Second Language Acquisition of Focus Prosody in English and Spanish

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Front Matter

0.1   Dedication

To the memory of my grandfather, an avid scrabble player and a lover of languages.

0.2   Declarations

Chapter 3 of this thesis is the result of joint work with Michael Wagner, submitted to be published as a co-authored journal article (Klassen and Wagner 2015). Chapter 5 of this thesis has been presented in various forms as a poster (Klassen 2013a,b) and is published as a proceedings paper Klassen (2013c). Chapters 6 & 7 are the result of joint work with Annie Tremblay, presented as a poster (Klassen and Tremblay 2015b) and as a talk (Klassen and Tremblay 2015a).

0.3 Abstract

The first goal of this thesis is to properly characterize prosodic focus in (L1) English and (L1) Spanish, and to establish to best to way to characterize the differences between the two. We provide data that help choose between two prevailing accounts of prominence, the first which attributes prosodic reduction to low-level activation (*Accessibility Theory,* e.g. Arnold and Watson 2015), and the second which attributes it to a syntactic operator that requires an antecedent, much like a pronoun (*Anaphoric Theory,* Rooth 1992, Wagner and Klassen 2015). Our English production data show that native English speakers shift prominence in the sentence according to the contrast that speakers intend to convey, using additional adverbs which are only compatible with certain choices in antecedents. We argue that this can only be accounted for by the Anaphoric Theory. With respect to the differences in prosodic focus marking between English and Spanish (and, tentatively, Germanic and Romance more generally), we show that the crosslinguistic differences can be explained by a syntactic-semantic account: the scope of the focus domain in Spanish must be wide, encompassing the entire speech act, while in English it can scope over smaller constituents, as expected based on the Scope Hypothesis (vander Klok et al. 2014). Additionally, the observation in Ladd (2008) that focus in Spanish must be correctional in nature, may indeed be correct, meaning that the interpretation of the focus operator in Romance is also restricted in addition to its scope. What is more, our data show that the differences between English and Spanish focus marking cannot be explained by phonological constraints on phrasing.

Using our L1 hypotheses about the crosslinguistic variation of prosodic focus as a starting point, we form a hypothesis regarding the L2 acquisition of prosodic focus, based on standard assumptions about the availability of evidence in L2 (White 2003). We suggest that English speakers have issues with Spanish prosodic stress shift because its use is constrained to a narrow set of contexts. Therefore, in order to acquire the specific restrictions (i.e. only corrective contexts), learners must integrate two separate pieces of evidence, or else they may simply posit the existence of two

grammars, resulting in optionality. Our production data support this hypothesis. After this, we examine the online processing of English cataphoric prosodic focus by Spanish native speakers– the nature of L2 processing being a debated issue (Kaan 2014). We show that L1 transfer plays a role in L2 processing of prosodic focus: Spanish-speaking learners of English are able to take into account prosodic cues during the processing of an English sentence only when these cues are similarly used in Spanish. We do not find evidence for different processing strategies between native and non-native speakers of English.

0.4 Abrégé

Le premier objectif de cette thèse est de décrire avec précision le focus prosodique en anglais (L1) et en espagnol (L1), et d'établir la meilleure façon de décrire les différences entre les deux. Nous fournissons des données qui aident à choisir entre deux explications actuelles de la proéminence, la première qui attribue la réduction prosodique à l'activation de bas niveau (*la théorie d'accessibilité,* e.g. Arnold and Watson 2015), et la deuxième qui l'attribue à un foncteur syntaxique qui exige un antécédent, similaire à un pronom (*la théorie anaphorique,* Rooth 1992, Wagner and Klassen 2015). Nos données de production anglaises montrent que les anglophones déplacent la proéminence dans la phrase selon le contraste que les locuteurs veulent exprimer, en utilisant des adverbes qui ne sont compatibles qu'avec certains choix d'antécédents. Nous soutenons que cela peut seulement s'expliquer par la théorie anaphorique. Quant aux différences dans le marquage de focus prosodique entre l'anglais et l'espagnol (et, provisoirement, entre les langues germaniques et latines en général), nous montrons qu'elles peuvent s'expliquer par une théorie syntaxique-sémantique: la portée du domaine de focus doit être large, englobant l'acte de parole, tandis qu'en anglais il peut porter sur des constituants plus petits, comme anticipé par l'hypothèse de portée (Scope Hypothesis) (vander Klok et al. 2014). De plus, l'observation faite dans Ladd (2008) que le focus en espagnol doit être de nature correctionnelle peut s'avérer juste, ce qui entraîne que l'interprétation du foncteur de focus en langues latines est limitée, tout comme sa portée. Nos données montrent en plus que les différences entre le marquage du focus en anglais et en espagnol ne peuvent pas s'expliquer par des contraintes sur la phrase prosodique.

Nous nous servons de notre hypothèse L1 sur la variation interlinguistique du focus prosodique comme point de départ pour une hypothèse sur l'acquisition de deuxième langue du focus prosodique, basée sur des suppositions standards sur la disponibilité de preuves dans une deuxième langue (White 2003). Nous suggérons que les anglophones ont des difficultés avec le déplacement de l'accent en espagnol parce que son utilisation est limitée à un groupe de contextes plus restreint.

Par conséquent, pour acquérir les contraintes spécifiques (c'est-à-dire seulement des contextes correctionnels), les apprenants doivent intégrer deux preuves separées; sinon, ils peuvent tout simplement postuler l'existence de deux grammaires, donnant lieu à la facultativité. Nos données de production soutiennent cette hypothèse. En outre, nous examinons le traitement en temps réel du focus cataphorique prosodique en anglais par les hispanophones—la nature du traitement L2 étant un problème très discuté (Kaan 2014). Nous montrons que l'interférence de la première langue joue un rôle dans le traitement du focus prosodique en L2: les hispanophones apprenant l'anglais sont capables de prendre en compte les indices prosodiques pendant le traitement d'une phrase anglaise, seulement dans les cas où ces indices sont utilisés de façon similaire en espagnol. Nous n'avons trouvé aucune preuve pour des stratégies différentes de traitement entre les locuteurs natifs et non-natifs d'anglais.

0.5 Acknowledgements

I am grateful to all those who helped me in the pursuit of higher education and who encouraged me along the way. These years have passed by incredibly quickly! Firstly, the appreciation I feel towards my primary supervisor, Lydia White, originates deep in my heart. If her formidable reputation has not reached your corner of the world, Lydia White is an incredible teacher and researcher and everything she does seems to be with ease and precision. From her, I have learned to look at a theory or a set of data and clear away the shrubbery to reveal the core principles. Or at least I have learned that this is something one can strive towards, and my mind has benefited.

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Annie Tremblay was the last person on my committee whom I met, but I owe her just as much as to the others. Her generosity cannot be overstated, as she allowed me to work at KU just for the simple reason that I wanted to be nearer to my significant other. The fact that her expertise was so beneficial so my research topic was a marvellous coincidence, and she has ended up having a

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Contents

Chapter 1

Introduction

What meaning does acoustic emphasis bring to a sentence? Does acoustically emphasizing a word or phrase have a universal interpretation? If not, is it difficult to acquire a new system of emphasis in a second language? These are the questions that this thesis attempts to answer in exploring the phenomenon of prosodic focus, both in native speech and in the speech of adult learners.

Firstly, this thesis argues that English prosodic focus is an anaphoric phenomenon, similar to pronominalization and other types of anaphora (Rooth 1992, Klassen and Wagner 2015). Given material is reduced in reference to a salient antecedent in the context. When multiple possible antecedents exist in the discourse, speakers choose an antecedent based on their expressive intention, much like what happens with pronouns.

This anaphoric representation classifies prosodic focus as an *external* interface phenomenon, in the words of Sorace (2011), since it functions much like pronominalization. However, data from a naturalness judgment experiment in Chapter 5 shows that it does not resemble other external interface phenomenon in that intermediate speakers show native-like judgments, whereas the Interface Hypothesis (Sorace 2011) predicts that speakers should not show native-like judgments with respect to external interface phenomena.

In Chapter 6, this thesis puts forth the claim that Spanish prosodic focus is also anaphoric, but

with additional conditions restricting its distribution. In particular, we provide L1 production evidence which shows that Spanish focus can only incur a shift in stress in corrective contexts, which parallels previous findings from L1 French (vander Klok et al. 2014). This suggests that Spanish prosodic focus differs syntactically from English prosodic focus with respect to the scope of the focus operator and perhaps also the interpretation of this operator. The data from this chapter are inconsistent with a phonetic or phonological account of crosslinguistic variation in focus marking (e.g. Féry 2013).

The syntactic account of focus-marking in Spanish and English creates predictions for acquisition. In particular, we should expect a directional asymmetry in acquisition stemming from the role of positive evidence. English speakers are argued to have a more difficult task in learning Spanish focus, as they are required to attend to the specific contexts in which stress shift is licit and illicit: in such a situation, the learner must construct a grammar drawing from two pieces of positive evidence at once; otherwise, they may simply entertain multiple conflicting grammars, leading to optionality in production. For Spanish speakers, the correct representation of English focus can be more easily acquired, as stress shift is allowed for all types of focus in English.

With respect to the processing of focus, I examine contexts where focus marking precedes the focus antecedent, thereby creating an expectation in the listener for upcoming meaning. This observation is related to recent L2 research which claims that learners have a reduced ability of generating expectations in real time (*cf.* Kaan 2014)—I provide evidence that this is not the case with English prosodic focus. However, L1 transfer is shown to have a strong effect on L2 processing.

1.1   Overview of Chapters

- **Chapter 2** offers a review of the current literature on focus, prominence, intonation and in particular presents the variation observed with respect to Germanic and Romance languages

and prosodic focus. There have been a multitude of claims made with regards to this parametric variation, some based on phonology and others on syntax and semantics. One of the main questions addressed in this thesis is concerned with what is driving this parametric variation.

- **Chapter 3** is a study comprised of a series of production experiments, whose main aim is to test whether contextual effects on prosodic prominence are simply caused by low-level processes such as phonological activation (as is the claim central to accessibility theory), or whether it is dependent on a speaker's expressive intention. We contend that accessibility theory cannot explain the data, which show that when a speaker is faced with multiple choices of focus antecedent, their choice is affected by the inclusion of certain adverbs that restrict the interpretation of the focus. Therefore, prosodic focus marking is understood to be an anaphoric phenomenon similar to pronominalization, and necessarily involves some level of semantic interpretation.

- **Chapter 4** consists of a review of the current literature on second language acquisition as it relates to prosodic focus. The main theories addressed in this thesis include the Full Transfer/Full Access theory, the Interface Hypothesis and current hypotheses regarding L2 processing.

- **Chapter 5** presents a study that tests the predictions of the Interface Hypothesis (IH) if extended to apply for prosodic focus. Because we contend that prosodic focus is anaphoric and functions like a pronoun, there is no principled reason why it should not behave similarly to other types of structures at the syntax-discourse interface. However, the results go against the predictions of the IH in that it is shown that high-intermediate learners show native-like judgments with respect to English prosodic focus. In addition to this, proficiency was shown to have a significant effect on the judgments of the learners.

- **Chapter 6** is a two-part study. The first part examines L1 production data from English and Spanish in order to provide the correct characterization of the variation in prosodic focus marking between the two languages. In particular, we compare predictions of phonological-based theories of prosodic focus variation to those of syntactic and semantic theories of prosodic focus. We show that Spanish native speakers do in fact shift prominence away from the rightmost prosodic constituent under certain conditions: namely, when focus serves a corrective function.

  The second part of this study examines L2 data in English and Spanish. Building a hypothesis based on what evidence is available to learners, we predict that English learners of Spanish should have issues deducing the exact conditions of prosodic stress shift in Spanish. Our results are in line with this hypothesis, and show evidence that English speakers are wavering between an English-type grammar which allows prosodic stress shift for all types of focus, and a grammar that (unlike Spanish) disallows all types of stress shift.

- **Chapter 7** examines the processing of prosodic focus by adult learners. Prosodic focus can be used to create expectations for upcoming content in a sentence and English native speakers have been shown to make use of prosodic cues to facilitate processing and predict upcoming material in real time. Given the different conditions on prosodic focus in English and Spanish, Spanish native speakers may not be habituated to certain prosodic cues in English. We show that this is indeed the case: the learners were unable to make use of English prosodic cues online in cases where the prosodic cue would be absent in Spanish.

- **Chapter 8** consolidates the conclusions from the studies of this thesis and summarizes the final conclusions.

Chapter 2

Focus Theory

2.1 What is Focus?

Presume that Amanda, Bruce and Carl wrote an exam and that Amanda and Bruce are discussing the results after the fact. Both of Bruce's replies in (1) are considered true in all possible worlds where Bruce passed the test. This primary meaning is derived from the syntactic composition of the verb and its arguments, tense, and other syntactic elements. However, it can be intuitively felt that each reply is better suited to its own situation, the two differing only in what is focussed within the sentence.

(1) A: How did the exam go? (Rooth 1992)

   B: Well, I [PASSED]$_F$

   B′: Well, [I]$_F$ passed.

In reply B, focus is on the verb. What is implied in this case, assuming the correct intonational contour is present, is that while Bruce passed the test, he did not *ace* the test. In B′, something very different is implied: Bruce passed but the third friend, Carl, did not (and perhaps Amanda did not either, depending on what information is available in the common ground).

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What this example shows is that defining "focus" as a linguistic phenomenon requires the identification of several related but distinct concepts. Focus itself is a component of information structure. One of the first to write about the term, Halliday (1967) describes information structure as constituting a separate "plane" of meaning from constituent structure. According to Halliday, the selection of syntactic constituents is mapped to the information structure of a sentence or clause, "neither determining the other". The semantic composition of syntactic constituents results in an expression that can be evaluated for its truth conditions and the expressions it entails. In contrast, the information structure of a sentence provides secondary, *pragmatic* meaning: it grounds a sentence within the discourse and triggers presuppositions and implicatures. Since Halliday's paper, it has been discovered that the division between compositional semantics and pragmatics may not be as discrete as was originally thought, or at least the line drawn between the two must be moved, since there are now many documented cases where an implicature can affect the truth conditions of a sentence (e.g. Rooth 1992, Sauerland 2012). However, even if we update Halliday's view by allowing that information structure is grammatically encoded, it still can be distinguished from different types of meaning in that it requires the integration of information from a domain higher than the sentence – namely, discourse.

