou* ‘all’ takes a wider scope than *shu* ‘NP’ and *shu* cannot take a wider scope than *suoyou*. Hence, when (8b) is used in a context where *shu* is indefinite, *shu* must refer to a whole set of books consisting of all that each teacher read. The derivation of this interpretation can be accounted for by the head raising analysis of CRCs: at LF, the head NP *shu* reconstructs at its base position within the RC so the universal quantifier *suoyou* ‘all’ takes a wider scope over it².

Thus, by comparing (8a) and (8b), we can see a difference between Japanese and Chinese concerning the scope interaction between the indefinite head NP and the universal quantifier *subete* ‘all’ within the RC: in Japanese, the head NP always takes a wider scope than the universal quantifier *subete* ‘all’ whereas in Chinese, the universal quantifier *suoyou* ‘all’ always takes a wider scope than the head NP. For L1 Chinese learners of L2 Japanese, the scope interaction difference between Chinese and Japanese can be positive evidence suggesting that the head NP of JRCs is base-generated. Recall that 7 learners seemed to have successfully acquired the target knowledge. At their beginning phase of acquiring JRCs, they were very likely to project a raised head NP on the basis of their Chinese knowledge. Later, JRCs like (8a) from the input, which involve a scope interaction between the universal quantifier *subete* ‘all’ and the head NP, may alert the learners that their initial hypothesis about the projection of the head NP is incorrect because their interlanguage knowledge predicts (8b) is impossible for the reading of books > all. Restructuring of JRCs then occurs and the learners must create a new projection for the head NP of JRCs. That is, the head NP should be base-generated rather than raised.

² A similar phenomenon involving a universal quantifier has also been discussed in Aoun and Li (2003).

9. Conclusion

In this study, we first conducted a picture-matching TVJT experiment with L1 Japanese speakers to investigate whether the anaphor *jibun* within the head NP of JRCs can be co-referential with the RC subject (Experiment 1). The results show that such co-reference is prohibited, which indicates that the head NP of JRC is base-generated externally to the RC and does not reconstruct within the RC at LF. With this finding, we continued to approach an L2 issue: can L1 Chinese learners of L2 Japanese acquire the knowledge that the co-reference between *jibun* and the RC subject is impossible? This knowledge is underdetermined for L1 Chinese learners since it cannot be directly derived from input, classroom instruction, or the learners' L1. If such knowledge can be acquired, the poverty of stimulus in L2 acquisition would be motivated. To address the question, we ran the same experiment that had been conducted with L1 Japanese speakers (Experiment 2), with an equivalent experiment in Chinese as a control. The results suggest that the L1 Chinese learners of L2 Japanese are able to make a distinction between Japanese and Chinese concerning the interpretation of the anaphor within the head NP of RCs. Although their judgments in the Japanese experiment are still far from being native-like, their knowledge of the difference between Japanese and Chinese implicates acquisition of the underdetermined knowledge. It provides new evidence to support the operation of UG in L2 acquisition. Further, how such knowledge may be acquired was discussed.

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CHAPTER TWELVE

GRAMMAR COMPETITION IN SECOND LANGUAGE ACQUISITION: THE ROLE OF V2 IN *WH* + PARTICLE CONSTRUCTIONS

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1. Introduction

In a series of recent publications, the theory of grammar competition or multiple grammars has been applied in second language acquisition contexts (cf. Roeper 2016; Amaral and Roeper 2014; Rankin 2014; and several others). This paper follows the trend and investigates how far a grammar competition analysis can account for V2 effects in L2 English of L1 speakers of a V2 language. The structure of the paper is as follows: Section 2 provides a short introduction into grammar competition/multiple grammar theory (GC/MG theory). Section 3 briefly illustrates the role of GC/MG in second language acquisition contexts. Section 4 presents a study on *wh*- + particle constructions in L2 English and shows how far grammar competition can account for the results of the study. Section 5 concludes the paper.

2. Grammar Competition and Multiple Grammar Theory

The theory of grammar competition was first developed in diachronic research (e.g. Kroch 1989; Kroch and Taylor 1997; Pintzuk 1999; and others). At roughly the same time, similar ideas were developed in the context of research on language acquisition (cf. Roeper 1999; Yang 2003) under the name of multiple grammar theory, universal bilingualism or theoretical bilingualism. Both theories argue that optionality in natural language can be accounted for by assuming that grammar allows for the

existence of multiple and possibly conflicting rule sets. So, in historical linguistics, the change from OV to VO word order from Old English to Early Middle English is accounted for by assuming that a rule set generating the OV pattern and a rule set generating the VO pattern must have existed side by side (Pintzuk 1999). Thus, two conflicting rule sets that generate opposite word order patterns are available within one grammar. One strong argument pointing in this direction is that the shift from OV to VO was a gradual shift that took roughly 200 years and that affected different construction types at different rates^{1,2}. All this indicates that the change from OV to VO cannot be relegated to a simple parameter switch or a simple resetting of a parameter.

Roeper (1999) argues that the same can be observed in first language acquisition contexts. Speakers of English have a set of rules in their grammar that generates overt subjects in main clauses. However, they must at the same time also have a conflicting rule set in their grammars that generates the sentences exemplified in (1):

- (1) a. ___ cold today, isn't it.
 b. ___ sounds all right to me.
 c. Where's Jack? ___ just went outside.

In all of these sentences the subject is not realized overtly. Thus, there must be a rule in English that applies in the majority of cases and generates overt subjects, and there must be a rule, also in the grammar of English, that generates the sentences in (1) where the subject is non-overt. We will leave how these rules can best be described open, suffice it to say at this point that both rules exist within a single grammar and thus are acquired in the process of language acquisition by all speakers.

The alternative would be that there is one, complex rule in English that can account for the default contexts, in which subjects are realized overtly and those in (1) where subjects are not realized overtly. Roeper (1999, 2016) argues against this view, basically for two reasons. The first is that grammatical rules must be simple. Although Roeper fails to provide a qualitative or quantitative measurement for what constitutes a simple rule, we will adopt this here and simply assume that two rules that regulate the overt vs. non-overt realization of subjects in English are intuitively simpler

¹ There is even evidence from one and the same source (i.e. speaker) for the use of both construction types within the same text.

² Quantified objects took longer to shift from OV to VO order than non-quantified objects. A similar scenario can also be observed in language contact contexts, e.g. in Urum or in Cimbrian and Sappodino.

than one rule that specifies a default context and a number of exceptions. The second argument is that simple rules are easier to learn. More precisely, Roeper (1999) argues against restructuring or parameter resetting in language acquisition. Instead, when empirical evidence would require restructuring, a new rule is simply added to the grammar that can account for the new context. Yang (2003) picks up this line of argumentation and provides a learning algorithm based on frequency that determines which of the two rules will be the default and which will account for 'special' contexts.

So, the two approaches of grammar competition theory and multiple grammar theory are very similar. New rules can be added to an existing grammar and these rules may even be incompatible with, i.e. they may contradict, other rules in the same grammar. The only limitation is that the rules must be compatible with UG and the only difference between MG and GC is that in the latter, conflicting rules are characterized as an unstable condition, i.e. here, the system strives for reestablishment of a stable state, which is achieved when one candidate wins over the competitor. In MG, on the other hand, multiple and potentially contradicting rules represent a stable state of grammar and there is no need for a resolution of the conflict because the rules are simply allowed to exist side by side. With this much in place, we can now turn to second language acquisition contexts.

3. GC/MG in Second Language Acquisition

Provided that GC/MG exists in first language acquisition contexts - as has been outlined above - it is only logical that it also exists in contexts of second language acquisition, provided some version of the Full Transfer/Full Access Hypothesis (Schwartz and Sprouse 1996) or of the Full Restriction Hypothesis (White 2003) holds. So under the assumption that all the properties of the L1 are available to the L2 learner, L2 acquisition can progress more or less along the same lines as L1 acquisition, in the sense that there is no restructuring or parameter resetting here either. As long as the L1 grammar can account for L2 structures there is no need for any additional rules. Only in those cases where the rules from the L1 are incompatible can the grammar be augmented by additional sub-rules, in the same way that has been described for L1 acquisition in Section 2 above. So let us now turn to a concrete example of GC/MG in second language acquisition contexts and look into the implications from the theory.

German main clauses have a very robust V2 structure³, as can be seen from the examples below, where the finite verb is marked in italics:

- (2) a. Gestern *tanzte* die Staatsanwältin
 Yesterday danced the state attorney
 mit dem Professor.
 with the professor.
 ‘Yesterday the state attorney danced with the professor’.
- b. Die Staatsanwältin *tanzte* gestern mit dem Professor.
 c. Mit dem Professor *tanzte* die Staatsanwältin gestern.
 d. ...
 e. *Gestern die Staatsanwältin *tanzte* mit dem Professor.
 f. *Die Staatsanwältin mit dem Professor *tanzte* gestern.

The standard analysis for this is that the verb consistently moves from V-to-T-to-C in German main clauses. English in contrast is not a V2 language, as can be easily illustrated with the following example:

- (3) Yesterday the state attorney danced with the professor.

Here two constituents precede the finite verb, the adverbial modifier yesterday and the subject the state attorney. However, English has some contexts which are analyzed as residual V2 contexts (Rizzi 1990). Relevant examples are provided in (4) and (5):

- (4) a. Who will kiss Vicki?
 b. Who will [TP who will kiss Vicki]?
- (5) a. Who will Ted kiss?
 b. Who will [TP Ted will kiss who]?

With this much in place, we can now ask how an L1 speaker of a V2 language interprets the sentences in (4) and (5) in L2 English. Arguably, these sentences will not provide much of a problem, because the V2 movement rule that is available to the speaker from their L1 can be straightforwardly applied to the contexts in (4) and (5), where simply, the auxiliary is moved from T-to-C. The following sentences present a more challenging puzzle for L1 V2 speakers:

³ This does not mean that there are no V3 clauses in German, but the pattern is very stable and deviations from it require special licensing (e.g. through pragmatic context and intonation).

- (6) a. Who picked Ann up?
 b. Who picked up Ann?

Both of these are subject questions in English and the main verb (picked) remains inside the T domain. However, the L1 grammar of a speaker of a V2 language allows for an alternative analysis here. Provided FT/FA and that L1 speakers of a V2 language use it in their analysis of the L2 English sentences in (6), it is possible that these speakers interpret these questions in L2 as ones in which the verb has moved from V-to-T-to-C just like it standardly does in their L1 grammar. Under this analysis the question could also be interpreted as an object question in which the wh-pronoun 'who' moved from the complement position inside the V domain to Spec, CP to check the wh-feature on C. However, there is a qualitative difference between the structure in (6a) and (6b). The object interpretation is much more likely to arise in (6a) for L1 V2 speakers, because the structure in (6b) is ungrammatical in their L1, as the following examples from German illustrate:

- (7) a. Wer holte Anna ab?
 Who picked Ann up?
 'Who picked Ann up'
 b. *Wer abholte/holte ab Anna?
 Who picked up Ann?

So, from a CG/MG perspective, competition from L1 is a much more likely scenario for the structure in (6a) than for the structure in (6b) and it is thus much more likely that the structure in (6a) is interpreted as an object question or as being ambiguous between a subject and an object question by L2 speakers with L1 V2 than the structure in (6b). This is what we tested in a free choice answer study with L1 German L2 English speakers. We additionally tested the construction pair in (8):

- (8) a. Which one picked Ann up?
 b. Which one picked up Ann?

Here, we also expect that in (8a) it is going to be harder to rule out the object interpretation than in (8b), for basically the same reasons and we further expect that the construction in (8a) is going to be harder for L1 V2 L2 English speakers than the construction in (7a), because case morphology on the wh-constituent is completely syncretic in (8), but not necessarily in (7) where the wh-pronoun is marked for nominative case,

contrasting with ‘whom’ for object questions.

4. Study: wh- + particle L1 V2/L2 English

4.1 Participants

We tested 185 students enrolled in the BA study program of the Department of English and American studies at the Bergische Universität Wuppertal. 19 participants did not identify German as their native language and these were excluded from further consideration in the present study. 166 participants identified German as their native language and for most participants this was their only native language. However, some participants additionally identified some other language(s) as their native language(s). These were not treated separately. Participants were aged between 18 and 28 years ($M = 21.37$; $SD = 2.104$) and their proficiency levels range between C1 and C2, which was measured by an in-house placement test at the beginning of the study program.

The control group consisted of 20 native speakers of English who were recruited through private contacts. Speakers spoke several varieties of English (American, British, Irish, Australian, South African) and some of them work as language instructors. Participants of the control group were aged between 19 and 73 years ($M = 40.00$; $SD = 14.287$).

4.2 Materials and Procedure

Participants were asked to complete a pen and paper questionnaire that consisted of scenes like the one exemplified in (9):

- (9) Susie, Ann and Maggie are carpooling. On Mondays Maggie picks Susie up. On Tuesdays Ann picks Maggie up and on Fridays Susie picks Ann up.

After each scene, participants had to answer a question about the scene. This question was one of the following four question types:

- | | | |
|--------|--------------------------|---------------------------|
| (10)a. | Which one picked Ann up? | which one - V - XP - Part |
| b. | Which one picked up Ann? | which one - V - Part - XP |
| c. | Who picked Ann up? | who - V - XP - Part |
| d. | Who picked up Ann? | who - V - Part - XP |

These are exactly the four different versions of the subject question outlined in section 2 above. The questionnaire consisted of 32 scenes in total, so each of the four question types in (10) occurred eight times throughout the questionnaire. Data collection took place in four different courses at Bergische Universität Wuppertal and on three consecutive days. In each of the four courses the same scene was accompanied by the same question type. However, the order in which the 32 scenes and the accompanying question were presented varied for the four different courses. This was done to be able to control for pattern learning, which turned out not to be a significant factor and is thus not taken into further consideration here.

Answers were coded as correct/target-like when participants provided a subject-only interpretation for the questions and as incorrect/generalized V2 when they provided either an object-only interpretation or an ambiguous interpretation (i.e. subject and object reading) for the questions. Inconclusive answers, which showed neither a subject, object nor ambiguous interpretation were coded as missing values and were excluded from further consideration. So for the scene in (9) the answer Susie was a target answer, Maggie as well as Maggie and Susie were non-target/generalized V2 answers and all other answers (e.g. Ann; I don't know; no answer, ...) were excluded from further consideration.

Participants were unaware of the aim of the study and were not subjected to a time limit for the completion of the questionnaire.

4.3 Results and Interpretation

We calculated the mean value of the correct and generalized V2 answers for each of the four test conditions. The results are provided in Table 12-1.

Table 11-1. L1 V2/ L2 English:

| | subject reading | generalized V2 |
|---------------------------|-----------------|----------------|
| which one - V - XP - Part | 72.97% | 27.03% |
| which one - V - Part - XP | 90.67% | 9.33% |
| who - V - XP - Part | 83.82% | 16.18% |
| who - V - Part - XP | 91.57% | 8.43% |

The results show that even very advanced L2 speakers of English with L1 V2 tend to interpret wh-subject questions as object questions (or as

ambiguous between subject and object questions) in almost 30% of all cases when the *wh*-constituent is *which one* and when the particle is stranded in sentence final position. When the particle is pied-piped along with the verb, error rates drop to under 10%. A similar tendency can be observed when comparing the two positions for the particle in the *who*-questions. Here, stranding the particle produces error rates of 16% when the particle is stranded and these again drop to just under 10% when the particle is pied-piped. So, the position of the particle is a major factor in the interpretation of the *wh*-constructions for L2 English speakers. Table 12-2 shows the results for the native speaker control group.

Table 12-2 - English native speakers:

| | subject reading | generalized V2 |
|---------------------------|-----------------|----------------|
| which one - V - XP - Part | 100% | 0% |
| which one - V - Part - XP | 100% | 0% |
| who - V - XP - Part | 100% | 0% |
| who - V - Part - XP | 100% | 0% |

As the results in Table 12-2 clearly indicate, native speakers of English had no problem whatsoever with these questions. There were some very occasional blank answers or inconclusive answers that did not allow for any conclusions on neither subject- nor object-readings of the questions and these were also excluded from further considerations, but very significantly, there was not a single case in which native speakers interpreted any of the subject questions as object questions or as being ambiguous between subject and object questions. We took this as an indication that the study was not intrinsically flawed and conducted a 2x4 repeated measures ANOVA to check for the significance of the results between the two groups (L1 vs L2 speakers) and across the four test conditions (which one - V - XP - Part = type 1; which one - V - Part - XP = type 2; who - V - XP - Part = type 3, who - V - Part - XP = type 4).

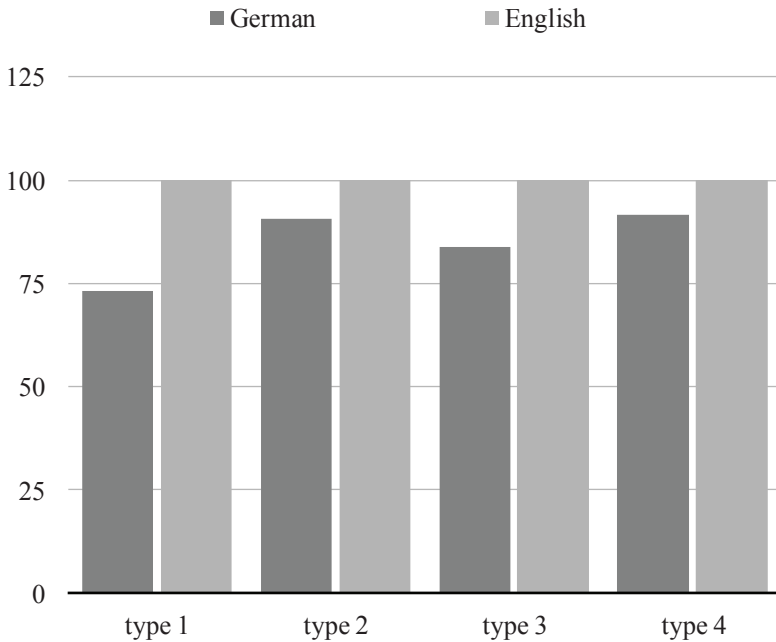


Figure 12-1: Percentage subject interpretations for the four clause types by language

Results show a highly significant effect of L1/L2 and of type 1 and type 3 ($p < .001$) and a significant effect for type 2 and type 4 ($p < .01$). The results for the between group comparison are presented in Figure 12-1.

5. Conclusion

The results from the study on *wh-* + particle constructions clearly show that L1 speakers of a V2 language tend to interpret subject questions as ambiguous between a subject and object question or as object questions in L2 English to a significantly higher extent than native speakers of English, who never make errors in these contexts. The effect is stronger when the particle in the *wh-* + particle construction is stranded in sentence final position and significantly lower when the particle is pied-piped along with the verb to sentence medial position. This, we argue, is due to the fact that the particle in sentence-final position parallels the L1 V2 structure. Pied-piping the particle to sentence medial position is not an option in the L1

and thus this is a clear signal to the learner that the L2 grammar has to be used for the interpretation of these questions, which consequently leads to an expected drop in error rates. Additionally, we can observe that the morphology of the wh-constituent also plays a role. Error rates are significantly higher when the wh-constituent does not carry any inflectional marking that points towards subject morphology. When the nominative marked wh-word *who* is used instead, error rates also drop.

When we take all this together we can conclude that there is a GC/MG effect in the L2 English of wh- + particle constructions for L1 speakers of a V2 language. This effect cannot be explained by FT/FA alone. If FT/FA were the only relevant factor here, we would expect the error rates for those constructions where the particle is pied-piped to be higher, because these mark a departure from the L1 grammar, however, we found exactly the reverse. Deviation from the patterns that are also grammatical in the L1 grammar leads to a significant drop in error rates while exactly those structures that parallel the L1 surface ordering of constituents lead to increased error rates, because it is precisely in these contexts where the L1 grammar rule of V-to-T-to-C movement of a lexical verb competes with the residual T-to-C movement rule available for auxiliaries in English, which then leads to overgeneralization, i.e. overapplication of the L1 rule in L2 contexts, and to non-target interpretations of wh- + particle constructions

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CHAPTER THIRTEEN

COMPETING FACTORS IN THE ACCEPTABILITY OF ITALIAN EMBEDDED *WH*-QUESTIONS

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1. Introduction

Numerous studies on heritage grammars throughout the past decade have come to the conclusion that heritage speakers (henceforth HSs) end up with grammars that differ from those of monolinguals in morphosyntax and pronunciation (cf., e.g., Benmamoun et al. 2013; Montrul 2016; Rothman 2009 for overviews). This across the board view of arrested development is challenged by recent work on HSs, showing that when these speakers differ from baselines, this is reflective of alternative paths in bilingual development (e.g., Pires and Rothman 2009; Putnam and Sánchez 2013; Kupisch and Rothman 2016).

When it comes to explaining differences between monolingual and bilingual grammars, crosslinguistic influence (henceforth CLI) has always played a prominent role (e.g., Kupisch forthcoming; Serratrice 2013 for overviews). In the present study, we will focus on syntactic CLI. Syntactic CLI has been argued to be particularly likely to occur if a phenomenon is at the crossroads between syntax and discourse (often defined as the left periphery of the clause, i.e., CP) and if the target language has alternating structures of which one is present in the contact language (Hulk and Müller 2000). Work on adult HSs has further shown that CLI depends on relative proficiency in HL, with speakers of higher proficiency showing no deviance from monolinguals. As an alternative, Hopp et al. (forthcoming) have recently suggested, based on seminal work by Jakubowicz (2011), Jakubowicz and Strik (2008), that computational complexity may explain restructuring patterns in HS grammars. They investigate *wh*-dependencies in HSs of Plautdietsch in Southwestern Kansas. In both L1 production and

comprehension HSs prefer medial-*wh* structures instead of structures involving long-distance *wh*-movement. The authors argue that medial-*wh* surfaces as a mechanism to reduce syntactic complexity in the HL. An additional and potentially relevant factor, which has not been investigated systematically so far, are languages acquired later in life as L2s or L3s. According to current views on regressive transfer (e.g., Cabrelli Amaro and Rothman 2010) and attrition (e.g., Schmid and Köpke 2017), these may further influence performance in the HL.

The present study investigates a phenomenon that displays a high degree of variation in monolingual Italian, namely word order in embedded *wh*-questions. We first assess CLI, and then test derivational complexity, language proficiency and regressive transfer as possible explanations for deviance between HSs and monolinguals. We compare 20 HSs of Italian in Germany with 20 monolingual speakers of Italian. All speakers are fluent in English, which we also take into account.

2. Matrix and embedded *wh*-questions in Italian, German and English

The three languages relevant to our study are Italian, German and English. In German and English, Subject-Verb-Inversion yields linear adjacency between the *wh*-phrase and the inflected verb in matrix *wh*-questions (cf., 1a and 1b). In embedded contexts, adjacency between the *wh*-phrase and the inflected verb results in ungrammaticality (cf. 2a and 2b).

- (1) a. *Was hat Maria gekauft?*
 what AUX.IND.3SG Maria buy-PTCP
 b. **Was Maria hat gekauft?*
 what Maria AUX.IND.3SG buy-PTCP
 ‘What did Maria buy?’
- (2) a. *Hans hat mich gefragt, was Maria gekauft hat.*
 Hans AUX.IND.3SG me ask-PTCP what Maria buy-PTCP AUX.IND.3SG
 b. **Hans hat mich gefragt, was Maria hat gekauft.*
 Hans AUX.IND.3SG me ask-PTCP what Maria AUX.IND.3SG buy-PTCP
 ‘Hans asked me, what Maria bought.’