The evaluation of the semantics of focus depends upon an anaphoric relationship in the discourse that is determined by the presence of a syntactic focus operator. Depending on the configuration of the focus operator, focus is expressed by means of acoustic prominence in many languages. However, prominence is not a universal marker of focus, as some languages such as Northern Sotho (a Bantu language) lack prosodic focus-marking altogether (Zerbian 2006, 2015).

2.2   Categories of Focus

Before turning to a more formal analysis of prosodic structure, prominence and the effect of focus on the former two, it is necessary to briefly talk about what kinds of functions focus takes on in

language. This discussion becomes relevant in light of diverse issues: the seeming multiplicity of focus accents and focus-marking strategies across languages.

An important paper on this topic is Kiss (1998), who labels these types "identificational" and "informational" focus. "Identificational" focus has also been termed "contrastive" focus and "informational" focus can likewise be found under a different name, "presentational" focus. Kiss (1998) theorized that identificational focus has a contrastive function, while informational focus simply fills in information gaps, as in response to wh-questions.

(2)   *Identificational Focus*: contrastive function

   A: I heard that John ran a marathon in Seattle.

   B: No, MARY ran a marathon in Seattle.

(3)   *Informational Focus*: information-giving function

   A: Who ran a marathon in Seattle?

   B: MARY ran a marathon in Seattle.

The two types of focus have different semantic interpretations under Kiss's account: identificational focus is exhaustive in nature – all alternative propositions are negated – while informational focus purportedly does not have this same meaning. Gussenhoven (2007) outlines five additional possible types of focus in English (corrective, counterpresuppositional, definitional, contingency and reactivating). However, many semantic accounts of focus do not make a distinction between identificational, informational or any other type of focus, but instead describe the core meaning of focus shared across pragmatic uses (Rooth 1992, Wagner 2005b).

Nevertheless, these distinctions serve well to explain certain focus-marking phenomena across languages. For example, Hungarian exhibits two different methods of marking focus; either the focussed constituent moves to occupy a position preceding the verb, (4a), or it remains in-situ (and is produced with acoustic emphasis), (4b).

(4)   (Kiss 1998, p.247)

        a.   Tegnap este **Marinak** mutattam   be   Pétert.
             last   night Mary.DAT introduced.I PERF Peter.ACC
             "Last night, I introduced MARY$_F$ to Peter."

        b.   Tegnap este be   mutattam   Pétert   **Marinak**.
             last   night PERF introduced.I Peter.ACC Mary.DAT
             "Last night, I introduced MARY$_F$ to Peter."

Kiss's description of Hungarian is that in the first example, focus has an exhaustive meaning (much like if in English, it was said "It was MARY who I introduced to Peter"), but the second example does not. This distinction does not just appear in Hungarian: it has long been observed that Spanish and Italian exhibit word order alternations that depend on the function of focus (Bolinger 1954). Likewise, English marks identificational focus with a different intonational contour than informational focus (Pierrehumbert 1980, Hirschberg and Pierrehumbert 1986, Pierrehumbert and Hirschberg 1990, Watson et al. 2008, Breen et al. 2010).

However, both identificational and informational focus are associated with acoustic prominence in both Spanish and English. If intonation and prominence are taken to constitute two separate phenomena, the distinction between identificational and informational focus becomes less important when only taking acoustic prominence into account. It is true that, in Spanish, the prevailing judgment for most dialects is that focus-driven word order alternations are only suitable in cases of informational focus, but this does not necessarily mean that this is the factor driving syntactic movement. It will be argued later in this thesis that prosodic focus can only be marked in Spanish under certain syntactic conditions, and therefore it could be that word order alternations are simply an alternative strategy to mark focus when the syntactic conditions do not allow stress shift.

2.3 Focus and Prominence

2.3.1 Theories of Prominence Assignment

Every sentence bears a main stress that is acoustically prominent relative to the rest of the sentence. Acoustic prominence is associated with higher values in the amplitude of the sound wave (usually measured as intensity or sound pressure level), higher values in the fundamental frequency (F0) of the wave and greater duration (Ladd 2008). It is assumed in most theories that prosodic structure plays a role in the assignment of prominence within a sentence. Selkirk (1978, 1980a,b, 1981, 1984, 1995) and Nespor and Vogel (1986) formulate prosodic structure in terms of a hierarchy of ordered constituents. For the purposes of this discussion, the differences between each account are unimportant. Here I adopt an abridged version of Nespor and Vogel (1986) where syllables form feet, which form prosodic words, which form phonological phrases, then intonational phrases and entire utterances (see Figure 2.1). Each constituent level contains a head, which is assigned the main prominence within the respective level of structure. For example, Figure 2.1 demonstrates how a transitive sentence may be represented.

In Chomsky and Halle (1968) it was observed that in English, sentential stress is typically attracted to the rightmost constituent of a sentence (although it will be shown that many exceptions exist to this). In terms of the prosodic hierarchy, this is expressed by the fact that both phonological and intonational phrases are right-headed, the consequence of which is the alignment of the main prominence to the rightmost prosodic word (Selkirk 2007, Bocci 2013). At levels lower than the phonological phrase, the rules for headedness are influenced by the lexico-phonological assignment of word-level stress. It is therefore safe to say that these levels of structure do not play a role in determining sentential prominence and do not interface with the syntax. By contrast, Phonological Words, Prosodic Phrases, Intonational Phrases and Prosodic Utterances each possess a syntactic correspondent. Phonological words map to syntactic heads, prosodic phrases map to XPs, intonational phrases map to clauses and prosodic utterances map to syntactic utterances
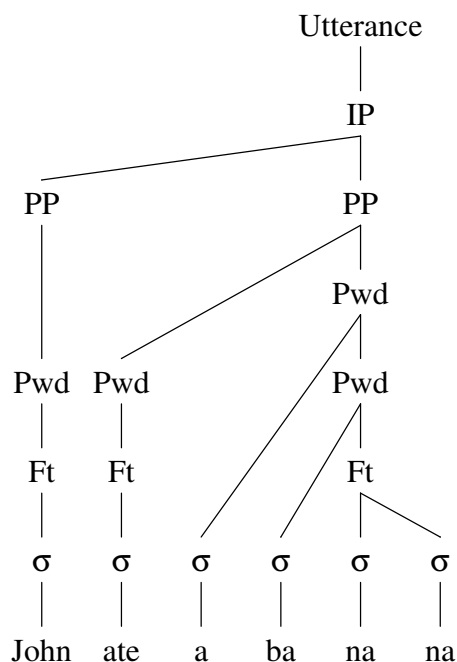
Figure 2.1: The Prosodic Hierarchy Illustrated

(Truckenbrodt 1995). In the sentence in Figure 2.1, the main sentential prominence is realized on the most deeply embedded prosodic head, which falls within the rightmost PWd. The location of this prominence within the PWd is determined by the stress pattern of this word – in this case, it is the first *na* in *banana*, which constitutes the head syllable of the head foot of the PWd, as determined by the rules for word-level stress.

In Romance languages such as Spanish and French, it is possible to say that the default headedness of prosodic phrases and higher prosodic constituents is assigned simply through directionality (Bocci 2013). In French, for example, the highest sentential prominence falls consistently on the final element in the sentence, regardless of syntactic structure (leaving aside the effects of information structure). The sentences in (5a) and (5c) exhibit sentence-final prominence. However, Germanic languages operate somewhat differently, presenting a problem for a simple theory of prominence assignment dependent solely on directionality of prosodic headedness. In (5b) and (5d), it is the direct object that bears the main sentential prominence in English, even though it is

not the rightmost constituent (Rizzi 1997, Zubizarreta 1998, Wagner 2005b, Ladd 2008).

(5)   a.   Jean a   mangé une banane HIER.
             John has eaten a   banana yesterday
       b.   John ate a BANANA yesterday

       c.   Jean avait des   courses à FAIRE.
             John had   some shopping to do
       d.   John had some SHOPPING to do.

German shows a similar pattern. The language possesses both pre- and postpositions, and shows different stress patterns in PPs depending on the location of the argument: main prominence always aligns with the noun, regardless of whether it precedes or follows the adpositional head.

(6)   a.   auf den TISCH
             onto the table

       b.   durch   das ZIMMER
             through the room

       c.   den FLUSS entlang
             the river   along
             "along the river"

       d.   den BURG   hinauf
             the mountain up
             "up the mountain"

       (Cinque 1993, p.250)

In response to this, Cinque (1993) argues that sentential prominence is determined by the syntax. His Null Stress Theory (NST) assigns the main sentential stress to the most deeply embedded syntactic constituent. In (5b), the most deeply embedded syntactic constituent is the direct object, *banana*, since the adverbial phrase is a VP modifier[1]. In (5d), the most deeply embedded constituent is the object of the small clause, *shopping*. The NST also works to explain the German

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[1]Later in the paper, Cinque adopts the representation of VP modification from Larson (1988). Under this representation, the adverb is asymmetrically c-commanded by the verb, a fact which becomes relevant in light of Zubizarreta's analysis, discussed in later paragraphs.

```
                                    IP
                          ╱                    ╲
                      DP                          VP
                       │                    ╱          ╲
                    John                  V̄              AdvP
                                     ╱        ╲            │
                                   V             DP      yesterday
                                   │             │
                                  ate           ╱╲
                                              ╱    ╲
                                            a banana
```

Level 1: [*   *   *   *]$_{IP}$

Level 2:   [*   *   *]$_{VP}$

Level 3:   [*   ]$_{DP}$
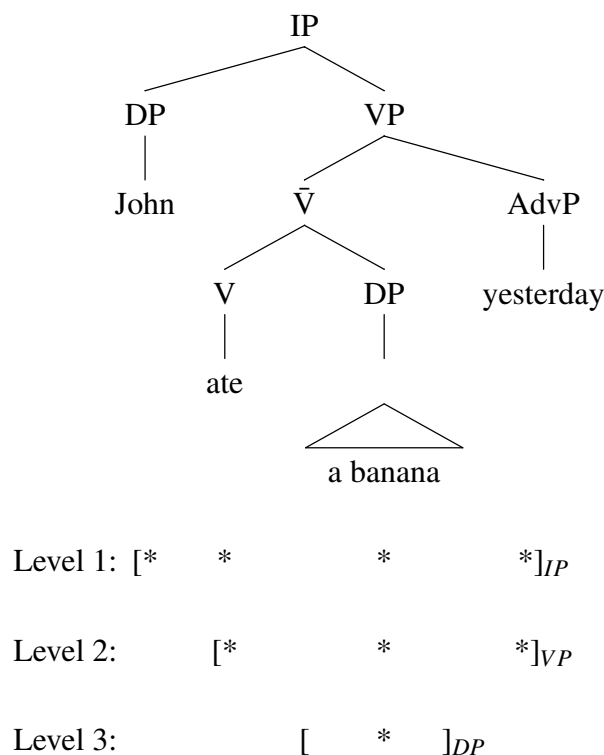
Figure 2.2: Null Stress Theory – embeddedness and prominence

examples in (6): the noun is the most deeply embedded constituent in the phrase. What is more, this observation has also been made in regards to object prominence in German and in other verb-final languages belonging to other language families, all of which place main sentential prominence on the pre-verbal object, not on the rightmost prosodic head (Dezsö 1977, Kim 1988).

The NST does not make use of the prosodic hierarchy in order to assign stress in a sentence. Instead, stress is assigned in a metrical grid (c.f. Liberman 1975, Halle and Vergnaud 1987). Each level of the syntax is assigned a line in the grid. The head of each phrase is assigned a stress-mark, *, at the highest level. Then the head of each phrase in the level below is assigned a mark. This process occurs cyclically down to the lowest level. The result is that the most deeply embedded constituent receives the most stress-marks, and this indicates the main sentential prominence. This cyclical algorithm is illustrated in Figure 2.2.

However, the NST cannot explain the French data in (5a) and (5c), and the behaviour of Romance languages in general, at least if it is to be assumed that the syntactic structure is identical to English in these examples. The solution proposed in Zubizarreta (1998) is to posit two separate rules for assigning sentential ("nuclear") stress.

(7)   Nuclear Stress Assignment Rules (Zubizarreta 1998)

    a.   *S-NSR:* Given two sister categories C_i and C_j, if C_i and C_j are selectionally ordered, the one lower in the selectional ordering is more prominent.

    b.   *C-NSR:* Given two sister categories C_i and C_j, the one lower in the asymmetric c-command ordering is more prominent

The selectional nuclear stress rule (S-NSR) is based upon selectional chains, a method of describing argument structure (Hale and Keyser 1991, 1993, Chomsky 1993). Selectional chains are ordered chains of syntactic categories, and the lowest category in a selectional chain corresponds to the concept of embeddedness seen in the NST. For example, in a selectional chain for a transitive verb, the lowest selectional category is the direct object. The concept of selectional categories encompasses more than just the most deeply embedded constituent. It also creates predictions for intransitive predicates: in unaccusative predicates, the subject is selected by the verb and therefore is the lowest in the selectional ordering. In unergatives, the subject selects the verb. This predicts that prominence should fall on the subject in unaccusatives and on the verb for unergatives, which is basically what occurs in English (except that stress is optional in the case of unergatives).

(8)   "What happened?"

    a.   JOHN arrived.

    b.   John SANG./JOHN sang.