Generally, Romance does not display the main vs. embedded word order asymmetry illustrated in (1-2), but requires adjacency in both matrix and embedded clauses (Rizzi 1996). Italian, however, differs slightly from the other Romance languages. While the *wh*-phrase and the inflected verb

must be adjacent in matrix contexts (3a vs. 3b), this requirement is less strict in embedded contexts: adjacency is the unmarked option (4a), but a lack of adjacency is marginally allowed in embedded contexts (4b), thus being similar to German (4c)¹.

- (3) a. *Cosa ha comprato Maria?*
 what AUX.3SG buy-PTCP Maria
 b. **Cosa Maria ha comprato?*
 what Maria AUX.3SG buy-PTCP
 ‘What did Maria buy?’
- (4) a. *Gianni non sa cosa ha comprato Maria.*
 Gianni NEG knows what AUX.IND.3SG buy-PTCP Maria
 ‘Gianni doesn’t know what Maria bought.’
 b. ?*Gianni non sa cosa Maria ha comprato.*
 Gianni NEG knows what Maria AUX.IND.3SG buy-PTCP
 c. *Hans weiß nicht, was Maria gekauft hat.*
 Hans knows NEG what Maria buy-PTC AUX.IND.3SG
 ‘Gianni doesn’t know what Maria bought’

Since the marginal Italian structure (4b) allows preverbal subjects, akin to the German structure (4c), we may expect embedded *wh*-questions to be particularly vulnerable to CLI from German. The picture might be a bit more complicated though. Although this has not been investigated for Italian so far, we suspect that the choice between (4a) and (4b) depends on verb class and the thematic type of the *wh*-item. Relevant evidence has been provided by Westergaard (2003) based on the Tromsø dialect spoken in Norway, where the choice between V2 (V-to-C, yielding postverbal subjects) and V3 (no V-to-C, yielding preverbal subjects) in matrix *wh*-questions partly depends on verb type. Moreover, the argument/adjunct-distinction interacts with the development of Subject-Verb-Inversion in both L1 (Stromswold 1990) and L2 acquisition (Lee 2008).

Finally, we briefly outline the relative complexity of (4a and 4b). According to the Derivational Complexity Hypothesis (DCH) (Jakubowicz 2011), more complex derivations are more vulnerable than less complex ones. Crucially, complexity is measured as the number of operations (Merge and Move) in a syntactic derivation. Applied to our phenomenon,

¹ So-called “bare” *wh*-items like *cosa* ‘what’ differ from both *perché* ‘why’ and D-linked *wh*-phrases in that the latter allow preverbal subjects as the unmarked option. Since “bare” *wh*-items display a wider spectrum of variation than the other class, this contribution focuses on the former.

the DCH predicts that structures with a postverbal subject are more complex than structures with a preverbal subject. This is because the former display movement of TP to the left periphery across the subject (Rizzi 2006), as in (5a), whereas the latter do not, as in (5b).

- (5) a...._{[FocP} *cosa*_[+wh] _{[Foc'} Foc^o_[+wh] _{[FinP} _{[TP[+wh]} *ha comprato* *cosa*] ...
 _{[SubjP} *Gianni* ... _{[TP[+wh]} *ha comprato* *cosa*]]]]]]
 b...._{[FocP} *cosa*_[+wh] _{[Foc'} Foc^o _{[FinP}... _{[SubjP} *Gianni* _{[TP[+wh]} *ha*
 comprato *cosa*]]]]]]

The DCH predicts that HSs prefer derivations like (5b), corresponding to (4b), instead of derivations like (5a), corresponding to (4a), because they are derivationally less complex. This means that there might be CLI from German with respect to both the non-overlapping structure (5a) and the partially overlapping one (5b).

Finally, as shown in (2), German and English do not differ with regard to our target structure. Since all our Italian HSs are proficient speakers of English, and since there have been many recent studies showing that CLI can take multiple directions, including from a late-acquired language to an early-acquired language (e.g., Schmid and Köpke 2017 for a recent discussion), the potential role of English needs to be taken into account. We will do so by including structures where Italian and German pattern the same while differing from English.

3. Research Questions and Predictions

In view of variation and overlap with German, we assess CLI from German in embedded *wh*-questions in heritage and monolingual Italian, focusing on the position of the subject (preverbal or postverbal). We further investigate to what extent the verb class and the argument/adjunct distinction determine the variation. Based on our data, we discuss the role of derivational complexity, HL proficiency, and CLI from English. Our research questions are:

RQ1. Do HSs accept embedded *wh*-questions with preverbal subjects more often than monolinguals and, if so, does their acceptance depend on verb class and/or argument-*wh* vs. adjunct-*wh* phrases?

RQ2. What is the role of derivational complexity, language dominance and CLI from English?

4. Embedded *wh*-questions in Italian HSs

We used a bi-modal speeded acceptability judgment task (AJT) completed as a self-directed task on a computer, using the Presentation® software. Participants were asked to listen to contextualized stimulus sentences and judge their acceptability ('Yes'=acceptable, 'No'=unacceptable). If they judged a sentence to be unacceptable, the sentence appeared on the screen and they were asked to provide a verbal correction. The correction showed whether participants rejected the sentence because of the structure we were interested in. We encouraged use of implicit knowledge by using a speeded task, and the auditory method was used to avoid potential disadvantages for the HSs, who generally have less experience with written language than monolinguals. However, pre-testing showed that participants needed to see the stimulus in written form for the second step of the experiment, i.e., when they were asked for a correction.

4.1 Participants

We tested 20 adult HSs of Italian in Germany and 20 Italian monolinguals. The HSs were university students in south Germany and had attended the German schooling system (mean age = 23). Seven were simultaneous bilinguals with exposure to both languages from birth, and 13 were successive bilinguals, who acquired German between 3–6 years. In addition to naturalistic input (parents, other family members, visits to Italy), half of the HSs ($n = 10$) had also attended Italian language classes during their school years. Some speakers reported contact with dialects in Northern and Central-Southern Italy and Tuscany. The bilinguals' self-assessments in the 4 skills (reading, writing, listening, and speaking) in Italian were generally higher for listening (mean = 8 out of 9) than for writing (mean = 6.8 out of 9), while self-assessments for German were at ceiling across all skills (mean = 8.8 out of 9).

We measured the HSs' relative proficiency in their two L1s using a Yes/No vocabulary task in German and Italian, which consisted of 50 real words (full verbs) and 25 pseudo-words. The stimuli for both languages were taken from the placement test created for DIALANG (Alderson 2005: 80) by Meara and associates, and adapted for use in a self-directed task using Presentation®. The results showed that the HSs performed at ceiling in the German vocabulary task (and comparably to a group of German monolinguals, cf., Lloyd-Smith et al. forthcoming) (mean = 70.5, SD = 3.4), while their scores in Italian display a much larger degree of

variation (mean = 58.5, SD = 8.4) and were well below the results from the Italian monolinguals (mean = 72, SD = 2.5).

4.2 Materials

The task consisted of 48 items, with 4 conditions and 12 items per condition (6 grammatical and 6 ungrammatical/marginal).

The main condition consisted of embedded *wh*-questions, 6 with post-verbal and 6 with preverbal subjects. The example in (6a) shows a moved *wh*-phrase and a postverbal subject, the structure that is unique to Italian; (6b) illustrates a moved *wh*-phrase and a preverbal subject, which is the only possible structure in German (and marginal in Italian). We are particularly interested in the latter, which will reveal how bilinguals deal with structural variation, given partial overlap with German.

Main condition: (a) = grammatical; (b) = marginal

(6) a. *Maria non sa chi è Giovanni.*

Maria NEG knows who be-3SG Giovanni

b. *Maria non sa chi Giovanni è.*

Maria NEG knows who Giovanni be-3SG

‘Maria doesn’t know who Giovanni is.’

As mentioned above, if the structures in (6) turn out to be more problematic for the HSs than for the monolinguals, we will not be able to conclude that this is due to contact with German, because our HSs also know English, and both German and English disallow postverbal subjects in these contexts (cf. 2). We therefore added two more conditions, which allow us to control whether our participants have more problems if only German differs from Italian (while English patterns with Italian) or if only English differs from Italian (while German patterns with Italian). We refer to them as ‘German condition’ and ‘English condition’ respectively. In the German condition, we manipulated word order in the VP, as illustrated in (7a) for a grammatical item and in (7b) for an ungrammatical item.

German Condition: (a) = grammatical; (b) = ungrammatical

(7) a. *Mi domando come mai Piero odia Luca.*

REFL.1SG ask-1SG how ever Piero hates Luca

‘I wonder why Piero hates Luca.’

b. *Carla non sa dove Gianni il pesce compra.*

Carla NEG knows where Gianni the fish buy-3SG

‘Carla doesn’t know where Gianni buys the fish.’

In the English condition, we used main clause structures because of the lack of embedded structures in which only English differs and German and Italian pattern alike. Examples of the English condition are given in (8a) (grammatical) and (8b) (ungrammatical).

English condition: (a) = grammatical; (b) = ungrammatical

- (8) a. *Cosa vede Simona*
 what see-3SG Simona
 ‘What does Simona see?’
 b. *Ha Paola trovato le chiavi?*
 AUX.3SG Paola find-PTCP the keys
 ‘Did Paola find the keys?’

Finally, we added a control condition in which all languages pattern the same, as illustrated in (9a) (grammatical) and (9b) (ungrammatical). We expected these structures to be unproblematic, unless the learners have problems unrelated to differences amongst their three languages, e.g., due to low syntactic proficiency.

Control condition: (a) = grammatical; (b) = ungrammatical

- (9) a. *Giusy non sa perché Gianni scappa.*
 Giusy NEG knows why Gianni flee-3SG
 ‘Giusy doesn’t know why Gianni is running away.’
 b. *Filippo non sa Ludovica ama chi.*
 Filippo NEG knows Ludovica love-3SG who
 ‘Filippo doesn’t know who Ludovica loves.’

Table 13-1. Summary of test items

| Condition | What is tested | Italian | German | English |
|----------------|----------------------------|---------|--------|---------|
| Main (n=12) | Variation | ✓ | ✗ | ✗ |
| German (n=12) | Exclusive CLI from German | ✓ | ✗ | ✓ |
| English (n=12) | Exclusive CLI from English | ✓ | ✓ | ✗ |
| Control (n=12) | General performance | ✓ | ✓ | ✓ |

Table 13-1 summarizes the test items. In each of the four conditions, 6 items were grammatical and 6 ungrammatical (*marginal* in the main condition). Checkmarks indicate where English or German patterns with Italian.

In addition, we were interested in potential effects of verb class (copula, unaccusative, unergative and transitive) and thematic type of the *wh*-phrase (i.e., argument vs. adjunct). This is why, for each condition, there were 6 sentence types differing with regard to these structures, as illustrated for the main condition in (10).