The categorical nuclear stress rule (C-NSR), by contrast, is not sensitive to argument structure. The direct object will be assigned the main prominence in a transitive sentence simply because it con-

stitutes the lowest category, asymmetrically c-commanded by the verb. In intransitive sentences, regardless of argument structure, the verb, asymmetrically c-commanded by the subject, will receive the main prominence. Zubizarreta generalizes the prosodic behaviour of Spanish, French and Italian by stating that the C-NSR is the only stress assignment rule that applies in these languages. It is for this reason, for example, that French does not show the same alternation as in English, (8). That is to say, prominence must always fall on intransitive verbs in broad-focussed contexts:

(9)   "Qu'est-ce qui s'est passé?" (*What happened?*)

    a.   Jean est ARRIVÉ. / *JEAN est arrivé
         John is arrived   John   is   arrived

    b.   Jean a   CHANTÉ / *JEAN a   chanté
         John has sung   John   has sung

The same observation cannot be made for Spanish and Italian, simply because these languages preserve the base-generated ordering with respect to intransitives; the subject occurring post-verbally with unaccusatives (Burzio 1986):

(10)   a.   *Spanish – "What happened?"*

           (i)   Juan grió.
                John cried

           (ii)   Vino   Juan.
                arrived John

     b.   *Italian – "What happened?"*

           (i)   Giovanni telefona.
                John   telephoned

           (ii)   Arriva Giovanni.
                arrived John

    The basis of the parametric variation between Germanic and Romance according to Zubizarreta (1998) is thus that the S-NSR is said to only apply in Germanic. This means that prominence in these languages can be assigned based either on selectionally ordered chains or based on the

asymmetrical c-command relation. This serves to explain the data in (5) and (6): verbal and prepositional arguments constitute the lowest elements in the selectional chain and therefore receive the main prominence in English and German. In contrast, a sentence-final adverb will receive main prominence in French because (according to the Larson (1988) analysis of VP modifiers) the adverb is asymmetrically c-commanded by the verb.

However, since the main sentential prominence so systematically lands at the end of the sentence in Romance, it is impossible to find an example to prove that the NSR is applying at all in these languages. Since there is no justification for the involvement of such computational complexity in an analysis of Romance nuclear stress, a slight modification to the NSR is proposed in Zubizarreta and Vergnaud (2005), wherein the authors reformulate the generalization on Germanic and Romance[2] as the following:

(11)   A [prosodic] system in which a focused phrase is not systematically flanked by a prosodic boundary computes prominence in terms of the syntactic notion of 'lowest,' rather than in terms of its phonological counterpart, namely the notion of 'rightmost'.

The constraint makes reference to a focussed phrase, which is a concept not yet addressed here. However, the consequence of this constraint is that Germanic, which will be shown to employ a system in which a prosodic boundary is not necessary following a focussed phrase, computes prominence using the NSR (both selectional and categorical) while Romance never makes use of syntactic structure to determine sentential stress – using instead prosodic structure. This is still to say that in Romance, a direct mapping exists between prosodic structures and syntactic ones (prosodic phrase to XP, prosodic word to X^o, etc.), but the headedness of non-lexically determined prosodic structures is assigned solely by the 'rightmost' rule.

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[2]In Zubizarreta and Vergnaud (2005) it is additionally shown that Bengali functions similarly to Romance.

2.3.2 Focus Phrases and Prominence

Up to this point, I have mostly discussed cases of prominence assignment under default conditions, when the entire sentence is broadly focussed, or is uttered "out of the blue". English and Spanish differ in how default prominence is assigned, a detail which is captured satisfactorily by the generalization in (11). However, Zubizarreta and Vergnaud's description of prosodic typology requires knowledge of how a particular language marks focus.

Focus and prominence are linked in a fundamental way that has been described by Truckenbrodt (1995) using a rule that associates the highest prominence within a domain with the focussed element. The rule states that within a focus domain, the greatest prominence must fall within the focussed constituent contained by the domain[3]. The domain of focus is defined as the semantic scope of the focus; Truckenbrodt cites Rooth (1992) in this regard.

(12)   Focus: If F is a focus [phrase] and DF is its domain, then the highest prominence in DF
          will be within F (Truckenbrodt 1995, p.160)

A focus phrase is an F-marked phrase, the F-mark notation first employed by Jackendoff (1972): an F-mark is a subscript assigned to a syntactic phrase during syntactic derivation. Whatever is F-marked in a sentence is determined by semantic and pragmatic constraints: the F-marking must be licensed by a relevant focus antecedent.

Romance languages were already shown to differ from Germanic in how the main prominence is assigned in the sentence: Germanic languages assign the main prominence within a phrase to arguments of heads. It is for this reason that in English and other related languages, the direct object and the object of adpositions receive higher relative prominence in relation to their heads – regardless of linear order – in cases that do not interact with F-marking. Romance languages do not assign prominence based on syntactic structure, but on prosodic structure alone. When choosing between two elements within a prosodic phrase, it is always the rightmost element that is as-

---

[3]This rule does not apply in languages that do not employ prominence for focus-marking, such as Northern Sotho.

```
                    Utterance
                        |
                       IP
                      /  \
                   PP      PP
                   |      /  \
                JOHN_F   ate a banana
```
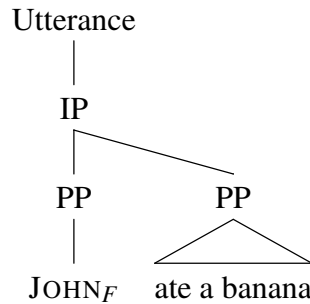
Figure 2.3: Shifting the Prosodic Head – Subject Focus in English

```
                    Utterance
                   /        \
                 IP          IP
                 |           |
                PP          PP
                 |         /  \
              JEAN_F    a mangé une banane
```
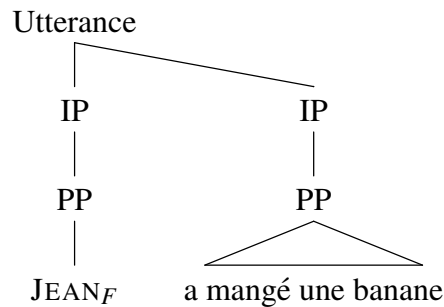
Figure 2.4: Insertion of Intonational Phrase Boundary – Subject Focus in French

signed greater relative prominence. Zubizarreta and Vergnaud (2005) predict that this occurs in all languages which obligatorily insert a prosodic boundary following a focus phrase[4]. Germanic languages do not require an intonational phrase boundary following the focus phrase. Instead, when a non-rightmost element is F-marked, the head of the intonational phrase shifts to the F-marked phrase, as in Figure 2.3. In Romance, however, placing narrow focus on the subject requires a new intonational phrase to be inserted – see the French example in Figure 2.4.

Thus, French subject focus forces a second intonational phrase to be constructed around the predicate to avoid moving the prosodic head within the intonational phrase. Boundary placement also occurs in Spanish and Italian (Bocci 2013). However, with subject focus, boundary placement is sometimes not necessary because of a well-known syntactic process that occurs in these languages. When there is narrow focus on the subject, the subject is often found in a non-canonical

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[4]I interpret "prosodic boundary" to mean the right edge of an intonational phrase.

position, at the right edge of the sentence (Bolinger 1954, Zubizarreta 1998, Belletti 2000, Hualde et al. 2012, Domínguez 2013).

(13)   *Spanish* (Lozano 2006)

    A: ¿Quién gritó anoche en la calle?

         "Who shouted last night in the street?"

    B: #[Una MUJER]$_F$ gritó
        a   woman   shouted

    B′: Gritó   [una MUJER]$_F$
        shouted a   woman

(14)   *Italian* (Belletti et al. 2007)

    A: Chi parlerá?

         "Who will talk?"

    B: #[GIANNI]$_F$ parlerá
        Gianni   will.talk

    B′: Parlerá [GIANNI]$_F$
        will.talk Gianni

This naturally preserves the position of the head within the intonational phrase as the focused constituent consequently aligns with the rightmost prosodic head, as is illustrated in Figure 2.5. In Zubizarreta (1998), this movement is said to be instigated by prosodic constraints. Termed *p-movement*, the movement of the defocalized (non-F-marked) material leftward leaves the F-marked material in a position which is prosodically strong. Büring (2010) probes this idea:

> "[H]ow could [prosody-driven word-order alternations] be implemented? Given that FocusProminence [i.e. Truckenbrodt's constraint] makes reference to prosodic struc-ture. . . does this mean that marked constituent order is established only after prosodic structure is built. . . ? . . . Alternatively, one can reverse the causal chain and claim that each syntactic structure, canonical or inverted, is associated with the set of its possible

```
                          Utterance
                              |
                              IP
                        _____/|
                       /       |
                     PP        PP
                    /\          |
                   /  \         |
           Se comió una banana  JUAN_F
```
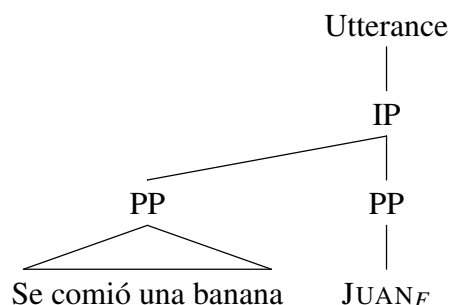
Figure 2.5: Subject Focus in Spanish

focus markings [à la Reinhart (2006)]."

It is clear from Zubizarreta (1998) and Zubizarreta and Vergnaud (2005) that *p-movement* is meant to be driven by the former implementation: under their formulation, prosodic structure is visible to narrow syntax. However, according to the Minimalist Program (Chomsky 1993, 2005), prosodic structure, belonging to PF, is built after spell-out. López (2009, p.180-181) argues that having prosodic structure influence the syntactic derivation violates core syntactic principles: the derivation, affecting c-command relations, must occur in the narrow (pre-PF) syntax, but must also look ahead past spell-out to incorporate information about the prosodic structure. A purely syntactic analysis of focus movement in Spanish is offered in López (2009) (and a multitude of other syntactic analyses exist—a brief review can be found in Ortega-Santos (2013, p.113)), although it also bears mentioning that some syntacticians are beginning to revise the assumption that prosody cannot affect derivations within narrow syntax—for example, Contiguity Theory (Richards 2010, 2014). Additionally, the problem of look-ahead is moot if an alternative architecture of the grammar is assumed, such the tripartite parallel model in Jackendoff (1997, 2002, p.126), in which phonological, syntactic and semantic structure is derived simultaneously.

Despite the apparent differences between Germanic and Romance, it must be stated that any notion that Romance languages lack prosodic focus marking altogether is false. Experimental data in Jun and Fougeron (2000), Face (2002) and Bocci (2013) found clear evidence for contrastive

focus marking in French, Spanish and Italian respectively. All three papers provide contexts where focus prominence does not fall on the default (rightmost) prosodic head but instead, the main stress is shifted away from the right edge of the sentence. This sort of evidence provides a problem for the p-movement account, particularly the formulation in Büring (2010), from which it might be concluded that Italian and Spanish possess a rigid prosodic structure that is unable to accommodate stress shift (therefore forcing syntactic movement). At the very least, such rigidity cannot be an inviolable constraint in the grammar. The version of p-movement in Zubizarreta (1998) is less strong in that it involves stipulating that p-movement only applies in certain cases. In fact, Zubizarreta (also, Ladd (2008)) asserts that prosodic focus marking in-situ only occurs in particular cases in Spanish: When some correction is being given. For example, p-movement is not considered pragmatically suitable in (15) (compare to (13)); instead, the intuition in Zubizarreta (1998) is that the focussed constituent is left in-situ and receives a contrastive accent.

(15)   A: Un hombre gritó anoche en la calle.

              "A man shouted in the street last night."

         B: No, [una MUJER]$_F$ gritó.
              no a   woman   shouted

         B′: #No, gritó   [una MUJER]$_F$.
              no shouted a   woman
              "No, a WOMAN shouted."

This observation with respect to the corrective nature of Spanish (in-situ) prosodic focus will become important again in later chapters.

2.3.3   Focus Projection and Givenness Reduction

Focus applies to prosodic phrases, which always align with some syntactic constituent. For example, in (16), the F-marked phrase is a DP. The domain, or scope of focus is at the level of the clause. The rule in (12) will dictate that the highest prominence in the sentence will fall within this

F-marked DP. As for which word within the DP gets main prominence, main stress is determined by the prosodic head, which is *cat* in this case.

(16)   A: What did Mary see?

   B: [Mary saw [a CAT]$_F$]$_{DF}$

In (17), the size of the F-marked phrase is considerably bigger, encompassing an entire clause. However, the prominence assignment rule assigns prominence to the same constituent as in (16).

(17)   A: What happened in the alley?

   B: [[Mary saw a CAT]$_F$]$_{DF}$

A similar pattern appears in (18), where the subject is F-marked in both B and B′. In both cases, the prosodic head of the F-marked phrase is aligned with the main sentential stress – always the rightmost PWd of the F-marked phrase.

(18)   A: Who saw the cat?

   B: [MARY]$_F$ saw the cat.

   B′:   [A very frightened young STUDENT]$_F$ saw the cat.

Selkirk (1995) calls this phenomenon focus projection, and argues that the sentence in (19) is ambiguous as to its focus structure – the various options for interpretation are below it.

(19)   Mary bought a book about BATS.

   a.   *What did Mary buy a book about?*

      Mary bought a book about [BATS]$_F$.

   b.   *What kind of book did Mary buy?*

      Mary bought a book [about BATS]$_F$.

   c.   *What did Mary buy?*

      Mary bought [a book about BATS]$_F$.

    d.   *What did Mary do?*

        Mary [bought a book about BATS]$_F$.

    e.   *What happened in the bookstore?*

        [Mary bought a book about BATS]$_F$.

Even though the size of the focus phrase varies in each example, Selkirk claims that the phonological representation is identical – and hence its phonetic realization. However, there is some evidence that this is false. In a production study in Breen et al. (2010) it was found that a phrase-final word in broad focus – for example *bats* in (19e) – received less prominence than if it was under narrow focus – (19a). In fact, a word under narrow focus showed a sharper rise in F0 which the authors said indicated that the material preceding was reduced in pitch. Therefore, it seems that Truckenbrodt's and Selkirk's combined theories are incomplete in describing the phonological realization of focus. In addition to assigning the main sentential prominence to the head of a focus phrase, whatever non-F-marked material is in the domain of focus is phonologically reduced.

In order to present a refined theory of phonological reduction, one must appeal to the notion of givenness, which is formalized in Schwarzschild (1999). Givenness is taken to be a property defined by an entailment relation between elements in the discourse – or a coreference relation in certain relevant cases. See (20) for the formal definition.

(20)   *Definition of* GIVEN (Schwarzschild 1999, p.151):

        An utterance U counts as GIVEN iff it has a salient antecedent A and

    a.   if U is type e, then A and U corefer;

    b.   otherwise: modulo ∃-type shifting, A entails the Existential F-Closure of U.

The upshot of this definition is that pronouns with salient antecedents count as given, (21a), as do previously mentioned referents like *apples* in (21b); even referents with previously mentioned meronyms as in (21c). Indeed, the intuition for these sentences is that each respective given con-

stituent should be prosodically reduced.

(21)   a.   John$_i$ is a hard worker. The company is likely to promote [him$_i$]$_G$.

           b.   John likes green apples. Conversely, Mary likes red [apples]$_G$.

           c.   John bought a house in Winnipeg. I didn't even know he was moving to [Manitoba]$_G$.

Bader (2001) formulates a constraint based on this intuition which in essence dictates that given material should not bear prominence (*GÍVEN). However, his conclusions lead him even further than simply positing the reduction of given material, as he argues that F-marking can be done away with altogether in favour of a givenness account. This seems at first a logical step to take, as givenness-marking seems to simply be the direct inverse of focus-marking with the added benefit that prosodic reduction can account for the phonetic differences between narrow and broad focus. Indeed, an analysis with a similar conclusion is presented in Sauerland (2005). There are theoretical reasons why this is not the correct approach (tackled in the following section), but on an even more basic level, it has still not even been decided whether givenness as a discourse feature has a universal effect on prominence across languages.

Quite simply, there are conflicting hypotheses and evidence as to whether givenness triggers prosodic reduction in Romance languages as it does in English and other Germanic languages. Zubizarreta (1998) claims that "anaphoric" (given) material in English, German and French is metrically invisible – and consequently, prosodically reduced – while it is metrically visible in Italian and Spanish (and therefore cannot undergo prosodic reduction). The analysis in Bader (2001) depends on a process of deaccentuation occurring in Italian, while Bocci and Avesani (2008) and Bocci (2013) claim that deaccentuation does not occur in Italian – previous analyses are said to mistake a low postfocal intonational target, L*, for a true instance of prosodic reduction. However, the claim that given material receives low pitch accents is contradicted by experimental findings in Swerts et al. (2002), who report that given material in Italian possesses the same intonational contour as non-given material. Unfortunately, the study does not measure other acoustic correlates

of prominence (duration, intensity). Similar data to Swerts et al. (2002) is reported for Spanish in van Maastricht et al. (2015), while Cruttenden (2006) reports that givenness reduction does occur in French and Spanish, albeit non-systematically. To generalize what has been found in various studies, it seems that if prosodic reduction is to be defined by a flattening of the pitch contour, it does not occur in Spanish and Italian. However, if prosodic reduction involves other acoustic values such as duration and intensity (Watson et al. 2008), the question has yet to be tested in Spanish and Italian (later I will discuss experimental findings in French (vander Klok et al. 2014)).

2.3.4   Intonation versus Prominence: Pitch Accents and Other Phenomena

Focus is marked by prominence, usually accompanied by all three acoustic cues (pitch, duration, intensity), but Watson et al. (2008), among others, suggests pitch/F0 may be an independent feature from duration and intensity in that it can express its own meaning. For example, questions in (North) American English are associated with a sentence-final rise in pitch, and this is expressed by a pitch accent with a low target, L*, followed by a high intermediate phrase tone, H- and a high intonational phrase boundary tone, H%.

(22)   Are legumes a good source of vitamins?
                                     L* H-   H%

Pierrehumbert and Hirschberg (1990) identify an inventory of American English intonational contours based on pitch accents and boundary tones (using the system of description developed in Pierrehumbert (1980)). Perhaps the most common type of pitch accent is the H* accent, associated with informational focus and "new" material in a discourse. The H* accent is defined by a high target with no sharp rise or fall before or after the accent. Consider (23), a sentence uttered out of the blue:

(23)   George likes pie.
         H*   H*

Identificational/contrastive focus is marked using a different pitch accent, the L+H*. This accent differs from H* in that it begins low, sharply rising to the high target.

(24) a. Mary likes pie ...

No, GEORGE likes pie.
      L+H*

Another intonational contour that has received much attention is what has been called the fall-rise contour[5], which is often used to express uncertainty in partial answers (Ward and Hirschberg 1985, Büring 1997). It is associated with a low pitch target followed by a rise, fall and rise to a high boundary tone. In (25), speaker B is only certain that Bill has one daughter and does not know whether he has other children.

(25) A: How many sons and daughters does Bill have?

B: He has a GIRL.
         L*+H L H%

Although a pitch accent obligatorily co-occurs with prominence, and therefore could be said to constitute a cue for focus, the actual tonal shape of the accent generates implicatures beyond the focus presupposition, and therefore is somewhat independent. One example of this in English would be with L* pitch accents – those with low tonal targets – which in *orange juice* indicates the first item of a list. The constituent is produced with a low F0, even if it is focussed, showing that prominence is not invariably associated with a high pitch.

(26) A: What does little Johnny like to drink?

B: He likes ORANGE JUICE$_F$ and APPLE JUICE$_F$.
         L*   H*   L-   L%

The disunion of prominence and intonation is also exemplified in French, in which the pitch accent does not necessarily align with the main stress of a prosodic domain. In fact, although main prominence is realized word-finally in French – duration and intensity being the strongest cues – a

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[5]Although it more accurately should be called the rise-fall-rise contour.

contrastive accent[6] is often realized *before* the final syllable; in fact, it is often associated with the first syllable of a word (Jun and Fougeron 2000). In (27), although the final syllable of *macarons* receives prominence, it is the first syllable that is associated with the high pitch target.

(27)   A: Marie aime les tartes.
             Mary loves DET pies
             "Mary loves pie."

        B: Non, c'est les macaRONS qu'elle aime.
                                  H*+L
             no   it.is DET macarons that.she loves

             "No, she loves maracons."

Spanish contrastive pitch accents are discussed in Face (2002). The inventory is similar to English: L+H* and L*+H are the two most common pitch accents used to mark contrastive focus in Spanish.[7] The study only tests the Spanish of Madrid and therefore dialectical variation is possible. O'Rourke (2012) asserts a certain degree of variation in intonational patterns occurs across Spanish dialects, but her review suggests that the variation is mostly found in the intonation of interrogatives and declaratives, not in the realization of contrastive pitch accents. With respect to Spanish informational focus, Face (2000) reports that there is no consistent pitch correlate in Madrid Spanish, nor was informational focus measured to be prominent in terms of duration and intensity[8]. This finding contrasted with previous findings in Toledo (1989), who reported that higher intensity is consistently present with informational focus in the Spanish of Buenos Aires. Similar to French, a pitch accent in Spanish can sometimes occur "early" (i.e. not aligned with the stressed syllable of a word): This is referred to as *early peak alignment* in Face (2001).

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[6]French employs H*-L most frequently in contrastive focus; this contour is never used in English for the same purpose.

[7]Additionally, intermediate high and low boundaries, L- and H-, are found immediately following a focussed word.

[8]As yet I am unable to get a copy of this publication, and so I do not know if Face (2000) investigated word order alternations, since this is presumably the dominant method of marking informational focus in Madrid Spanish.

2.4 Focus, Syntax and Meaning

2.4.1 Focus in the Syntax

Bader (2001) proposed an account of sentence prosody that did away with F-marking altogether in favour of a givenness account. Leaving aside the debate as to whether givenness even applies to the prosody in Romance, there are purely theoretical arguments against a solely givenness-based account. Firstly, it is difficult to determine what is given in a sentence without determining what is focussed. Schwarzschild's formal definition of givenness requires the semantic operation of Existential F-Closure, which involves replacing F-marked material with a variable, the resulting expression transformed to a proposition through existential type-shifting:

(28)   Mary bought a book about [BATS]$_F$

       F-Closure: $\exists x$ [Mary bought a book about *x*]

The F-Closure of the sentence in (28) is in effect similar to what Jackendoff (1972) termed a focus presupposition – a presupposition that must be salient in the discourse in order to license a particular focus configuration. If focus is on *bats*, it must have been presupposed that Mary bought a book about *something*.

    Another good reason not to do away with F-marking is that a givenness-only account ignores the idea of contrastiveness in a discourse. This point was raised in Wagner (2006), where can be found the following example:

(29)   Mary's uncle, who produces high-end convertibles, is coming to her wedding. I wonder what he brought as a present.

      a.   He brought a CHEAP convertible.

      b.   #He brought a RED convertible.

      c.   He brought a red CONVERTIBLE.

When *cheap* is used to modify *convertible* in (29a), it is most naturally produced with greater prominence relative to the following noun, *convertible*. This fact could be potentially explained by solely appealing to givenness, since *convertible* is given and *cheap* is not. However, by that logic, the sentence in (29b) should also sound correct but in fact it sounds unnatural to shift prominence to the adjective in this case. Even though *red* is not given, there is no salient element in the discourse with which it is contrastive. *Cheap*, on the other hand, contrasts with *high-end* and therefore can receive prominence.

To understand the concept of contrastiveness, one must first appeal to the theory of alternative semantics[9] (Rooth 1985, von Stechow 1991, Rooth 1992). According to this theory, focus is characterized by the evocation of a set of relevant alternatives. This alternative set must be properly accommodated by the discourse in that an element belonging to it must be salient. Wagner (2005a) extends this further by proposing that the alternative set contains only relevant, contrastive alternatives: *Cheap* is a relevant alternative to *high-end*; *red* is not.

In Rooth (1992), prosodic focus functions by means of a silent operator, $\sim$[10], which combines with the focus presupposition to produce the set of alternatives. Here we can nicely tie Truckenbrodt's prominence rule back into the equation, as Truckenbrodt's domain of focus (DF) was directly based on Rooth (1992) in that it corresponds to whatever is in the scope of $\sim$. Whatever is F-marked in the scope of $\sim$ will receive the main prominence within $\sim$'s domain.

2.4.2 Cleft Constructions

In addition to the assignment of acoustic prominence through stress shift and syntactic movement, English and Spanish sometimes employ alternative means of focus marking. Cleft constructions are one such strategy, and although they mark focus, their use is pragmatically marked as they

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[9]As stated by Rooth (1992), the term *alternative semantics* bears primary stress on *alternative*, since it is a theory of semantics involving alternatives, and not a theory of semantics that *is* alternative (i.e. non-standard).

[10]Pronounced "squiggle".

require an additional presupposition. In terms of the syntax, clefting involves what resembles a relative clause extraction; the resulting DP is the verbal complement of an expletive pronoun (English) or a null pronoun (Spanish). The extracted constituent is under under focus in most cases.

(30) a. It was [∼ [MARY$_i$ [that Bill saw t$_i$]]]

  b. *pro* fue [∼ [MARÍA$_i$ [la que Bill vio t$_i$]]]
      was   Maria   which Bill saw
    "It was Maria who Bill saw"

Clefting places the focussed constituent at a clausal boundary, a structurally prominent position. The use of cleft constructions is pragmatically constrained, however. Kiss (1998) proposes that the type of focus marked in a cleft construction is of a specific category which she names *identificational* focus, which differs from the *informational* focus seen in wh-question contexts in that it has an exhaustive meaning. Büring and Križ (2013) further refine this semantic analysis. First they provide a background that shows that the exhaustivity in clefts is not asserted, simply presupposed. In (31), a presupposition of exhaustivity is constructed in the question in A, and a cleft construction seems suitable. When an exhaustive presupposition is not possible, as in (32), a cleft construction is not felicitous.

(31) a. A: I know that one person passed the test. Do you know who?

  b. B: It was MARY who passed the test.

  c. B′: MARY passed.

(32) a. A: I know that five people passed the test. Do you know who?

  b. B: #It was MARY who passed (but I don't know who else).

  c. B′: MARY passed (but I don't know who else).

The additional presupposition required for cleft constructions means that it is a marked construc-
tion and dispreferred in contexts that are incompatible with the exhaustive presupposition. In sim-
ple wh-question-answer contexts, a cleft construction seems unsuitable when no additional context
is given, as in (33).

(33)   a.   A: Who is swimming?

         b.   B: The DUCKS are swimming.

         c.   B′: ??It's the DUCKS who are swimming.

The semantics of cleft sentences will become relevant later in the thesis when examining judg-
ment data from learners. The fact that it is a focus-marking strategy that exists in both English
and Spanish means that it can provide a control condition when examining the comprehension of
prosodic focus in English by Spanish learners.

2.4.3   Constraints on the Focus Operator: The Scope Hypothesis

In English, it is the case that a constituent of almost any size can serve as a focus phrase, and
similarly the semantic scope of focus can occur at many different levels in the structure. Along
with the size of the focus phrase varying, the domain of focus varies according to the scope of $\sim$,
which can take broad or narrow scope in English. However, it has been hypothesized that the scope
of the focus operator is restricted in certain languages, such as French. vander Klok et al. (2014)
put forth a hypothesis to explain the parametric difference between English and French. This is
termed the "Scope Hypothesis" and goes thusly:

(34)   *Scope Hypothesis:* In French, $\sim$ must scope over the root clause, while in English, $\sim$ can
         attach at embedded nodes

Because many of the features of focus-marking in French are often attributed to Romance lan-
guages in general, the next logical step is to extend this hypothesis to cover other Romance lan-

guages, such as Spanish. As yet, the only experimental work done on Spanish prosodic focus has looked at examples of corrective focus, which excludes cases where $\sim$ is embedded within the sentence (e.g. Face 2002)[11].