- (10)a. *Maria non sa chi è Giovanni.*
 Maria NEG knows who be-3SG Giovanni
 ‘Maria doesn’t know who Giovanni is.’ (COPULA)
- b. *Lucia non sa cosa ha cucinato Mario.*
 Lucia NEG knows what AUX.3SG cook-PTCP Mario
 ‘Lucia doesn’t know what Mario cooked.’ (TRANSITIVE)
- c. *Giulia non sa dove è andato Luca.*
 Giulia NEG knows where AUX.3SG go-PTCP-3SG.M Luca
 ‘Giulia doesn’t know where Luca went.’ (UNACC., ARG.)
- d. *Claudia non sa quando è partito Carlo.*
 Claudia NEG knows when AUX.3SG leave-PTCP-3SG.M Carlo
 ‘Claudia doesn’t know when Carlo left.’ (UNACC., ADJ.)
- e. *Mi chiedo con chi ha parlato Gianni.*
 REFL.1SG ask-1SG with who AUX.3SG talk-PTCP Gianni
 ‘I wonder who Gianni talked to.’ (UNERG., ARG.)
- f. *Stefania non sa come ha giocato Walter.*
 Stefania NEG knows how AUX.3SG play-PTCP Walter
 ‘Stefania doesn’t know how Walter played.’ (UNERG., ADJ.)

4.3 Results

Figure 13-1 illustrates the results of the experiment, pairing grammatical and ungrammatical/marginal sentences in the four conditions, and showing how often participants showed the expected result, i.e., accepting grammatical items and correcting ungrammatical/marginal ones. If participants were unable to correct an ungrammatical sentence despite clicking ‘No’, this was treated as if they had accepted the sentence.²

In general, monolinguals and HSs show similar patterns in the four conditions with grammatical and ungrammatical stimuli, although the

² The same was done in cases where participants (correctly) clicked ‘No’, but then accepted the sentence upon reflection. If participants clicked ‘No’ for a grammatical sentence but accepted the sentence upon reflection, this was treated as a ‘Yes’. Finally, participants sometimes rejected grammatical sentences, correcting them into sentences with the same word order but using subjunctive instead of indicative verb mood. These cases were treated as a ‘Yes’.

former provided relatively more expected (target-like) judgments, except with the marginal sentences of the main condition. Both groups tended to accept grammatical stimuli and had more problems correcting ungrammatical stimuli except in the control condition. The main condition and the German condition were relatively more problematic than the English condition.

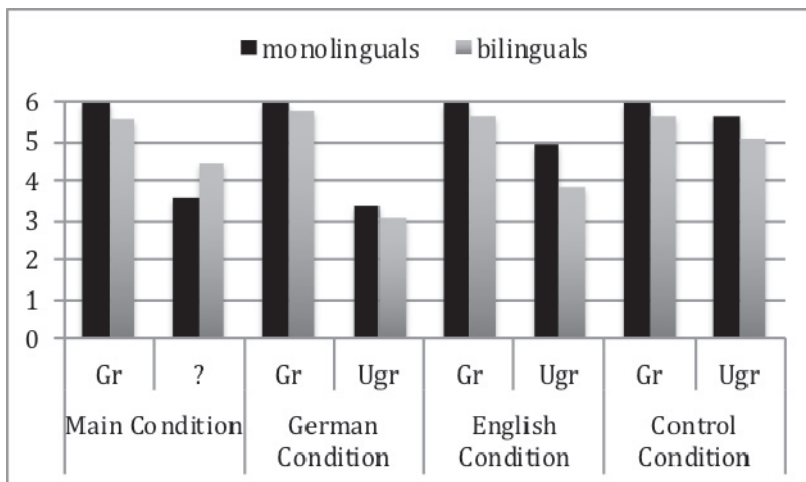


Figure 13-1. Scores of the AJT per condition per group

In the main condition, the HSS accepted the grammatical structure less often than the monolinguals. A Wilcoxon rank sum test showed that this difference is indeed significant ($p = .02$). The marginal structure, by contrast, is accepted somewhat more often by the monolinguals, but a Wilcoxon rank sum test showed no significant difference between the group means ($p = .09$). Finally, an analysis of the bilinguals' performance in the vocabulary task and their performance in the main condition shows a strong positive correlation between the vocabulary score and the grammatical condition ($\tau = .71, p = .0003$) and a moderate positive correlation between the vocabulary score and the marginal structure ($\tau = .49, p = .03$), suggesting that HSS with higher proficiency in Italian were more monolingual-like in the main condition.

As to the effect of verb class and thematic type of *wh*-phrase in the main condition, both HSS and monolinguals performed comparably to one another, and a Wilcoxon rank sum test showed no significant difference between the group means ($p > .05$). There was, however, a notable

difference in overall performance depending on verb class. Performance was completely target-like for copula verbs and only few errors were made with transitive verbs, but a significantly higher number of errors were made with unergative ($p < .05$) and unaccusative verbs ($p < .005$), with no significant difference between the latter two. As for unaccusative verbs, participants performed significantly better with argument *wh*-items than with adjunct *wh*-items ($p < .005$).

In the German and English conditions, the results for the monolinguals are unexpected. Given that Italian is their native language, there should not have been any problems correcting any of the ungrammatical sentences. We return to these points in the discussion. For the moment, the crucial observation is that monolinguals and HSs pattern mostly alike, but in the main condition there is a significant difference between the two groups.

5. Discussion

Focusing on condition 1 first (cf., Figure 13-1), we can answer our two research questions. As to RQ1, the results show that there was no significant difference between the groups in the acceptance of embedded *wh*-questions displaying preverbal subjects (the *marginal* structure). Nonetheless, the HSs rejected the *grammatical* items in this condition significantly more often than the control group. We would tentatively interpret this finding as indicating CLI from German, but not in an across-the-board fashion, as predicted by the DCH. Recall that according to the DCH, HSs are also expected to accept the marginal structure significantly more often. Instead, they corrected it to a similar degree as did the monolingual controls, producing the more complex structure. Moreover, HSs and monolinguals were equally sensitive to verb class and thematic type of *wh*-phrase. Both groups were equally categorical in rejecting (and correcting) preverbal subjects with the copula *essere*, and both groups showed a similar tendency with unaccusatives in accepting preverbal subjects with adjunct-*wh*-phrases more often than with argument-*wh*-phrases. The categorical pattern found with *essere* parallels findings in Westergaard's (2003) study of V2/V3 variation in matrix *wh*-questions in Tromsø Norwegian, where a sub-class of *wh*-items (*ka* 'what', *kem* 'who' and *kor* 'where') allow either V2 (yielding postverbal subjects) or V3 (yielding preverbal subjects) with lexical verbs, but in nearly all cases only V2 (yielding a postverbal subject) when they appear with the verb *være* 'be'.

As a by-product of our study, we have provided empirical evidence that embedded *wh*-questions with preverbal subjects are less marginal in

monolingual Italian than is often reported in the (introspection-based) literature, suggesting that the choice between pre- and postverbal structures with “bare” *wh*-items is not only governed by syntactic factors.

Turning to RQ2, the results show that how much the HSs differed from monolinguals was related to their proficiency in Italian, as measured by the vocabulary test. The DCH predicted that HSs would differ from monolinguals in displaying a higher rate of rejection of the grammatical (but derivationally more complex) items and of acceptance of the marginal (but derivationally less complex) items respectively. While the HSs indeed rejected the grammatical structures more often than the controls, no asymmetry was found between the groups with respect to the marginal structures. However, we do not think that this generally compromises the DCH, as our HSs might simply have had more occasions to use their HL as other HS populations, e.g., those tested by Hopp et al. (forthcoming).

As for conditions 2 and 3, testing CLI from German only and English only, we would like to offer principled explanations for the somewhat unexpected results. The ungrammatical items in the *German* condition reflect the German word order WH–Subj–XP–V, but besides object DPs, we also used adverbials/circumstantials (e.g. *la sera* ‘in the evening’) as XPs. The latter exhibit a higher degree of positional flexibility than objects, as witnessed by the fact that even the monolinguals accepted stimuli with such XPs preverbal position, though never accepting stimuli with object DPs in that position. The ungrammatical items in the *English* condition were matrix *yes/no*-questions with the word order Aux–Subj–V–XP. This type of inversion is ungrammatical in Italian, where the whole verb complex (e.g., Aux+V) must be moved across the Subject. Since these structures are possible in English and since all our participants know English, CLI from English is hypothetically possible. However, there is an alternative explanation: *yes/no*-questions with Aux–Subj–V–XP order are marginally possible in Italian if uttered in a formal context. One particular item we used was *Ha Alessia parlato col direttore?* ‘Did Alessia speak to the director?’, which might indeed have triggered such an interpretation. Since this is the item that was accepted most often by both groups of participants, the second explanation gains plausibility. Then, higher tolerance of such structures by HSs could be interpreted as an overextension, due to lack of knowledge of their pragmatic and register-specific felicity conditions.

6. Conclusion

We investigated embedded *wh*-questions in Italian HSs in Germany, hypothesizing that this structure is particularly vulnerable to CLI, as it displays overlap with German and a high degree of variation in monolingual Italian. Our results indicate that the HSs are indeed subject to CLI from German. At the same time, acceptability of the marginal structure appears to be governed by the same structural factors in both HSs and monolinguals, suggesting sensitivity to fine structural distinctions rather than across-the-board generalizations. How similar the HSs were to monolinguals was related to their relative proficiency, whereas structural complexity did not seem to be crucial for the group tested here.

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PART V:

**ACQUISITION OF FUNCTIONAL
MORPHOLOGY**

CHAPTER FOURTEEN

THE ROLE OF GENDER IN
MIXED-LANGUAGE NOMINAL PHRASES:
INSIGHTS FROM DISTRIBUTED MORPHOLOGY

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1. Introduction

Language mixing is a common phenomenon in many bilingual populations. It can be defined as the spontaneous incorporation of elements from two languages in a single discourse, and importantly, while it may be unpredictable and optional, it is also highly constrained; ungrammaticality results when a language switch occurs between certain constituents. Accounting for what constrains language mixing has been approached from many different perspectives. However, in terms of generative approaches framed within the Minimalist Program, most have taken a lexicalist view of morphosyntax (e.g. MacSwan 2000). It is only more recently that the non-lexicalist assumptions of frameworks, such as Distributed Morphology (DM), have started to be explored (e.g. Licerias et al. 2008; Grimstad, Lohndal and Åfarli 2015; Alexiadou et al. 2015).

As such, the goals of this paper are twofold. The first is to use the DM framework to account for a particular asymmetry in the mixed language data, and the second is to provide preliminary experimental evidence for this account. The particular asymmetry that will be addressed involves the observation that in Spanish-English language mixing, switches between a Spanish determiner (D) and an English noun (N), as in (1a), are common in naturalistic corpora data, whereas switches between an English D and a Spanish N, as in (1b), are rare (Pfaff 1979; Jake, Myers-Scotton and Gross 2002), and so are considered ungrammatical (MacSwan 2005).

- (1) a. la house
 the.SG.F house.SG

- b. *the casa
 the.SG house.SG.F

Previous Minimalist accounts of this asymmetry have proposed that it is a consequence of an underlying feature asymmetry, namely that Spanish has uninterpretable gender features, whereas English does not. For example, MacSwan (2005) has argued that, for a syntactic derivation to converge, the phi features (i.e. person, number and gender) of N must be a subset of the phi features of D, and so nominal phrases (DPs) involving an English D and a Spanish N will crash at Spell-Out due to the additional gender feature on the Spanish N which is not also present on the English D since English has no grammatical gender system.¹ However, if we look to another language pair which also has a gender feature asymmetry, Norwegian-English, there is evidence that this mixed DP asymmetry does not exist here. Switches between an English D and a Norwegian N as in (2b) are attested, despite the fact that the Norwegian N also has an additional gender feature relative to the English D.²

- (2) a. den track-en
 that.SG.M/F track-DEF.SG.M
 b. the by
 the.SG city.SG.M

To account for these patterns, we propose that it is not a gender feature asymmetry per se that is the issue, but the relationship between gender and nominal declension class in Spanish. Indeed, the DM-based approach to Spanish gender and declension class proposed by Kramer (2015) actually predicts this asymmetry. Specifically, Kramer assumes that gender is a feature on the nominalizing head, *n*, and proposes that declension class is dependent on gender. Because Spanish roots (e.g. \sqrt{CAS} -) cannot surface without their declension class suffix (e.g. *-a*), it follows that the noun must be associated to an underlying gender feature in order for it to surface with that suffix. This then leads to the prediction that mixed DPs with an English D, such as *the casa*, are blocked in favour of unmixed Spanish DPs, such as *la casa*, via DM's Subset Principle. Importantly, the same asymmetry is not predicted for Norwegian-English mixed DPs because

¹ We do not assume language “tags” or “features” to be linguistic primitives, but that functional separation emerges for elements of a bilingual's two languages.

² All Norwegian-English examples provided and analyzed in this paper are taken directly from Alexiadou et al. (2015).

Norwegian roots (e.g. $\sqrt{\text{BY}}$) are free and can surface without gender-dependent suffixes (e.g. $-\text{en}$).

Before going into the details of this theoretical proposal, we will first provide a brief overview of the DM theoretical framework, as well as its implications with respect to language mixing (Section 2). We will then demonstrate how this approach does not predict an asymmetry for Norwegian-English (Section 3.1) but does for Spanish-English (Section 3.2). Finally, we will present some preliminary experimental evidence testing the predictions for French-English mixed DPs (Section 4).

2. Theoretical Framework

From a lexicalist perspective of Minimalist syntax, the lexicon includes items that are specified for phonological form, word category, and morphosyntactic features such as person, number and gender (Chomsky 1995; Lieber 1992; Müller and Wechsler 2014). Morphologically complex words are derived in the lexicon and enter the derivation with their features, such that syntactic structure is projected from those features. This approach has been extended to account for bilingual language mixing, where it has been proposed to essentially operate in the same way, except that lexical items from either language can be selected into the numeration, and manipulated in the syntactic component (MacSwan 2000).

In contrast, the non-lexicalist approach of DM (e.g. Halle and Marantz 1993; Embick and Noyer 2007) assumes not a single lexicon, but one that is divided up into three separate “lists”. List 1 consists of abstract morphemes (i.e. morphosyntactic features) and bare lexical roots, which are not specified for word category or phonological form, and in some approaches, they are not even specified semantically (Harley 2014). These elements can be selected for a numeration and combine in the syntax to form morphologically complex words. For example, roots become nouns by merging with a nominalizing head, n , and, crucially, it has been argued that the gender feature is on n (e.g. Kramer 2015). Syntactic terminal nodes therefore consist of roots fused with those morphosyntactic features acquired in the derivation (Siddiqi 2006) and are still devoid of phonological and semantic information. This brings us to the Vocabulary Items (VIs) of List 2, which are the mappings of roots and feature bundles to their corresponding phonological forms, and the List 3 items, which are their mapping to their corresponding semantic forms.³ Crucially, VIs are morphologically underspecified and compete for insertion into the fully

³ List 3 is not relevant to the current topic, so will not be discussed further.

specified syntactic terminal nodes, such that the form with the most compatible features (but no incompatible features) is selected. This selection process is known as the Subset Principle.

Extending this model to language mixing, we can make the following assumptions. First, that bilinguals have functionally separate distributed lexicons, such that in unilingual language use they can access the set of lists associated to one language with limited interference from the other. Second, during language mixing, neither language is inhibited and as such, roots and abstract morphemes (List 1 elements) from either language can be selected into the numeration, and List 2 VIs from both languages can compete for insertion into the terminal nodes.

There are two important advantages to a DM approach to language mixing. First, because morphology is taken out of the lexicon, this means that the same syntactic processes apply both above and below the word-level (Alexiadou et al. 2015). “Words” are therefore derived from their morphological sub-components in the same way that sentences are derived from their lexical sub-components. As such, word-internal and word-external language mixing can be accounted for using the same formal mechanisms. Secondly, because underspecified VIs from both languages compete for insertion, this allows for optionality when VIs from the two languages have the same feature specifications. This leads to theoretically motivated predictions with respect to where optionality can be expected in mixed language utterances, and where there should be a categorical language preference.

3. A DM Account of Mixed DPs

In this section, we will first build on Alexiadou et al.’s (2015) analysis for Norwegian-English in order to demonstrate that English roots can combine with a Norwegian *n*, and vice versa. In this way, the features of the *n* selected constrains which VI wins the competition for insertion after Spell-Out, and this leads to symmetrical language switching within the DP. We will then demonstrate that, for Spanish-English, English roots can combine with a Spanish *n*, but Spanish roots *cannot* combine with an English *n* because such a derivation would result in the root being spelled out without the required declension class suffix, hence the asymmetry.

3.1 Norwegian-English

Norwegian has three genders, feminine (F), masculine (M) and neuter (N). Definite nouns surface with a suffix that is marked for gender (Julien 2005), as in (3).

- | | | |
|---------------|--------------|----------------|
| (3) a. by-en | b. ku-a | c. felt-et |
| city-DEF.M.SG | cow-DEF.F.SG | field-DEF.N.SG |
| 'the city' | 'the cow' | 'the field' |

These definite article suffixes can co-occur with overt definite determiners, for example, when there is an adjective, as in (4). Also, demonstratives have the same overt form as these definite determiners, as seen in (5), with syncretism occurring between masculine and feminine forms. Finally, Norwegian nouns can surface without any suffix, for example in indefinites (6). As such, nouns are not bound roots.⁴

- (4) den travel by-en
'the.DEF busy city-DEF.M.SG'

- (5) a. den ku-a
'that cow-DEF.F.SG'
b. den by-en
'that city-DEF.M.SG'
c. det felt-et
'that.N field-DEF.N.SG'

- (6) et felt
'a.N.SG field'

When an English root combines with a Norwegian *n* to produce a mixed DP such as *den track-en* (2a), first the relevant List 1 items would be selected for the numeration, including a D with uninterpretable phi features, a bare lexical root, and an *n* with a masculine feature. These elements would combine in the syntax via Merge and Move, resulting in the root and gender feature being adjoined under the Definite Phrase

⁴ It has also been proposed that these definite article suffixes are not marked for gender, but for declension classes that are correlated with gender (Lohndal and Westergaard 2016). This is not problematic for the proposed analysis of mixed DPs; what is important is that Norwegian nouns are not bound and can surface without the definite article suffix, unlike in Spanish.

(DefP) head, along with a singular (SG) and definite (DEF) feature. In order to value its uninterpretable phi features, D would Agree with those features under the DefP head, thus obtaining the same phi features. During Vocabulary Insertion, the VIs in (7) and (8) would compete for insertion into the DefP and DP head terminal nodes, respectively. For the DefP head node, the noun *track* is inserted with the suffix *-en* because the underlying feature bundle has a masculine feature, leading to the VI in (7b) winning the competition for insertion. For the DP head node, the Norwegian VI in (8c), *den*, which is not specified for gender, wins the competition.

(7) Norwegian (a-d) and English (e,f) VIs competing for $\sqrt{-M.DF.SG}$

- a. $\sqrt{-F.SG.DF} \rightarrow \sqrt{-a}$
- b. $\sqrt{-M.SG.DF} \rightarrow \sqrt{-en}$
- c. $\sqrt{-N.SG.DF} \rightarrow \sqrt{-et}$
- d. $\sqrt{-PL.DF} \rightarrow \sqrt{-ene}$
- e. $\sqrt{-PL} \rightarrow \sqrt{-s}$
- f. $\sqrt{} \rightarrow \sqrt{}$

(8) Norwegian (a-c) and English (d) VIs competing for $D[M.DF.SG]$

- a. PL.DF \rightarrow dei
- b. N.DF \rightarrow det
- c. DF \rightarrow den
- d. DF \rightarrow the

It should be noted that Norwegian *den* and English *the* have the same feature specification in this analysis. This predicts optionality, which is supported by attested forms such as *the road-en* (Alexiadou et al. 2015).

Turning now to the opposite case of a Norwegian root merging with an English *n*, the same process applies, but because there is no gender feature on the English *n*, no definite article suffix is spelled out on the noun (i.e. the VI in (7f) would win, as the other exponents are over-specified). This is not problematic because, as mentioned before, Norwegian nouns can surface bare, as they do when they are indefinite. This leads to mixed DPs such as *the by* (2b). Interestingly, it also predicts DPs such as ‘*den by*’ if it is assumed, as it is here, that *den* and *the* have the same feature specifications. Such a form would be ungrammatical in Norwegian due to the lack of definite article suffix (c.f. (3) and (4) above). Interestingly, such missing surface inflection is a relatively common occurrence in attrited language. As such, the proposed approach provides an alternative account of this: language mixing below the word level.

3.2 Spanish-English

Nouns in Spanish are assigned one of two genders (F, M), and typically fall into one of three declension classes (I, II, III), which are each associated with a particular suffix (-o, -a, or -e). However, while declension classes are strongly correlated with gender, such as in (9a) and (9b), they are distinct from gender as there are exceptions, for example (9c). Also, while some nouns take no overt suffix, such as established loanwords, nouns that *do* take a declension class suffix never surface bare; they are bound roots.

- (9) a. la pas-a b. el libr-o c. la man-o
 the.F raisin.F-II the.M book.M-I the.F hand.F-I

In order for a noun to surface with a theme vowel, Kramer (2015) proposes that after Spell-Out, theme nodes are adjoined to *n* in accordance with insertion rules, such as those in (10). Those in (10a) capture the listed exceptions, and those in (10b) and (10c) ensure that, aside from those exceptions, declension class is indeed dependent on the gender feature.

(10) Theme Node Insertion Rules for Spanish⁵

- a. i. Insert [THEME, III] in the context of $\sqrt{\text{MADR-}}$, $\sqrt{\text{PADR-}}$...
- ii. Insert [THEME, II] in the context of $\sqrt{\text{DI-}}$...
- iii. Insert [THEME, I] in the context of $\sqrt{\text{MAN-}}$...
- b. Insert [THEME, II] in the context of $n[+\text{FEM}]$
- c. Insert [THEME, I] in the context of $n[-\text{FEM}]$
- d. Insert \emptyset elsewhere.

Then, at Vocabulary Insertion, theme vowels are inserted into theme nodes in accordance with (11), and we propose that this only applies when theme nodes are right adjacent to a *bound* root. This ensures that nouns such as established loanwords (consisting of free roots) do not get a declension class suffix, and captures the idea that the purpose of declension class suffixes is to render bound roots pronounceable by completing their phonological form. Importantly, like established loanwords in Spanish and Norwegian nominal roots, English nominal roots are not bound.

(11) Vocabulary Insertion for Theme Nodes

- a. [THEME, III] \rightarrow -e / $\sqrt{\text{X-}}$ ___ Num⁶

⁵ Based on Kramer (2015), with some minor modifications.

- b. [THEME, II] → -a / √X- ___ Num
- c. [THEME, I] → -o / √X- ___ Num
- d. [THEME] → ∅

Turning now to mixed DPs, when an English root merges with a Spanish *n*, this operates in exactly the same way as with unmixed Spanish DPs. The crucial difference is that when it comes to Vocabulary Insertion, because the theme node is not right adjacent to a bound root (English nominal roots are free), rule (11d) applies, and no theme vowel is inserted. Because D values its uninterpretable phi features against a feature bundle containing a feminine gender feature, the Spanish determiner *la* (12c) wins the competition for insertion, resulting in *la house*.

(12) Spanish (a-e) and English (f) VIs: D[DF.SG.F]

- a. F.PL.DF → las
- b. PL.DF → los
- c. F.DF → la
- d. M.DF → el
- e. DF → lo
- f. DF → the

In terms of the case of a Spanish root merging with an English *n*, because *n* has no gender feature, theme node insertion rule (10d) applies and so nothing is inserted. As such, the bound root cannot get a theme vowel to complete its phonological form. To get a theme node inserted and thus a theme vowel, the Spanish root has to merge with a Spanish *n* with a gender feature. However, if that is the case, then the D terminal node will also have a feminine feature, and so the feminine Spanish determiner *la* (12d) is the VI that wins the competition for insertion, not *the* (12f). As such, the DP '*the casa*' (1b) is blocked by the Subset Principle.