In cases of corrective focus, the prosodic focus operator takes wide scope over an entire speech act, because the utterance is being put in contrast with a previous speech act. While the Scope Hypothesis is a syntactic theory regarding restrictions on scope of the operator, a hypothesis with almost identical predictions can be found in Ladd (2008), which is a semantic theory regarding the interpretation of the operator. Ladd (2008) characterizes the Romance-Germanic variation by the fact that Romance only allows corrective focus to be marked prosodically, which would mean that the interpretation of the focus operator is restricted in Romance to this type of meaning. This distinction will become important when examining the production data of chapter 6.

2.4.4 Small Focus Domains – Alternative to Scope Hypothesis

In contrast to the Scope Hypothesis, there are several papers in support of a different explanation for the seeming lack of stress shift in Romance. Féry (2001, 2013) and Hamlaoui et al. (2012) all argue in favour of a prosodic explanation instead of a syntactic one. The argument is related to previous discussion of focus prominence: recall that Zubizarreta (1998) argued that in Romance languages, an intonational boundary must be inserted following a focussed phrase. However, when the focus domain aligns to a syntactic constituent smaller than the clause – DPs for example – there arises a problem. The insertion of an intonational boundary within a DP is considered a violation of phonological phrasing rules (Nespor and Vogel 1986).

Consider the "farmer sentence" that was discussed in (6). The prosodic structure of this sentence is illustrated in Figure 6.1. Because it contains two focussed phrases, the sentence is divided into two intonational phrases to accommodate the two pitch accents. Both occurrences of focus

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[11]This is also the case for Italian (e.g. Bocci 2013).

require the shifting of the prosodic head within the prosodic phrase.

Indeed, lack of deaccentuation within the DP was found for French (Hamlaoui et al. 2012), Spanish (van Maastricht et al. 2015) and Italian (Swerts et al. 2002), all of which tested noun-adjective combinations and found that given adjectives had the same intonational contour as non-given adjectives. Nevertheless, examples still exist in the literature of stress shift within prosodic phrases. For example, (35) illustrates the *only* way focus can be expressed in Italian with respect to pre-nominal material (Samek-Lodovici 2005, Büring 2010). The numeral cannot be moved to the right edge; stress is instead shifted away from the rightmost constituent:

(35)   A: *How many sandwiches will you eat?/Will you eat two sandwiches?*

         B: Mangera TRE$_F$ panini.
              eat.FUT   three sandwiches
              "I will eat three$_F$ sandwiches."

         B′: *Mangera panini TRE$_F$

And of course, as mentioned before, vander Klok et al. (2014) offer experimental evidence that shows prominence shifted away from the sentence end. The main acoustic cue that was used was intensity, which had not been tested in many similar studies (e.g. Swerts et al. 2002, van Maastricht et al. 2015). In other words, *salade* is produced with greater intensity than *froide* in the following example:

(36)   A: Pour le piquenique, Jean apportera une soupe froide.
              for   the picnic   John will.bring a   soup cold
              "For the picnic, John will bring a cold soup."

         B: Non, il apportera une SALADE$_F$ froide.
              no   he will.bring a   salad   cold
              "No, he will bring a cold salad."

The authors found a smaller effect for pitch, but interestingly, although *salade* was produced with greater duration, European French speakers did not produce *froide* with a reduced duration com-
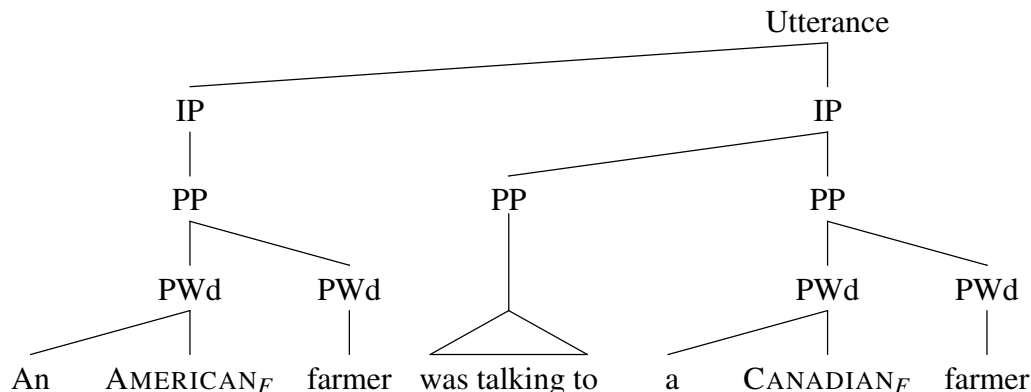
Figure 2.6: Prosodic Structure of the "Farmer Sentence"

pared to contexts where it was non-given. The duration result offers some support to the claim that Romance disallows prosodic givenness reduction. However, the relative prominence difference between the two constituents found on all measures negates claims that the prosodic head cannot be moved within the domain of the prosodic phrase. Indeed, this raises the question of whether the same would be found in Spanish or Italian, for which relative prominence within prosodic phrases has not yet been investigated.

2.4.5 Anaphoricity and Cataphoricity of Focus

It is implied by the general premises introduced in the previous sections that a theory of focus cannot function without the idea of anaphoricity. The anaphoric nature of focus has long been a key assumption in the linguistics literature (Bolinger 1965, Chomsky and Halle 1968, Chomsky 1969, Jackendoff 1972). It has been similarly embraced in the psycholinguistics literature, beginning with studies that showed that new words received greater prominence than old words in a discourse – paralleling the distribution of pronouns (e.g. Fowler and Housum 1987). However, unlike psycholinguistic approaches to focus, I adopt a more formal definition of anaphoricity that is determined by compositional semantics (Klassen and Wagner 2015). To reiterate this theory, prosodic focus involves the silent operator ∼ (Rooth 1992). Inserting ∼ into the syntax requires a

salient, relevant antecedent that belongs to the focus alternative set.

In this respect, focus is not unlike pronominalization[12]. One relevant property of pronouns is that speakers are not restricted to their choice of antecedent insofar as the coindexing depends on the intended meaning of the utterance. For example, in (37), the speaker may be expressing disbelief in the fact that Game of Thrones is being cancelled, or in the fact that John *said* that it is being cancelled, and this is reflected in the coindexing. Based on the intended meaning, the antecedent to *that* is either the embedded clause alone or the entire utterance in (37).

(37)   A: [John said that [Game of Thrones is being cancelled]$_i$]$_j$

         B: I don't believe **that**$_{i/j}$!

Similarly with focus, what is assigned main prominence in the sentence is not a simple reflex to whatever utterances may be floating around in the context. Speakers have the choice of antecedent if more than one possibility exists. Consider for example a dialogue found in Schwarzschild (1999), where it seems clear that a speaker can either consider the relative clause or the root clause (to the exclusion of the relative clause) to serve as the focus antecedent.

(38)   A: [John borrowed [the book]$_i$]$_1$ that [Max had purchased t_i]$_2$.

         B: No, [MAX$_F$ borrowed it$_i$]$_1$.

         B′: No, [Max BORROWED$_F$ it$_i$]$_2$.

Another property of pronouns is that the relation between a pronoun and its antecedent is not linearly restricted: a pronoun can precede its antecedent in certain cases, such as in (39).

(39)   Before he$_i$ left town, John$_i$ remembered to get a cat-sitter.

The phenomenon in (39) is known as backward anaphora, or cataphora, but it does not occur freely. Pronouns and many other types of anaphora (such as ellipsis) are restricted by the Backward

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[12]Rooth (1992) in fact captures this fact nicely by introducing an unpronounced pronoun into the syntactic derivation.

Anaphora Constraint (BAC), which states that an anaphor may not linearly precede its antecedent if the anaphor c-commands the antecedent (Ross 1967). Therefore, although a pronoun can precede its antecedent if it is found within a fronted prepositional phrase like (39), sentences like (40a) are ungrammatical (in which *John* and *he* corefer).

(40)   a.   *He$_i$ thought that John$_i$ was very bright

          b.   John$_i$ thought that he$_i$ was very bright.

Focus likewise can be cataphoric. For example, the first instance of *mother* can be prosodically reduced in (41a)[13] even though the focus antecedent comes afterwards. It should be noted that the second occurrence of *mother* can additionally undergo ellipsis, as in (41b). However, if both instances undergo ellipsis, as in (41c), it is impossible to recover the original referent without some prior antecedent.

(41)   a.   MARY$_F$'s <u>mother</u> has very little in common with JANE$_F$'s <u>mother</u>.

          b.   MARY$_F$'s <u>mother</u> has very little in common with JANE$_F$'s _____.

          c.   ?MARY$_F$'s _____ has very little in common with JANE$_F$'s _____.

The preceding examples illustrate a key attribute of prosodic reduction, which is that it does not lead to a complete loss of referential meaning. This means that cataphoric prosody can serve a function in the discourse: it helps listeners anticipate what material is coming up next.

(42)   a.   John didn't just fail [the TEST]$_F$. He failed [the WHOLE COURSE]$_F$!

In (42), focus on *the test* sets up an expectation for the listener which is fulfilled in the following sentence. Put simply, the first sentence leaves the listener hanging; it sets up a contrast that must yet be satisfied. In fact, if the speaker had only uttered the first sentence of (42), an astute listener could understand what is implied by the focus structure. This is not a new idea: The example in

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[13]<u>Underlined</u> material is to be interpreted as prosodically reduced.

(42) is very similar to the one given at the beginning of the chapter, (1), from Rooth (1992).

It is not always so clear, however, that cataphoric focus makes such an important contribution to the discourse. Let us revisit the farmer sentence from Rooth (1992), much-discussed in the literature because such focus marking is disallowed in Romance languages. In a sentence like (43), focus can optionally be marked on the first adjective, *Canadian* (*farmer* is subsequently reduced).

(43)   A ~[[CANADIAN]$_F$ farmer] was speaking to an ~[[AMERICAN]$_F$ farmer][14] . . .

The focussing of *Canadian* in (43) signals an upcoming contrast in the discourse, but it is difficult to know whether listeners actually make use of this information in real time. It may be that a speaker focusses *Canadian* simply because having already planned the utterance, *American farmer* is already salient in their mind. This does not necessarily entail that the prominence pattern is directed towards the listener or used by them in comprehension. Moreover, because the focus and its antecedent occur in the same sentence, they are too temporally close to really be able to test the hypothesis with offline measures. We therefore must turn to experimental work in order to learn more about this construction.

The prevailing intuition for Romance is that farmer sentences are ill-formed in these languages (Bocci 2013). However, this is in relation to the first instance of focus; Bocci (2013, p.60) offers an example where contrastive prosody can occur on the second conjunct (but not the first)[15]:

(44)   a.   Uno studente di chimica   ha chiesto aiuto   a un PROFESSORE di chimica.
               a   student of chemistry has asked   advice at a   professor   of chemistry

         b.   *Uno STUDENTE di chimica   ha chiesto aiuto   a un PROFESSORE/professore di
               a   student   of chemistry has asked   advice at a   professor   of
               chimica.
               chemistry
               "A chemistry student asked advice from a chemistry professor."

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[14]As much as this sentence has been discussed, no one has ever discovered how the joke ends.

[15]Bocci's observation contradicts earlier observations about Italian made in Ladd (2008), who said that stress shift should never occur in this context. Bocci (2013) maintains that it is licit in the case of contrastive focus; it is not clear if in this example *professore* is meant to contrast with *studente* or an external referent.

According to Bocci (2013) this boils down to a constraint against multiplicity of focus: Italian allows only a single focus within the sentence[16]. He also independently makes a related claim elsewhere in the book that the domain of focus must be the clause in Italian. In essence, this is the Scope Hypothesis: multiple foci in a sentence are ruled out by the SH because it involves embedding the focus operator, $\sim$. Whatever the reason behind the ill-formedness of farmer-sentences in Romance, the ramification is that cataphoric focus marking never appears within the sentence in these languages.

In domains larger than the sentence, however, it may also be the case that cataphoric focus marking cannot operate through prosody alone in Romance. Consider, for example, the marginality of the following sentences:

(45) a. ??Jean n'a   pas RÉUSSI à l'examen. *(cannot imply he aced the test)*
          John NEG.has not passed at the.test

  b. ??Juan no PASÓ el   examen *(cannot imply he aced the test)*
        John not pass   the test
        "John didn't PASS the test."

In order to arrive at the same implicature as is found in English, a different syntactic formulation is needed (e.g. "Jean a non seulement réussi à l'examen...."). In English (recall the examples in (1)), the implicature is expressed through a particular intonational contour already discussed, the fall-rise contour, which does not exist in the French or Spanish intonational inventories[17]. Therefore, it is the case that in general, Romance speakers are less habituated to the use of cataphoric focus marking than English speakers, relying much more on syntactic methods of deriving this kind of meaning.

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[16]This first to posit a constraint against multiple foci in Italian was in fact Calabrese (1987).

[17]A similar intonational contour does exist in German (Büring 1997), indicating that this is again a parametric difference between Romance and Germanic.

2.5   Chapter Summary

This chapter began by distinguishing between identificational or contrastive focus and informational focus, then by distinguishing focus from acoustic prominence. Acoustic prominence is assigned in Germanic by selectional chains in the syntax while in Romance it is determined by the prosodic structure of a sentence: the most deeply embedded prosodic head bears the highest prominence. Focus alters the default prosodic structure of a sentence such that it forces the prosodic head of the utterance to correspond with the focussed phrase. The domain of focus is the semantic scope of the focus, and whatever is within the focus domain that is not F-marked will be prosodically reduced – at least in English. It is still up for debate whether givenness reduction occurs in Romance; it is at the very least optional in some dialects. F-marking triggers a focus presupposition which is converted into a set of relevant alternatives by the focus operator, $\sim$. There have been numerous proposals in the literature regarding the parametric differences between Germanic and Romance, which are not necessarily mutually exclusive theories. These various proposals are outlined in Table 2.1.