3.3 Summary and Predictions for French-English

Previous approaches predict an asymmetry in both language pairs because both have an underlying gender feature asymmetry. However, by applying the DM-based assumptions of Kramer (2015) with respect to Spanish gender and declension class, this predicts only a Spanish-English asymmetry, thus accounting for what is attested in naturalistic corpora.

⁶ Kramer proposes that theme vowels are only inserted when the theme node is left-adjacent to the Number head for independent reasons.

This analysis also leads to the prediction that there should be no asymmetry in French-English mixed DPs because, although there is a gender feature asymmetry in this language pair, gender in French does not interact with morphophonological phenomena such as declension class suffixes, and French nominal roots are not bound. The following section presents experimental evidence supporting this prediction.

4. Testing the Predictions for French-English

The main question that this study seeks to address is whether there is evidence of a mixed DP asymmetry in French-English. A secondary research question that will be addressed is, when an English N appear with a French D, which gender is it assigned: the gender of the translation equivalent, masculine as default, or no systematic preference? In order to investigate this, an acceptability judgement task (AJT) was combined with self-paced reading (SPR). As such, two dependent measures of grammaticality were collected: reading times (RT) for the critical N following a D (implicit measure of processing), and acceptability ratings of sentences containing the critical DPs (explicit measure of knowledge).

4.1 Methodology

Participants. The data presented are from 21 French-English bilinguals, aged between 18-35. All were undergraduates whose native language (L1) was French. Based on responses to a language background questionnaire (Sabourin et al. 2016), 14 were classed as simultaneous bilinguals, and 7 as early sequential bilinguals (age of acquisition < 6). According to self-ratings, all were highly proficient in English, and were habitual language mixers. None had early exposure to or high proficiency in other languages.

Procedure. The experiment was designed and presented using the *Linger* software program (<http://tedlab.mit.edu/~dr/Linger>). All 88 sentences contained words of both English and French. Participants were told that the words of each sentence would at first be covered in dashes, and to see each successive word, they had to press the space bar (non-cumulative moving window paradigm; De Vincenzi et al. 2003). They were asked to rate the acceptability of each sentence on a scale from 1 to 4, where “1” meant “Terrible” and “4” meant “Fine”. After 50% of the sentences, a Y/N comprehension question was asked. Participants saw each critical (n = 48) and filler (n = 40) sentence once, counterbalanced across conditions (see below) such that they saw an equal number of sentences in each.

Sentences were presented in a semi-randomized order, and separated into six blocks such that each block began with a filler sentence and no more than two sentences of the same condition appeared consecutively.

Stimuli. To create the critical sentences, 48 French nouns (and their translations) were selected. All were mono-morphemic and commonly known non-cognates, and 23/48 had feminine gender. Established loan words were avoided. Word frequency and length were controlled across languages as far as possible. To create DPs, each noun was paired with the singular definite determiner, except for five, which appeared with the singular indefinite determiner to avoid élision. One sentence was created for each of the 48 critical DPs, and three dependent variables were manipulated in order to produce six conditions for each sentence: 1) *Language of D*; 2) *DP Type*; and 3) *Gender Congruence* (Table 14-1).

Table 14-1: Conditions for critical stimuli (critical DP bolded)

| D | DP Type | Gender | Example |
|----|---------|----------|---|
| Fr | Mixed | Congr. | Paul bought trois livres pendant le month of May. |
| | | Incongr. | Paul bought trois livres pendant la month of May. |
| | Unmixed | Congr. | Paul bought trois livres pendant le mois de mai. |
| | | Incongr. | Paul bought trois livres pendant la mois de mai. |
| En | Mixed | N/A | Paul a acheté three books during the mois de mai. |
| | Unmixed | N/A | Paul a acheté three books during the month of May. |

Three types of mixed-language fillers were included: 1) sentences containing a within-language morphosyntactic violation (n=15); 2) sentences containing an uncontroversial language switch violation, such as between a noun and a post-posed adjective (n=15); and 3) grammatical sentences with uncontroversial language switches (n=10). Grammatical control conditions were created for the first two types of filler by repairing the mismatch. Significantly lower ratings and longer reading times were indeed found for both types of violations compared to their controls.

4.2 Results

Mean acceptability ratings were calculated for each participant by condition. RTs were time-locked to participants' button press to the critical noun in each critical sentence, and means were calculated for each participant. Data points that were 2.5 standard deviations above or below each participant's mean were replaced by the mean value (4.9%). Mean RTs were then re-calculated for each participant by condition

4.2.1 Mixed DP Asymmetry

A two-way repeated measures ANOVA was conducted for each dependent variable with *Language of D* (French vs. English), and *DP Type* (Unmixed vs. Mixed) as independent variables. For Ratings (Fig. 14-1A), there was a significant main effect of *DP Type* [$F(1,19) = 25.739$, $MSE = 10.955$, $p < .001$], indicating that participants preferred unmixed DPs over mixed DPs. The main effect of *Language of D* was not significant, and crucially, neither was the interaction between *Determiner Language* and *DP Type*. This indicates that participants had no preference for DPs with a French D over DPs with an English D for neither mixed nor unmixed DPs.

The results for RTs (Fig. 14-1B) mirror those for Ratings: there was a significant main effect of *DP Type* [$F(1,19) = 16.129$, $MSE = 595119.05$, $p = .001$], indicating that participants preferred unmixed DPs. The main effect of *Language of D* was not significant, nor was the interaction. As such, the results for both dependent measures support the hypothesis that there is no mixed DP asymmetry in this language pair.

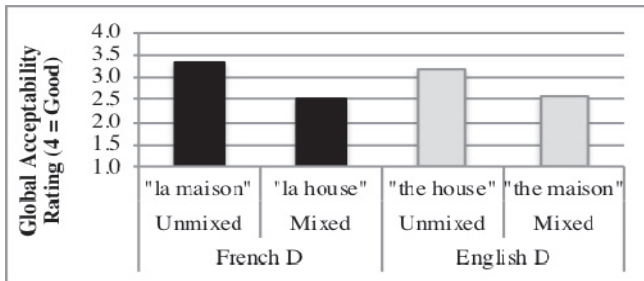


Figure 14-1A. Ratings

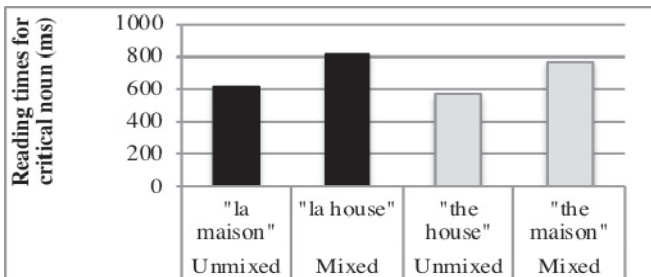


Figure 14-1B. RTs

4.2.2 Effects of Gender Congruence

Looking only at conditions with a French D, a four-way repeated measures ANOVA was conducted for each dependent variable with *DP Type* (Unmixed vs. Mixed), *Gender Congruence* (Congruent vs. Incongruent), *Noun Gender* (Feminine vs. Masculine), and *Participant Group* (Early Sequential vs. Simultaneous Bilingual) as independent variables.⁷

Results for Ratings (Fig. 14-2A) showed a significant interaction between *DP Type* and *Gender Congruence*, indicating that the difference between DPs with congruent vs. incongruent gender was much larger in unmixed French DPs compared to mixed DPs [$F(1,19) = 5.666$, $MSE=0.886$, $p=.028$]. There was also a strong trend towards significance for the 3-way interaction between *DP Type*, *Gender Congruence* and *Gender of N* [$F(1,19) = 4.309$, $MSE = 0.607$, $p = .052$]. Pairwise comparisons indicated that the difference between mixed DPs with congruent vs. incongruent gender was only significant when the English N's translation equivalent was masculine.

For RTs (Fig. 14-2B), the interaction between *DP Type* and *Gender Congruence* was significant [$F(1,19) = 8.004$, $MSE = 145.080$, $p = .011$], but not the 3-way interaction between *DP Type*, *Gender Congruence* and *Gender of N*, suggesting that participants showed a preference for congruent over incongruent DPs in unmixed DPs only.

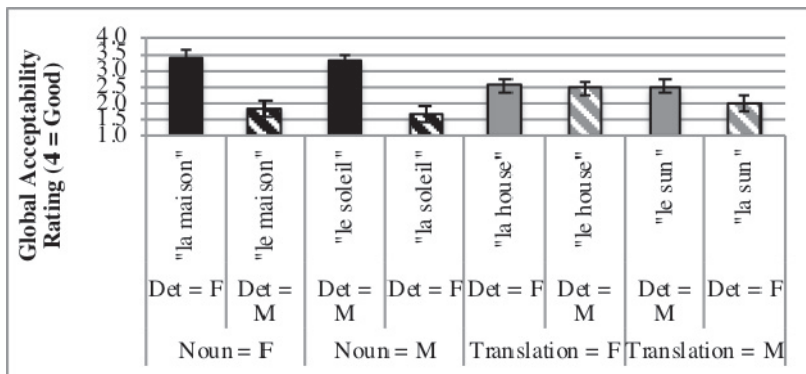


Figure 14-2A. Global sentence ratings for DPs with French D: 3-way interaction.

⁷ While there are no specific hypotheses related to the age of acquisition of the participants, the between-group variable was included in order to control for any potential variability in the results based on the different language background profiles of these two groups. This is an area that future work should explore.

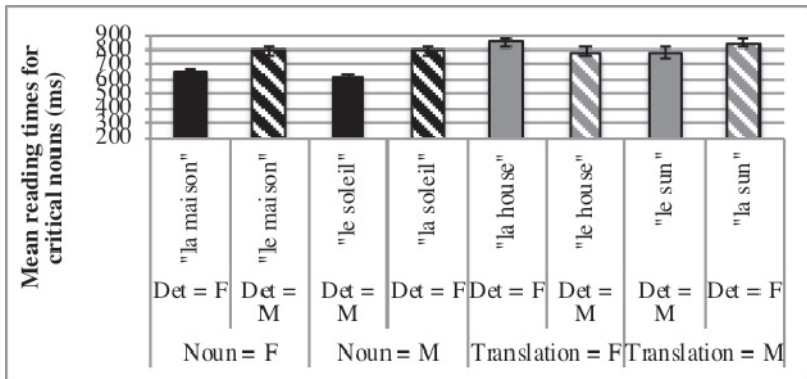


Figure 14-2B. RTs for Ns preceding French D: 3-way interaction.

5. Discussion

In terms of the first research question, we found no evidence for a mixed DP asymmetry in French-English, as predicted. However, it is important to concede that an absence of an effect is not strong evidence for the theoretical account. In order to make stronger conclusions, experimental evidence for the Spanish-English asymmetry is needed in addition to the corpus-based evidence. There are two previous studies that have looked at this with early sequential bilinguals with Spanish as their L1. Most recently is one by Fairchild and Van Hell (2017). They used a picture-naming task and actually found the opposite DP asymmetry: a dispreference for DPs such as *la house*. They have argued that this reflects a greater processing cost for language switches from L1 to L2. Second, Licerias and colleagues (2008) used an AJT and found that their groups of sequential bilinguals did have a slight preference for mixed DPs with a Spanish D, but only if analogical gender was assigned to the English N. Mixed DPs with English determiners were rated nearly as high.

In terms of gender assignment of English nouns in mixed DPs, we found different results for the two dependent variables. For acceptability ratings, the pattern of results differed depending on the gender of the translation equivalent. This finding is consistent with Spanish-English corpus data where English nouns with masculine Spanish translation equivalents are almost categorically found with masculine determiners, but there is much more variability for English nouns with feminine translation equivalents (e.g. Poplack, Pousada and Sankoff 1982). A possible explanation for this pattern is that speakers attempt to assign analogical

gender if it can be retrieved; if not, they assign masculine as default. In terms of the results for RTs, we found no real indication for a preference. Because there were such robust effects for unmixed DPs, this cannot be attributed to a lack of statistical power. Instead, it seems that participants found processing gender agreement for any English noun generally very effortful, perhaps because they were consciously applying metalinguistic knowledge to perform the task.

6. Conclusions

To summarize, we demonstrated that a DM-based approach to language mixing can account for the mixed DP asymmetry in Spanish-English, and its lack thereof in Norwegian-English. The experimental results presented here support the consequent prediction that there should not be such an asymmetry in French-English mixed DPs, and provide evidence that when English nouns appear with a French determiner, gender is assigned analogically if possible. Future directions include using this methodology with Spanish-English bilinguals in order to determine if it can indeed elicit the mixed DP asymmetry that is attested in corpus data, but which has not yet been replicated experimentally. A way to do this may be to increase the covertness of the task and perhaps combine it with an more sensitive and implicit measure of processing, such as event-related brain potentials (ERPs). It would also be relevant to explore whether individual differences such as age of L2 acquisition play a role in gender assignment preferences for English nouns in mixed DPs.

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CHAPTER FIFTEEN

NONWORD PLURALIZATION: EVIDENCE FOR AN ADVANTAGE OF BILINGUALISM IN ALBANIAN-ITALIAN AND ROMANIAN-ITALIAN BILINGUAL CHILDREN

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1. Introduction

1.1 Bilingualism and Morphological Skills

Over the last years, a growing body of evidence has shown that bilingualism positively affects our cognitive abilities, boosting executive functions such as inhibition and attention control, which are significantly more trained and efficient in individuals who have to deal on a daily basis with two or more languages (Bialystok 2009). Other positive effects concern language and specifically metalinguistic awareness, as continuous exposure to more than one language appears to enhance the subjects' sensitivity to language structures and patterns (Bialystok and Barac 2013). The first empirical evidence of enhanced metalinguistic awareness dates back to the sixties, when Vygotsky (1962) found that bilingual individuals are more familiar with the arbitrariness of the relationship between meaning and form and perform better than monolinguals in tasks tapping the ability to separate them. Other indicators for this advantage have accumulated over the last decades: in particular, Bialystok (1986) found that bilinguals perform better than monolinguals in grammaticality judgment tasks involving anomalous sentences, e.g. *Apples grow on noses*. Bilinguals showed a sophisticated metalinguistic awareness and outperformed their monolingual peers, accepting grammatically correct yet semantically anomalous sentences more often than monolinguals, who

were more reluctant to separate meaning and form. Similar results were also found by Ricciardelli (1999) and, subsequently, were replicated in an ERP study by Moreno, Bialystok, Wodniecka and Alain (2010). Overall, this metalinguistic advantage has been attributed to the very nature of bilingualism, which seems to guarantee a higher symbolic flexibility, allowing children to experience an accelerated separation of meaning and form and to focus their attention on language form (Cummins 1978).

A more recent stream of research has shown that the bilingual advantage extends to the domain of morphological awareness, as found by Barac and Bialystok (2012), who administered a modified version of original Berko's (1958) Wug Task to a group of monolingual children and three groups of age-matched bilinguals, i.e. Spanish-English, French-English and Chinese-English. As in Berko's Wug Test, the ability to generate plurals of nouns has been tested by means of English non-words such as *wug*. The aim of the study was comparing the performance of monolinguals and bilinguals, and - for the bilingual groups - singling out the role of factors such as language similarity, cultural background and language of schooling on verbal and non-verbal skills. Barac and Bialystok's results revealed a general advantage of all bilingual groups in the Wug test compared to other linguistic measures, specifically, receptive vocabulary and grammatical ability. Whilst the French and Chinese groups reached monolinguals' performance in this task, the advantage was especially evident in the case of the Spanish-English children who surpassed the English monolinguals, despite showing the same language proficiency as the controls. According to the authors, the differences between the bilingual groups can be ascribed to the fact that only the Spanish-English bilinguals could have benefitted from both the linguistic similarity between Spanish and English and from the use of English as language of instruction, whereas the other two groups could not take advantage of at least one of these essential aspects (the French group had French as language of schooling and Chinese has the lowest degree of similarity w.r.t. English).

These interesting results stimulated further research, especially addressed to evaluate the validity and extent of the bilingual advantage in morphology. In particular, Bialystok, Peets, and Moreno (2014) investigated whether an enhanced morphological awareness also arose in children who were still acquiring the second language and could not be considered as full bilinguals. To this purpose, they administered the Wug Task, together with other metalinguistic tests, a grammaticality judgment one and a verbal fluency one, to two groups of monolingual English children, second-grade or fifth-grade students, and two groups of children

with English as L1 who were learning French as L2 in an immersion education program. Results showed that all bilingual children outperformed monolinguals in the Wug Task, whereas only the older bilingual children were more accurate than monolinguals in the sentence-judgment task. Therefore, it was found that the bilingual advantage emerges earlier and more clearly in the Wug Task, which can be considered less complex than the other tasks, since there is no misleading information to be filtered out or any need for particularly effortful processing (Bialystok et al. 2014).

Basing on these findings, Vender et al. (submitted) administered a Wug Task to four groups of children – i.e. monolinguals and bilinguals, with and without a diagnosis of dyslexia – with the aim of comparing their performance in a task assessing the ability to generate plurals of nouns and pseudo-nouns in Italian, and to evaluate the interaction between language impairment and bilingualism in the domain of morphological skills. The same task had been previously administered by the authors to two groups of monolingual children with and without dyslexia, showing that dyslexics were more impaired than typically developing children in the pluralization of nonwords (Vender et al. 2017).

Taking Berko's original paradigm as a basis, the authors adapted it to the more complex context represented by the Italian inflection system, in which plurals are typically obtained by modifying the phonological shape of the singular ending in accordance with the declension class and gender feature of the stem. In their study, the authors compared the performance of the groups in five conditions, corresponding to the different declension classes of Italian and characterized by distinct levels of complexity (see the section Methods below for a description of these conditions).

The main results of Vender's et al. study corroborate and increase the relevance of previous outcomes. Firstly, they reveal the presence of a bilingual advantage in Italian inflectional morphology, since all bilingual children, both dyslexics and controls, performed significantly better than monolingual children in the most difficult (non-word) conditions. Furthermore, these results highlight the positive effect of bilingualism in language-impaired populations, since growing bilinguals arguably constitutes a compensating condition for dyslexia, at least as far as inflectional morphology skills are concerned. In the most difficult conditions, indeed, bilingual dyslexics performed even better than monolingual unimpaired children, indicating that their ability to apply morphological rules across the board was significantly better not only with respect to monolingual dyslexics but also with respect to monolingual typically developing children. However, differently from the previous

studies, Vender et al. could not evaluate the role of language similarity between Italian and the first language of the bilingual children, since overall the children had various native languages characterized by different degrees of similarity to Italian.

To sum up, bilingual children are generally reported to outperform their monolingual peers in tests assessing their morphological and metalinguistic awareness skills, as in the Wug Test. Some evidence points to the role of language similarity for this advantage, while other studies found that the presence of this advantage seems to hold independently of the subjects' mother-tongue.

2. The Current Study

Building on the body of evidence portrayed in the preceding section, we decided to administer a version of the pluralization task designed by Vender et al. (2017) to a group of monolingual Italian children and two groups of L2 Italian / early bilingual children whose L1s differ in their degree of similarity to Italian.

The aim of the study was two-fold: first of all, we wanted to confirm or disconfirm the presence of an advantage of bilingualism in a task tapping the subject's morphological skills; second, we intended to verify if and to what extent children's L1 may influence bilinguals' performance in the pluralization task. To this aim, we recruited bilingual subjects having respectively L1 Romanian, i.e. a Romance language with a high degree of similarity to Italian in the lexicon and in the nominal morphology domain (Farkas 1990; Bateman and Polinsky 2010), and L1 Albanian, a language holding a lower degree of similarity to Italian (for a comparative analysis see Manzini and Savoia 2011; Giurgea 2014).

While Barac and Bialystok's (2012) found an effect of language similarity on children's performance in the Wug Task, it is worth emphasizing that among the languages they considered (English vs. French, Spanish, Chinese), Chinese stands alone in several respects, ranging from phonology to lexicon and grammar (both morphology and syntax). In the present study, however, the difference in distance between Albanian and Italian on the one side, and Romanian and Italian on the other, is less drastic, since these languages all belong to the I.E. family, are characterized by similar SVO syntactic order and exhibit fusional morphology, with gender and declension classes represented in the nominal system. However, important differences arise in the lexicon and in the morpho-phonology of the declension class system, where Romanian, like Italian, has declension classes opaquely connected to

gender, while Albanian nominal inflection beyond coding number/gender also express features such as case and definiteness.

In view of the picture above, we can formulate some predictions. Firstly, on the grounds of Vender et al. (submitted), we expect to confirm the bilingual advantage in the subjects' ability to generate plurals of non-words, especially in the most difficult conditions.

Furthermore, following Barac and Bialystok (2012), we might hypothesize that language similarity affects bilingual subjects' performance, with Romanian-Italian children outperforming Albanian-Italian children in the pluralization task due to the stronger resemblance between Romanian and Italian than between Albanian and Italian. However, the peculiarities of the Wug Task in use - adapted here to the complex picture of Italian nominal inflection - and the different degrees of similarities between the languages under consideration do not allow us to advance strong predictions about possible differences in the performance between the bilingual groups. More precise expectations concerning the performance in each condition of the pluralization task will be spelled out in the next section.

3. Methods

3.1. Participants

The experimental protocol was administered to 42 subjects, divided in three groups: 12 Italian monolingual children (MON henceforth), 15 Romanian-Italian bilingual children (BIR) and 15 Albanian-Italian bilingual children (BIA).

All children attended to the same public schools in the area of Padua and they had no referred learning, hearing or oral disorder. All the bilingual children had Italian as their second language and spoke their first language (Romanian or Albanian) at home. Detailed information about the children's exposure to the two languages were collected by means of a questionnaire gathering information concerning their age of first exposure to Italian (AoE), quantity of exposure to Italian (QoE), traditional length of exposure (TLE) and cumulative length of exposure (CLE) to Italian (Unsworth et al. 2012; Vender et al. 2016), as reported in Table 15-1. Independent samples t-tests revealed that there were no significant differences among the two groups in AoE ($t(28) = .906, p = .373$), QoE ($t(28) = 1.582, p = .125$) TLE ($t(28) = .846, p = .405$) and CLE ($t(28) = 1.042, p = .306$).

Table 15-1. Means (and SDs) of bilingual children's exposure to Italian.

| | AFE (years) | QE (percentage) | TLE (years) | CLE (years) |
|--|------------------------|----------------------------|------------------------|------------------------|
| Romanian-Italian Bilinguals | 0.52 (1.23) | 0.68 (0.14) | 9.19 (1.40) | 3.27 (0.81) |
| Albanian-Italian Bilinguals | 0.20 (0.56) | 0.76 (0.14) | 9.59 (1.16) | 3.55 (0.63) |

We collected measures concerning the participants' cognitive, reading and linguistic abilities in Italian by administering a set of preliminary tasks including the CPM Raven (no subject scored below 1.5 SD under the mean for their age), the DDE-2, a standardized task which assesses fluency and accuracy in word and nonword reading (no subjects scored below 2 SD below the mean in two out of the three measures) and the *Peabody Picture Vocabulary Test* by Dunn and Dunn (2000), adopting the Italian standardization by Stella, Pizzioli and Tressoldi (2000). The results of the preliminary measures of the three groups are summarized in Table 15-2.