In particular, the theories tested in this thesis are the Scope Hypothesis and the Phrasing Hypothesis. In chapter 6, we replicate the experiments in vander Klok et al. (2014): native speakers of Spanish are tested on sentences in which the focus operator takes either broad or narrow scope, in order to see whether the differences in prosodic focus marking between Spanish and English are better explained through a syntactic-semantic account or instead by a theory of prosodic phrasing.

	Germanic	**Romance**	**Source**
Prosodic focus operator:	Can be embedded	Cannot be embedded	vander Klok et al. (2014)
Phrasal boundary:	Optionally inserted after F	Obligatory after F	Zubizarreta (1998), Féry (2001)
Shifting prosodic head:	Allowed at every level	Not allowed within PP or lower	Féry (2001), Hamlaoui et al. (2012)
Givenness reduction:	Obligatory	Absent/optional	Absent: Swerts et al. (2002), optional: Cruttenden (2006)
Multiple Foci:	Allowed	Disallowed	Calabrese (1987), Bocci (2013)
Semantics of Prosodic Focus:	All types of focus	Only corrective focus	Ladd (2008)

Table 2.1: Various Proposals Concerning the Parametric Variation between Germanic and Romance Prosodic Focus

Chapter 3

Study 1: English Focus Prominence

This chapter is the result of joint work with Michael Wagner, submitted to be published as a co-authored study.[1]

3.1 Prominence Shifts and Coordinated Antecedents

In English, the prosodic prominence pattern of a sentence is affected in systematic ways by discourse context. Consider the following examples with two different contexts:

(1) a. A: What happened while the kids went for a swim?

      B: JOLENE pitched the TENT.

  b. A: Who pitched the tent?

      B: JOLENE pitched the tent.

Whereas in the first discourse, both the words *Jolene* and *tent* typically carry an accent and receive prosodic prominence, in the second discourse, only the word *Jolene* is likely to be accented, and the material in the VP *pitched the tent* is prosodically reduced and perceived as being less prominent than the subject.

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[1](Klassen and Wagner 2015)

Such contextual effects on prosodic prominence relate to what part of the information in a sentence constitutes new and given information respectively. Earlier studies have shown that placing prominence on given material as well as failing to place prominence on new material can incur a processing cost: Both accenting given material and deaccenting new material leads to increased processing time (e.g. Terken 1984, Cutler et al. 1997, Dahan et al. 2002) and elicits a measurable electrophysiological compoment (Wang et al. 2011). The prosodic rendition of a particular constituent and its prominence relative to the other constituents in the same sentence therefore effectively encodes information about the discourse status of a constituent, which lead Fowler and Housum (1987, and many others) to conclude that the prosodic rendition of an utterance is *anaphoric* to the context, in a broad sense of the word, where any utterance that seems to require particular information to be contextually salient counts as anaphoric.

This much is uncontroversial, but what is controversial is the proper characterization of the mechanism responsible for such contextual effects on prominence. On the one hand, activation-based views of prosodic reduction view the relationship between context and prosodic prominence as a direct consequence of the prior activation of certain linguistic constituents or their referents in discourse: If an expression or its referent is already activated or 'accessible,' then its prosodic prominence will be reduced (Terken 1984, Terken and Hirschberg 1994, Watson 2010, Arnold and Watson 2015, i.a.). For example, one possible explanation is that prosodic reduction comes about by low level reduction effects. In this vein, Lam and Watson (2010) argue that prior articulation of a word by a speaker will have a strong reductive effect on a repeated instance of the same word. Similarly, Arnold et al. (2012) and Kahn and Arnold (2015) argue that prior audition of a word is sufficient to induce prosodic reduction of a subsequent articulation, but the mechanism by which this reduction occurs is production facilitation. See Arnold and Watson (2015) for a summary of recent research in this framework. Under this low-level activation-based view, the prominence shift observed in (1b) would be seen as a direct consequence of the previous mention of the constituent *pitched the tent*. Other accounts try to explicate the notion of accessibility in terms of predictability,

and relate the prosodic realization to measures of expectedness of informativeness (Terken 1984, Arnold 1998, Aylett and Turk 2004, Bell et al. 2009, Lam and Watson 2010, Calhoun 2010, Jaeger 2010). Under this view, greater prominence might ensue on *Jolene* in (1b) because the question establishes the phrase *pitched the tent* as a highly probable component of B's response.

In contrast to these activation- and predictability-based theories, there are semantic approaches to the phenomenon, which view the placement of prominence as a means of grammar to encode anaphoric relations to antecedents in the discourse (Jackendoff 1972, Rooth 1992, Schwarzschild 1999, Sauerland 2005, Wagner 2006). The alternatives theory of focus (Rooth 1985, von Stechow 1991, Rooth 1992) is one such theory. It postulates that every constituent, apart from its regular asserted meaning, evokes a set of alternatives of the same semantic type. Prosodic prominence relations reveal which alternatives a speaker considers to be salient in the context. In the formalization used in Rooth (1992), this anaphoric relation is encoded by a silent focus operator, symbolized by the tilde operator ($\sim$). This operator takes a syntactic constituent as its complement, and introduces the presupposition that an antecedent alternative has to be salient in the context. The alternatives that qualify as antecedents depend on which constituents are marked for substitution within the scope of $\sim$, which in turn determines prosodic prominence. The constituents to be substituted in the alternatives are marked by 'F-markers'. In the following representation, *Jolene* is marked with an F-marker, hence alternatives of the form *x pitched the tent* are considered. The operator $\sim$ will introduce the requirement that a salient antecedent of this shape be contextually salient:

(2) $\sim$[JOLENE$_F$ pitched the tent.]

We can think of the prosodic effect of F-marking as the result of a principle that assures that F-marked constituents within the scope of $\sim$ are more prominent than those that are not F-marked (Truckenbrodt 1995). We can define the latter ones as 'given,' since non-F-marked material has to be present in the antecedent required by $\sim$. We will assume that non-F-marked material in the scope of $\sim$ must receive less prominence than F-marked material, following Bader (2001). This

can explain why *pitched the tent* is prosodically reduced in (2)[2]: The subject *Jolene* in (2) is F-marked, the VP is not. Since they are both in the scope of ∼, the VP must be less prominent than non-F-marked material, which can easily be achieved by accenting the subject, and omitting any accent on the VP.[3] Absent F-marking, as in the response in (1a), prominence is determined by the general principles of prominence placement in English[4].

In the representation in (2), the operator ∼ introduces the presupposition that one or more alternatives of the form *x pitched the tent* are salient. This presupposition is satisfied in (1b), but not in (1a). This explains why shifting prominence in (1a) is not possible. On the assumption that one has to use ∼ whenever possible, as would be expected by the more general pragmatic principle (often referred to as MAXIMIZE PRESUPPOSITION) that the presuppositions encoded in an utterance should be maximized (Heim 1991), we can also explain why failing to shift prominence in (1b) seems infelicitous. Just as one has to use a definite determiner when uniqueness can be assumed to be satisfied (e.g., # Look, a sun is rising!), and just as speakers prefer to employ pronouns when appropriate, prominence shifts are employed to mark anaphoric relations to antecedents in the context whenever possible.

The alternatives theory of focus makes similar predictions for (1) as theories based on activation, or predictability. But predictions diverge once other examples are explored. Consider the following dialogue:

(3)   A: Last week, Dolly pitched the tent. What happened today?

        B: JOLENE pitched the tent.

        B′: ?# JOLENE pitched the TENT.

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[2] Truckenbrodt (1995) deals with the prosodic facts by stating that F-marked material must have highest prominence within the scope of ∼, which leaves unclear, however, what happens in cases when multiple constituents in the scope of ∼ are F-marked.

[3] A rendition compatible with this view would be one in which both subject and VP are accented, but the accent on the subject is more prominent. And it is indeed often observed that post-focal material in English is not necessarily completely de-accented (cf. Wagner 2005b).

[4] In a transitive sentence, this means that the direct object will receive main prominence (Cinque 1993).

A prominence shift appears to be preferred even when the question does not narrow down the set of adequate answers to the set of propositions of the form *x pitched the tent*, as was the case in (1b) (where *Who pitched the tent?* was explicitly asked). This is not expected under the view that all that matters is the predictability of the phrase *pitched the tent*. Shifting prominence should be much less likely in the case of (3). If all that matters is whether *pitched the tent* is repeated, however, we expect (1b) and (3) to pattern similarly. The predictions of focus theory are similar to the repetition view: Since there is an appropriate antecedent in (3) (i.e. *Dolly pitched the tent*), a prominence shift should be similarly likely as in (1b).

Consider now the following variation, which again involves a repetition of *pitched the tent*:[5]

(4)　　A:　Yesterday, Jolene pitched the tent. What happened today?

　　　　B:　# JOLENE pitched the tent.

　　　　B′:　JOLENE pitched the TENT.

A prominence shift seems infelicitous in this case, which would seem to be incompatible with the idea that any repetition will enable prosodic reduction. Focus theory can account for this observation, once it is assumed that alternatives have to be distinct from each other (Wagner 2006)[6]. This rules out that that the constituent *Jolene pitched the tent* serves as the antecedent for shifting prominence on the target sentence *Jolene pitched the tent*). This restriction on alternatives is further supported in Wagner (2006) by a comparison to a type of dialogue that is minimally different and does provide such a contrast, one in which two constituents are coordinated in the antecedent:

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[5]Our intuition is that there is a pronunciation of B′ that, while keeping prominence relations intact, the intonational contour acknowledges that this is a repeated event and hence encodes its givenness after all, at least to some extent—we will return to this intuition below.

[6]Generally, it is assumed that a focus alternative cannot be entailed by its anaphor—consider the following example from Wagner (2012):

(i)　　A:　Last week a physics student pulled the fire alarm, and class got cancelled. Did you have better luck this week?
　　　　B:　You won't believe what happened:
　　　　…　#[A STUDENT]$_F$ pulled the fire alarm!
　　　　…　A student pulled the fire alarm!

(5)   A: Yesterday, Jolene and Dolly pitched the tent. What happened today?

       B: JOLENE pitched the tent.

       B′: JOLENE pitched the TENT.

Shifting prominence to *Jolene* in (5), in contrast to (4), is certainly possible, and maybe even pre-
ferred. It might be predicted that the MAXIMIZE PRESUPPOSITION constraint would force speak-
ers to always prefer shifting stress to the subject, since this encodes the strongest presupposition—
this is what is argued in Wagner (2006). However, this cannot be the full picture, since there is at
least a certain degree of optionality in the coordinated case shown in (5) as to whether prominence
is shifted to the subject or not. Under the anaphoric view, this optionality arises from variability in
the choice of antecedent. If a speaker considers *Jolene pitched the tent* as the relevant antecedent,
it would lead to a similar prosodic rendition as in the repeated case in (4); if a speaker considers
Dolly pitched the tent to be the relevant antecedent (or maybe *Jolene and Dolly pitched the tent*),
it will lead to a prosodic rendition similar to the contrastive case in (3).

   As observed in Wagner (2006), prominence shifts in cases with coordinated antecedents like
(5) provide the possibility of deciding between two theories, but intuitions are not immediately
obvious since it seems that both pronunciations are possible. While Wagner (2006) claimed that
shifting prominence in (5) is obligatory or should at least be preferred, it is not clear that this is
actually the case. Under the repetition-based approach, one would also expect prosodic reduction
to a certain extent, since the constituent *pitched the tent* is repeated in (5). But there is an important
difference in the nature of the predictions between the two accounts: The anaphoric view posits that
the use of prominence shifts reveals something about the alternatives entertained by the speaker.
For the repetition-based view there is no reason to expect such pragmatic consequences of the
choice in pronunciation.

   More concretely, if prosodic prominence shifts essentially constitute an anaphor, similar to
a pronominal anaphor, we expect it to show similar patterns with respect to its interaction with

context. Of particular interest for this chapter is the observation that there is often optionality with respect to the interpretation of anaphors, in cases where multiple potential antecedents exist. Consider the following example, involving the propositional pronoun *that*:

(6)   A: John claimed that the Earth is flat.

       B: I don't believe **that**.

B could express disbelief in whether the Earth is flat or whether John claimed that it is—which reading is more likely will depend on A's and B's beliefs about the world and about each other. Similarly, a pronoun referring to an individual can pick out one out of several possible referents, if the context is sufficiently rich to assure that the referent can be established:

(7)   A: What about Jolene? Is she coming?

       B: I heard Jolene and Dolly talking about sharing a ride to get there. I think **she**'ll come.

The main point here is that the occurrence of prosodic focus presupposes an anaphoric relation to an antecedent, similar to the case of pronouns. Just as in the case of a pronominal anaphor, the determination of which antecedent serves in the anaphoric relation in situations where multiple possible antecedents exist depends on the intended meaning the speaker wishes to convey. The idea is then that in the dialogue of interest in which there is variability in the prosody of the response, there is variability in the choice of antecedent. Schwarzschild (1999) explains the choice of antecedent through the concept of *rhetorical relation*, and provides the example in (8):

(8)   A: John borrowed the book that Max had purchased.

       B: No, MAX_F borrowed it.

           Antecedent: *John borrowed the book.*

       B′: No, Max BORROWED_F it.

           Antecedent: *Max purchased the book.*

In (8), the intuition is that the speaker can either contradict the matrix clause, using the prosody in B, or simply the relative clause, in which case B′ is preferred. In B′, what might be said is that the speaker ignores the matrix clause for the purposes of anaphora and only considers the relative clause as the antecedent.

When a coordinated NP serves as a potential focus antecedent, there is a similar case of optionality, arising from the choice of antecedent:

(9)   A: Yesterday, Jolene and Dolly pitched the tent. What happened today?

        B: JOLENE pitched the tent.

              Antecedent: *(Jolene and) Dolly pitched the tent.*

        B′:   JOLENE pitched the TENT.

              Antecedent: *Jolene pitched the tent.*

There are then two questions of theoretical interest regarding the case of coordinated antecedents: First, we need to establish to what extent a prominence shift is possible or even preferred. Second, to the extent that we find variation in how responses are realized in the presence of coordinated antecedents, we can distinguish between different theories designed to account for prominence shifts by identifying the factors that determine the variation. Crucially, focus theory predicts that the different prosodic renditions reveal very different meanings conveyed by the speaker. Theories that attribute shifts in prominence to repetition or low-level facilitation predict that the case of coordinated antecedents should show some degree of reduction of the repeated material, without any prediction of a pragmatic difference in meaning, and reduction would also be expected for the cases of complete repetition as in (4), where focus theory does not predict reduction.

The experiments reported in this chapter aim at establishing how speakers actually produce responses in dialogues like (1)–(3), as well as investigating the pragmatic intentions underlying the different renditions in pronunciation for responses with coordinated antecedents like (3).

3.2   Experiment 1: Repeated and Coordinated Antecedents

The first experiment explored how speakers produce sentences in dialogues such as those illustrated in (1)–(5). The fives types of dialogues we looked at are summarized in Table 3.1.

Condition	Set-up	Question
	"Last week at the student meeting,	
WhQuestion	…Mary ate a cupcake."	"Who ate one this week?"
Contrast	…Mary ate a cupcake."	"What happened this week?"
Coordinated	…John and Mary ate a cupcake."	"What happened this week?"
Repeated	…John ate a cupcake."	"What happened this week?"
New	…the food provided was extremely unhealthy."	"What happened this week?"

Elicited response: "John ate a cupcake."

Table 3.1: An example item with the 5 conditions from Experiment 1.

If a repetition of the VP is sufficient to cause prosodic reduction of the VP, then we would expect all but the New condition to pattern alike, since in all of these conditions the VP is repeated. If predictability is important for prosodic reduction, one might expect a difference between WhQuestion and Contrast, since only in the WhQuestion context is the set of possible answers narrowed down to those including a repetition of the VP.

Focus theory makes a different set of predictions. If a focus alternative that contrasts in subject position is necessary for a prominence shift (and thus necessary for a reduction of the VP), then we would expect the Repetition condition to pattern with the New condition. The condition with a coordinated antecedent, finally, might pattern with the contrast condition, if contrast-marking is obligatory when possible; it should show an intermediate status if speakers are free to choose an antecedent, and effectively convey different messages depending on whether they shift prominence or not.

3.2.1   Methodology

Participants were asked to take part in dialogues of the form in Table 3.1, listening to pre-recorded material and recording their responses verbally with a Logitech headset. For each trial, the participant would first hear the pre-recorded material: First a set-up, which introduced the context, and then a question to elicit the answer from the participant. The participant then gave the answer, based on the script on the screen. The set-up would contain a focus antecedent which either contrasted with the answer *John ate a cupcake* (i.e. *Mary ate a cupcake*), did not contrast (i.e. *John ate a cupcake*) or potentially contrasted (i.e. *John and Mary ate a cupcake*). In all conditions but the WhQuestion condition, the eliciting question was a broad question (i.e. *What happened?*). The WhQuestion condition employed a narrow wh-question to specifically elicit focus on the subject (i.e. *Who ate a cupcake?*). Items were presented in Latin Square design and were randomized within blocks of 5 trials to ensure that the experiment conditions would be equally distributed across the experiment.

The recorded utterances were automatically aligned using the prosody.lab forced-aligner (Gorman et al. 2011), which creates a segment-by-segment and word-by-word alignment of the acoustic data. We extracted acoustic measures from two words of interest in each sentence: the grammatical subject, and the rightmost constituent of the verbal argument:

(10)   a. $[\text{John}]_1$ ate a $[\text{cupcake}]_2$.

        b. $[\text{Jolene}]_1$ pitched a $[\text{tent}]_2$.

We measured along three acoustic dimensions to estimate the relative prominence between the two words of interest. In particular, we measured the difference in pitch in semitones (a measure correlating with the pitch ratio), the difference of the log duration of the nouns (a measure correlating with the duration ratio), and the difference in intensity (a measure correlating with the loudness ratio). Ratios are usually better proxies for the psychoacoustic perception of differences.

The sound files were separately hand-annotated by two trained annotators who marked down for each recorded item whether they perceived that prominence was shifted to the Subject, or whether the VP carried the main prominence of the sentence. The annotators were blind to the experimental conditions and to the purpose of the experiment. The two annotations had a good correlation based on the kappa statistic, and analysis based on either annotation lead to qualitatively similar results. We report on the annotation that lead to a higher R^2 when we fit a simple logistic regression with the three acoustic measures as the predictor.

Thirty-four native speakers of North-American English were tested. Each participant took part in 20 dialogues, drawn from 20 different items (shown in Appendix A.1) in a Latin Square design, such that they encountered 4 trials in each condition, but only encountered each target sentence once. Participants were mostly undergraduates recruited from the McGill University community and compensated $10 per hour for their time.

3.2.2 Results

The proportions of utterances judged to have a reduced VP and to carry prosodic prominence on the subject are summarized in Figure 3.1.
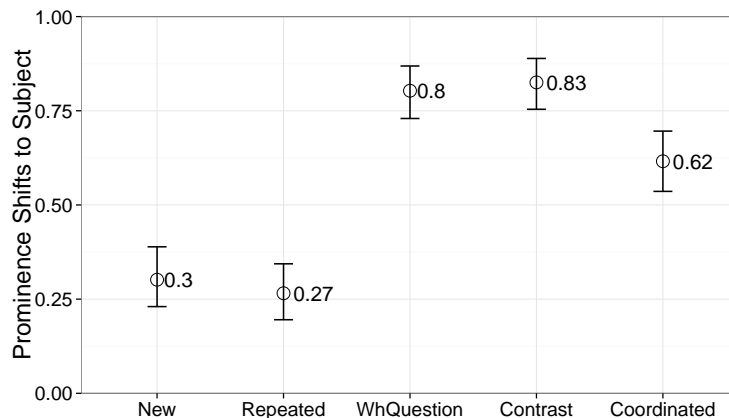
Figure 3.1: Proportion of prominence Shifts to the Subject based on perceptual annotation in Experiment 1.

As expected under any account, a prominence shift is unlikely within a sentence that encodes entirely new information (New). Likewise, a repetition of the entire sentence does not lead to a prominence shift to the Subject. Prominence is most likely to shift to the subject when a wh-question is asked about the subject which contains the VP (WhQuestion), or if there is a context with a contrasting subject but repeated VP (Contrast). The coordinated condition crucially shows an intermediate rate of prominence shifts: While a prominence shift is more likely than not, it occurs less often than in the two other conditions where a contrast is available.

It seems surprising at first sight that the rate of prominence shifts should be as high as 30% in the control condition. However, even when an antecedent is not explicitly mentioned, several contexts might have lent themselves easily to accommodate such an antecedent. Consider the following dialogue in which an antecedent for a prominence shift can possibly be accommodated:

(11)   A: On Monday, the dishwasher broke. What happened last night?

        B: Janet dried the dishes.

Here, *Janet dried the dishes* was probably often taken to contrast with an inferred assertion, *the*

dishwasher dried the dishes. For this item, there was an overall rate of 40% prominence shift in the control condition, while for some other items there were no prominence shifts. Rather than excluding items post-hoc based on an assessment of how likely an antecedent could be accommodated, we simply kept all the data despite this variability between items, since there is no reason to think that it would introduce a confound for our hypothesis.

We used the R package *lme4* (Bates et al. 2014) to fit a logistic mixed effects regression and test significance, reported in the first column of Table 3.2; p-values are estimated based on the Wald test (Baayen et al. 2008, Baayen 2008, Barr et al. 2012). The model included random effects for item and participant.[7] We used the condition in which all material in the response was new as a reference condition. The dependent variable encoded whether prominence was shifted to the subject of the sentence or not. We found significant differences in the rate of prominence shifts for WhQuestion (p< 0.001)[8], for the simple Contrast case (p< 0.001), and, crucially, also for the Coordinated case (p< 0.001). As expected based on the figure and as predicted by focus theory, a repetition in the absence of a contrast for the subject did not lead to a different rate of prominence shifts.

Table 3.2: Mixed Effects Regression Models for Experiment 1

	Dependent variable:			
	Prominence	Intensity	Pitch	Duration
	generalized linear mixed-effects	*linear mixed-effects*	*linear mixed-effects*	*linear mixed-effects*
	(1)	(2)	(3)	(4)
ContextRepeated	−0.224 (0.320)	−0.822 (0.565)	−1.595*** (0.531)	0.014 (0.028)
ContextWhQuestion	2.958*** (0.368)	1.618*** (0.519)	0.685 (0.531)	0.114*** (0.030)
ContextContrast	3.155*** (0.376)	1.217** (0.524)	1.441*** (0.511)	0.093*** (0.031)
ContextCoordinated	1.746*** (0.320)	0.844* (0.507)	0.534 (0.500)	0.054* (0.030)
Constant	−1.173*** (0.365)	16.815*** (0.843)	3.322*** (0.423)	−0.561*** (0.079)
Observations	627	620	588	620
Note:				*p<0.1; **p<0.05; ***p<0.01

[7]The model did not converge with random slopes. In order to assure further than the results we report here are not spurious, we also fit simpler models with each of the individual comparisons reported here, which included slopes for both random effects. These also lead to significant results for the same comparison as the full model.

[8]The lowest threshold for p-value we report is 0.001, if the p-value was higher, we report the actual estimated p-value.

The three acoustic acoustic measures are summarized in Figure 3.2. We fit linear mixed effects models for each measure, with the type of Context as a fixed effect, with random effects and slopes for participant and item. The statistical results are summarized in the three last columns of Table 3.2.
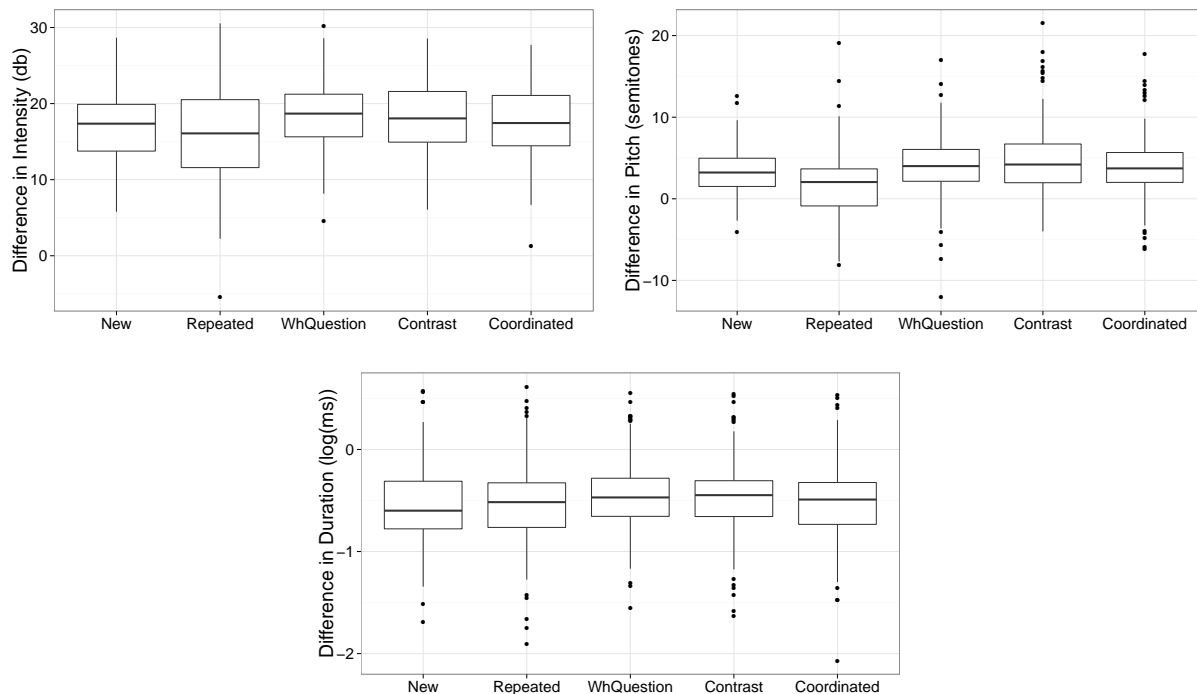
Figure 3.2: Acoustic measures of relative prominence from Experiment 1.

The relative measures of Intensity and Duration show qualitatively the same pattern as the perceptual annotation, with WhQuestion, Contrast, and Coordinated differing from the New condition, while Repetition does not. Pitch shows an interesting effect for repetition: The pitch difference was actually *lower* than in the control condition. This suggests that a complete repetition might be signalled by an upstep of the final pitch accent, which seems intuitively plausible. This particular intonational contour, which we refer to as the "repeated-events" contour for lack of a better term, is perhaps used to encode the given status of the entire sentence. A similar pattern was in fact observed for a repetition condition in Wagner and Klassen (2015). Pitch did not distinguish the

WhQuestion or the Coordinated condition from New.

3.2.3 Discussion

Both perceptual and acoustic measures show a general pattern that is as predicted by the alternatives theory of focus, but is unexpected based accounts under which any repeated constituent should be reduced, since repeated words were often not reduced. We also failed to find evidence for a predictability effect: It did not matter whether the context question made the recurrence of the VP very likely (*Who ate a cupcake?*) or not (*What happened this time?*). The results are as expected under the alternatives theory of focus: Prominence is shifted when there is an appropriate antecedent for focus marking. Furthermore, our results support the view proposed in Wagner (2005a) that only 'true' alternatives, that is, alternatives that are actually different from the antecedent, are valid antecedents for prosodic prominence shifts. The intermediate status raises doubts, however, about the claim in Wagner (2006) that speakers obligatorily mark a contrast whenever possible. The variability in the pronunciation of the cases with coordinated antecedents is compatible with the idea that in the critical coordinated condition, speakers have a choice between different antecedents, and their choice about which meaning to convey is reflected in their prosody. If true, then the different pronunciations should actually reveal very different pragmatic intentions. Our next experiment directly tests this hypothesis.