Table 15-2. Mean (SD) of the four groups in Age, Raven task, PPVT-R and reading measures.

| | Monolinguals | Romanian Italian Bilinguals | Albanian Italian Bilinguals |
|------------------------------|---------------------|--|--|
| Age | 10.20 (0.10) | 9.90 (0.10) | 9.80 (0.11) |
| Raven (z-scores) | 0.29 (0.78) | 0.35 (0.48) | -0.04 (0.89) |
| PPVT-R | 115 (9.28) | 100.40 (13.58) | 93.73 (13.55) |
| Word speed | 0.47 (1.06) | -0.01 (0.87) | -0.18 (0.57) |
| Word accuracy | 0.25 (0.63) | -0.39 (0.90) | 0.03 (0.62) |
| Nonwords speed | 0.14 (1.28) | 0.50 (0.78) | 0.30 (0.34) |
| Nonwords accuracy | 0.16 (1.03) | 0.06 (0.85) | -0.12 (0.92) |

One-way ANOVAs revealed no differences between the three groups regarding age, $F(2, 39) = 1.157, p = .325$, the Raven scores, $F(2, 39) = 1.193, p = .314$, word reading speed, $F(2, 39) = 1.105, p = .341$, word reading accuracy, $F(2, 39) = 2.677, p = .081$, nonword reading speed, $F(2, 39) = .350, p = .707$, and nonword reading accuracy, $F(2, 39) = .323, p = .726$. Conversely, we found significant differences in the PPVT-R, $F(2, 39) = 9.870, p < .001$; post-hoc comparisons revealed that MON had better

vocabulary scores than both BIR ($p < .05$) and BIA ($p < .001$), whereas BIA and BIR performed similarly ($p = .457$). These preliminary results confirmed that the three groups of children had a homogeneous cognitive and reading level and that monolinguals had a higher receptive vocabulary in comparison to both groups of bilinguals, in line with what reported by previous studies (Bialystok et al. 2008).

3.2. Procedure and Materials

In addition to the texts described above, all children were administered a new version of the nonword pluralization task developed by Vender et al. (2017). In this task, based on Berko's Wug Test, children were asked to form the plural of invented nouns in five different conditions, with three items per condition, corresponding to different declension classes of Italian, as outlined below. An example of the experimental conditions, with an existing noun for each of the relevant declension classes, is reported in brackets.

- (i) Condition 1: Feminine $a > e$, e.g. *la muv-a > un po' di muv-e*
(Class I, e.g. *la port-a > le port-e*, 'door')
- (ii) Condition 2: Masculine $o > i$, e.g. *il fol-o > un po' di fol-i*
(Class II, e.g. *il gall-o > i gall-i*, 'rooster')
- (iii) Condition 3: Masculine $a > i$, e.g. *il tred-a > un po' di tred-i*
(Class IV, e.g. *il pirat-a > i pirat-i*, 'pirate')
- (iv) Condition 4: Masculine $e > i$, e.g. *il dort-e > un po' di dort-i*
(Class III masc., e.g. *il pesc-e > i pesc-i*, 'fish')
- (v) Condition 5: Feminine $e > i$, e.g. *la stab-e > un po' di stab-i*
(Class III fem., e.g. *la nav-e > le nav-i*, 'boat')

Conditions 1 and 2, which correspond respectively to Class I and II of Italian nominal morphology, are fully productive, predominant in the input and extremely salient from the acquisition perspective, due to their high regularity and predictability (see Dressler and Thornton (1996) among others). Moreover, they show maximal discrepancy in gender and in phonological form ($a > e - o > i$). On the contrary, Conditions 4 and 5 comprise items belonging to Class III, which is numerically consistent, but

totally unproductive and completely independent from gender specification. A noun ending in *-e* can be either masculine or feminine and takes the corresponding plural ending in *-i* independently of the stem's gender. Therefore, differently from Class I and II, there is no systematic gender-based rule or pattern for class determination. Finally, Condition 3, which corresponds to Class IV of Italian morphology, is numerically less pervasive than Class III, but opaque as far as gender manifestation is concerned. The majority of Italian nouns ending in *-a* are indeed feminine, whereas those in this class are masculine: hence, the learner must pay attention to agreement patterns in the singular to disentangle gender specification and devious phonological exponence, learning to produce the target plural marker *-i*. Given the peculiarities of these declension classes of Italian, Conditions 3, 4 and 5 were expected to be more challenging than Conditions 1 and 2.

The task was preceded by a familiarization session comprising four training items, two with real words and two with nonwords. There were two main modifications between the original version by Vender and colleagues, and the one that we used in this study. First, we did not include a part assessing the pluralization of real words, which was at ceiling in the previous study. Second, we decided to avoid the elicitation of the determiner, in order to verify if this could influence performance. The elicitation formula was changed from “Questo è *il folo*, questi sono...” (‘This is *il folo*, these are...’), where a determiner had to be produced in order to obtain grammatical sentence, to “Questo è *il folo*, questi sono un po’ di...” (‘This is *il folo*, these are some...’) where the production of the article is not required and would yield an ungrammatical sentence.

As in Vender et al. (2017), we attributed 1 point to each correct plural form produced and 0 points to wrong inflections. We accepted as target also items that were wrongly repeated by the children but correctly inflected (e.g. “*il treda*” > “*un po’ di trebi*”).

4. Results

Means and standard deviations for each of the five conditions are reported in Table 15-3.

Table 15-3. Mean (SD) in the five conditions of the nonword pluralization task.

| | Monolinguals (n=12) | Romanian Italian Bilinguals (n=15) | Albanian Italian Bilinguals (n=15) |
|-------------------------|--------------------------------|---|---|
| Cond. 1 F a>e | 0.97 (0.09) | 0.93 (0.14) | 0.95 (0.12) |
| Cond. 2 M o>i | 1.00 (0.00) | 1.00 (0.00) | 1.00 (0.00) |
| Cond. 3 M a>i | 0.86 (0.22) | 0.66 (0.33) | 0.60 (0.36) |
| Cond. 4 M e>i | 0.97 (0.09) | 0.95 (0.12) | 0.95 (0.17) |
| Cond. 5 F e>i | 0.25 (0.25) | 0.64 (0.36) | 0.82 (0.35) |

Both groups of bilingual children showed a similar and almost ceiling performance in Condition 1 (F a>e), 2 (M o>i) and 4 (M e>i). The accuracy was lower for all participant in Condition 3 (M a>i), with monolinguals showing the best performance, and in Condition 5 (F e>i), with both groups of bilinguals performing much more accurately than monolinguals, and with Albanian-Italian bilinguals showing the most accurate behavior.

A one-way ANOVA carried on these data revealed that there were no differences in Condition 1 ($F(2, 39) = .364, p = .697$), in Condition 2, where all participants showed a 100% correct performance, and in Condition 4 ($F(2, 39) = .065, p = .937$). Despite the apparently more accurate behavior of monolinguals in Condition 3, no statistically significant differences were found ($F(2, 39) = 2.376, p = .106$). Conversely, a highly significant difference was found in Condition 5 ($F(2, 39) = 10.099, p < .001$). Post-hoc comparisons with Bonferroni correction revealed that that both BIR and BIA outperformed MON (respectively: $p < .05$ and $p < .000$); conversely no differences were found BIR and BIA ($p = .455$). This indicates that both groups of bilinguals showed an advantage in the pluralization of invented feminine nouns belonging to Class III and that, although BIA apparently performed better than BIR, the similarity between the L1 and the L2 did not influence performance in a statistically significant way.

A Pearson correlation task was run on this data to evaluate the presence of correlations between nonword pluralization in the five conditions, the preliminary measures collected and the exposure to Italian of the two groups of bilinguals. We found that the traditional length of exposure positively correlated with conditions F a>e ($R = .366, p < .05$), and F e>I ($R = .432, p < .05$). In addition, we found a positive correlation between F e>i and M e>i ($R = .408, p < .01$), indicating that, as for Class

III, the children who were more skilled in applying the correct rule to pluralize masculine nonwords were also more skilled in inflecting feminine nonwords.

As for condition M a>i, instead, we found that accuracy was significantly predicted by receptive vocabulary ($R = .396, p < .01$), suggesting that children with higher cognitive ability and higher vocabulary had better chances to pluralize correctly masculine nouns ending in *-a* for the singular.

5. Discussion and Conclusion

The results of this study confirmed our expectations about the enhanced morphological skills of bilinguals in the Wug Task, adding further evidence to the stream of studies discussed in the introduction and, more specifically, validating the results obtained by Vender et al. (submitted) concerning Italian inflectional morphology. Interestingly enough, this bilingual effect seems to hold independently of language similarity, since no significant differences were found between the performances of the bilingual groups in any of the conditions.

The results, indeed, show that both groups of bilingual children displayed a monolingual-like performance in the pluralization of nonwords, confirming the results obtained by Vender et al (submitted). Furthermore, a positive effect of bilingualism was found in Condition F e>i, which was the most difficult one, with both groups of bilingual children performing more accurately than their monolingual peers. This condition is especially difficult for the mismatch between the feminine gender of the stem (as in the real word *nav-e* 'ship') and the target form of the plural, which is *-i* (*nav-i*) instead of *-e*, i.e. the prototypical plural marker of most It. feminine nouns (sg. *port-a*, pl. *port-e*). Indeed, here as in the other conditions, the most typical error consisted in leaving the input form unchanged, producing the non-target *un po' di nav-e* instead of *un po' di nav-i*. The enhanced morphological skills displayed by bilinguals in this condition might be attributed to their superior ability to abstract away from gender features, and just rely on declension class markers when asked to form the plural of non-words in this Class. Interestingly, the bilingual advantage found in Vender et al. (submitted) has been confirmed by our data, in spite of the changes introduced in the present work with respect to the elicitation of the determiner. The fact that the tendency to pluralize feminine nouns with the ending in *-e* remains strong also in this version of the experiment suggests that this effect was not determined by the explicit presence of the article *le* in Vender et al.' study. Nevertheless,

this tendency is stronger for monolinguals, whereas it appears that bilinguals, independently of their L1, display a better capacity to inhibit it and to stick to the relevant rule. This enhanced performance could be attributed to the bilingual advantage in metalinguistic awareness tasks, resulting in a better ability to capture relevant formal patterns in the language, arguably derived from their early and continuous exposure to different linguistic systems.

In light of the above, it is especially telling that this advantage was found independently from the L1 spoken by the children. Subjects' performance in this condition was related to the length of exposure to Italian: bilinguals with a longer exposure showed indeed a more accurate performance than those with a shorter exposure.

Another interesting result concerns Condition M a>i: although both groups of bilingual children were less accurate than the group of monolinguals in this condition, we didn't find statistically significant differences among the three groups. However, we found a significant correlation between accuracy and vocabulary, suggesting that performance was influenced by the subjects' lexical competence in Italian. The correlation between performance in this condition and lexical competence is not surprising in consideration of the low (type) frequency of words belonging to Class IV in the Italian lexicon. Moreover, this result replicates what reported in Vender et al. (submitted), thus supporting the idea related to the presence of a lexical effect in this condition, favoring children with a higher vocabulary in the inflection of nonwords belonging to Class IV.

Author Contribution

CM and MV conceived the project and designed the experiment with the support of DD, they collected the data with the help of Silvia Di Marco, who is gratefully acknowledged for her work. CM and MV analyzed the results and wrote the first draft of the paper. CM, MV and DD revised the work critically for important intellectual content and gave the final approval of the version to be published.

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