3.3 Experiment 2: Variability and Anaphoric Choices

The purpose of the second experiment was to test the hypothesis that the optionality observed in Experiment 1 in contexts with coordinate antecedents was due to differing contrast sets that the speakers considered when making their assertion. If the context makes available the antecedent *Jolene and Dolly pitched the tent*, and a speaker subsequently reports that this time around, *Jolene pitched the tent*, then they might view this statement as relating to the previous one in two different

ways. The first possibility is that they view it as a recurrence of an event of Jolene pitching the tent. The second possibility is that they see it as an event which contrasts with the previous one in that Dolly did not help pitch the tent this time. Under the latter reading, a prominence shift conveys the contrast to the antecedent *Dolly pitched the tent* or maybe *Jolene and Dolly pitched the tent*, while the response without the prominence shift does not convey such a contrast. In other words, the utterances differ in the speaker's intentions as to which contrast set to evoke.

To test this hypothesis, we used adverbials that independently reveal which alternatives are considered relevant in an utterance. The first adverb we used is *again*. The adverb *again* introduces an *iterative* or *repetitive* presupposition in which it is assumed that the said action has already been carried out at an earlier time (Klein 2001, Beck 2006, Eckardt and Fränkel 2012). This presupposition must be supported by the context for the use of *again* to be felicitous. Consider again our tent-pitching example:

(12)   a.   Yesterday, Jolene pitched the tent. What happened today?

         b.   #Again, Dolly pitched the tent. (*vs.* Again, Jolene pitched the tent.)

With the addition of the adverb *again*, the repetition of an event is highlighted and the speaker must consider *Jolene pitched the tent* to be the relevant antecedent. Our assumption is now the following: When there is a coordinate antecedent present, where in principle both *Jolene pitched the tent* and *Dolly pitched the tent* are viable antecedents, using *again* will only be felicitous if the speaker considers *Jolene pitched the tent* as the antecedent. A prominence shift, however, is only possible if the alternative *Dolly pitched the tent* is considered. This entails that shifting prominence is infelicitous:

(13)   A: Yesterday, Jolene and Dolly pitched the tent. What happened today?

         B: #Again, JOLENE pitched the tent.

         B′:   Again, JOLENE pitched the TENT.

The second adverb we use is *this time*. One can only use *this time* if what is described in the event marked with *this time* contrasts with the previous time. Consider the following dialogues:

(14)   A: Yesterday, Jolene pitched the tent. What happened today?

        B: #This time, Jolene pitched the tent.

(15)   A: Yesterday, Dolly pitched the tent. What happened today?

        B: This time, Jolene pitched the tent.

If the manipulation with *this time* is successful, then shifting the prominence should actually become obligatory when this adverb is used:

(16)   A: Yesterday, Jolene and Dolly pitched the tent. What happened today?

        B: This time, JOLENE pitched the tent.

        B′: #This time, JOLENE pitched the TENT.

We can make sense of these intuitions if we define the meanings of *again* and *this time* as follows:

(17)   a.   *again*: Takes a function p from time points t to propositions as its argument, and introduces the presupposition that for an earlier time t', $p(t')$ is true.

             [→ requires salience of antecedent of the form p(t)]

        b.   *this time*: Takes a function p from time points t to propositions as its argument, and introduces the presupposition that at an earlier time t', $p'(t')$ was true, and where p' is a member of the focus alternative set of p.

             [→ requires salience of antecedent of the form p'(t)]

The prediction is that sentences with *this time* should consistently exhibit subject prominence while in the *again* condition, object prominence should be strongly preferred, as per the judgments in (13)

and (16). However, if the variability in coordinate examples is simply due to the fact that the VP is repeated, then the use of *again* and *this time* should not affect this variability.

Condition	Set-up & Question	Response
	"Last week at the student meeting,	
Contrast	. . . Mary ate a cupcake. What happened this week?"	". . .
Again	. . . John and Mary ate a cupcake. What happened this week?"	"Again,. . .
ThisTime	. . . John and Mary ate a cupcake. What happened this week?"	"This time, . . .
Repeated	. . . John ate a cupcake. What happened this week?"	". . .
New	. . . the food provided was extremely unhealthy. What happened this week?"	". . .

Response, continued: . . . John ate a cupcake."

Table 3.3: An example item with the 5 conditions from Experiment 2.

We used sentence-initial adverbials for a reason. Placing the adverb in sentence-final position is compatible with various possible attachment sites. In sentence initial position, it necessarily outscopes following material (Bale 2007). A common use of sentence-initial *again* which we are not interested in is to reiterate a previously made speech act. In these cases, it can be said that *again* is taking scope over the entire speech act:

(18)   A white-water rafting instructor is giving some last-minute instructions to his students:

   a.   Again, remember to paddle quickly when we get to the rapids and I will steer from
         the back.

   b.   *Presupposed: The instructor has already said to paddle quickly.*

Although this is a possible reading for sentence-initial *again*, it cannot be the only reading. In (19), for example, *again* occurs in a position where it cannot scope over the entire speech act. In this case, the presupposition that is generated involves the embedded clause only. From this it must be the case that sentence-initial *again* has at least two scope options.

(19)   a.   John knew that, again, Jolene had betrayed Dolly.

b.   *Presupposed: Jolene betrayed Dolly at an earlier time*

Another reason to use sentence-initial adverbs is their prosody relative to the rest of the sentence. Klein (2001) observes that depending on whether the rest of the sentence is explicitly given in the context or not, sentence-final *again* will be stressed—(20)—or destressed—(21). In line with the analysis in Beck (2006), we assume that this simply has to do with the fact that in (21), *petting zoo* is given prominence because of the availability of a relevant alternative in the discourse whereas in (20), no alternative is available.

(20)   a.   Last year, they decided to take the children to the petting zoo.

        b.   . . . This year, they took them to the petting zoo AGAIN.

(21)   a.   Last year, they decided to take the children to the PLANETARIUM (unlike previous years).

        b.   . . . This year, they took them to the PETTING ZOO again.

3.3.1   Methods

The experimental paradigm of Experiment 2 was identical to that of Experiment 1. Participants had time to read each dialogue, before pressing a key to start the recording. They then heard the pre-recorded context including the question, and were asked to say the answer as if in a casual conversation with a friend. Each of the 16 participants, all native speakers of North-American English, saw a total of 20 trials in a Latin-Square design, drawn from 20 different sets of materials (items) shown in Appendix A.2.

3.3.2   Results

The perceptual annotation showed a very clear pattern in line with the predictions of focus theory, grouping together New, Repetition, and the Again case with a low rate of prominence shifts, and

a very high rate of prominence shifts in the Contrast condition and manipulation with the adverb
this time. This is illustrated in Figure 3.3. A logistic mixed effects model with random effects for
item and participant showed significant differences to the New condition only for these latter two
conditions, as expected based on the figure (see Table 3.4).
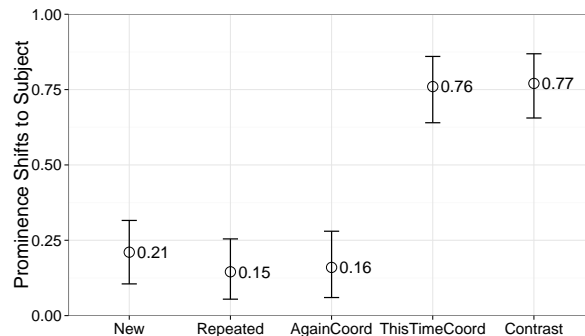
Figure 3.3: Proportion of prominence Shifts to the Subject based on perceptual annotation in
Experiment 1.

Table 3.4: Mixed Effects Regression Models for Experiment 2

	Prominence	Intensity	Pitch	Duration
	Dependent variable:			
	generalized linear mixed-effects	linear mixed-effects	linear mixed-effects	linear mixed-effects
	(1)	(2)	(3)	(4)
ContextRepeated	−0.544 (0.590)	−1.044 (0.727)	−1.501* (0.840)	−0.028 (0.045)
ContextAgainCoord	−0.474 (0.587)	0.380 (0.736)	−0.562 (0.834)	−0.019 (0.058)
ContextThisTimeCoord	3.587*** (0.645)	1.561** (0.751)	0.620 (1.447)	0.068 (0.047)
ContextContrast	3.521*** (0.607)	2.497*** (0.709)	1.987* (1.123)	0.051 (0.044)
Constant	−1.908*** (0.566)	16.731*** (1.004)	2.681*** (0.669)	−0.470*** (0.077)
Observations	273	277	253	277

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

The acoustic results are summarized in Figure 3.4. Relative prominence as measured for in-
tensity shows the same qualitative pattern as the perceptual annotation. Comparisons for pitch
again showed a decrease of the pitch difference in the repetition condition, indicative of a raising
of the final pitch accent to highlight the repetition, replicating the effect observed in Experiment 1.
With respect to the other conditions, only the Contrast condition came out significantly different.

Duration was not a significant cue for any of the comparisons—maybe the lack of significance of duration is a result of lower power of our second experiment given the lower number of participants.
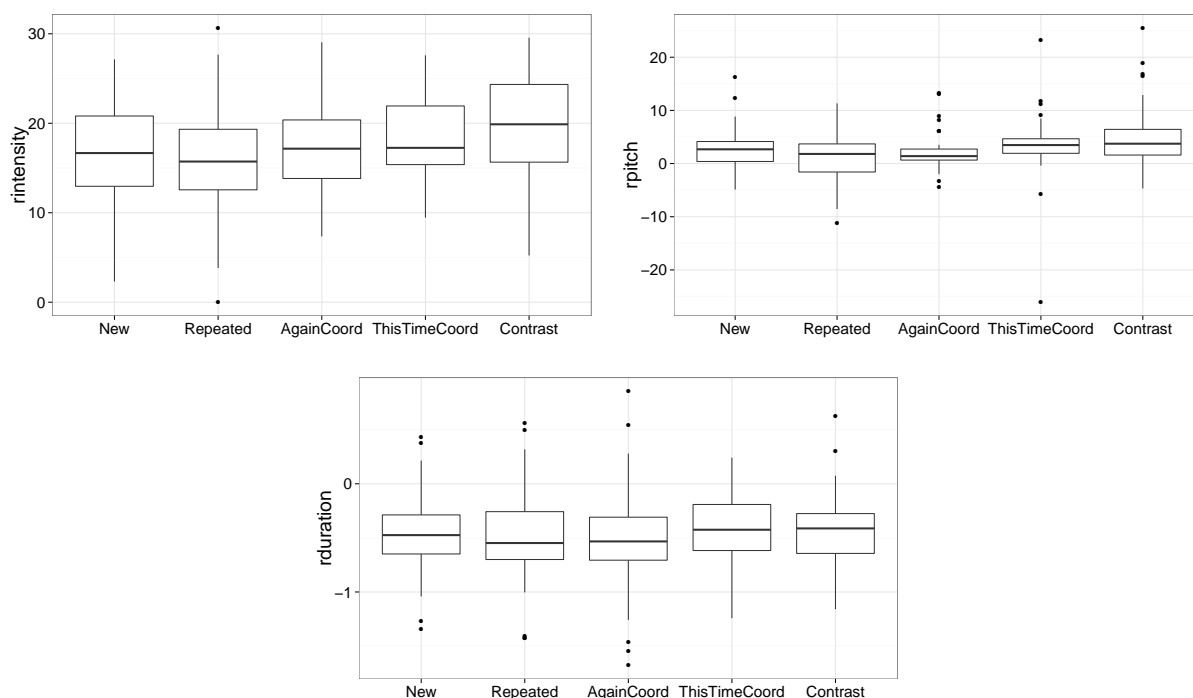
Figure 3.4: Acoustic measures of relative prominence from Experiment 1.

3.3.3 Discussion

Experiment 2 replicated several results from Experiment 1: That prominence shifts are as unlikely under repetition as in a discourse new context; that the contrast condition makes a prominence shift very likely; and that repetition of the entire sentence within a context leads to an upstep of the final pitch accent. The new manipulation of Experiment 2 using repetitive adverbs such as *again* and contrast-indicating adjectives such as *this time* was successful in reducing the variability in the conditions with a coordinated antecedent: When *again* was used, prominence shifts were as unlikely as in the control condition; when *this time* was used, they were as likely as in the contrast

condition. This supports the hypothesis that the variability in prominence pattern for coordinated antecedents observed in Experiment 1 is indeed due to different intentions that the speaker tried to convey, and the prominence pattern reflects the shape of the antecedent they are anaphoric to.

Even in the absence of adverbs such as *again* and *this time*, we theorize that a different contrast has interpretative consequences for an utterance. Which alternatives are computed decides which implicatures are drawn based on an utterance. Shifting prominence to the subject will have the consequence that a listener will draw the implicature that alternatives with different subjects are false:[9]

(22)   JOLENE pitched the tent. $\rightarrow \neg$ Dolly pitched the tent.

We can see the strength of this effect when considering its interaction with the use of *again*. Note that shifting prominence to the subject is not just rare in dialogues like (13); our experiment showed that it is altogether infelicitous. In fact, the pattern observed with a prosodic prominence shift is similar to the pattern observed with sentences that involve an exclusive operator like *only*:

(23)   A: Yesterday, Jolene and Dolly pitched the tent. What happened today?

        B: #Again, only Jolene pitched the tent.

In other words, a prominence shift in the absence of additive operators has a similar effect on interpretation as an exclusive operator. We can make sense of this as asserting a proposition is usually taken to also deny that any of its alternatives are true, by way of an implicature. This type of exhaustive inference has sometimes even been attributed to a hidden operator similar to *only* that is part of the structure of most sentences (Chierchia et al. 2012). The interaction with *again* observed in (13) might actually constitute an argument in favour of such a grammaticalized view of implicatures.

However, while Experiment 2 supports the view that the variability in Experiment 1 can be ex-

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[9]This is at least so in the absence of additive operators that prevent such an implicature, such as *too* or *even*.

plained by varying contrast sets, there is another potential explanation. Suppose that the variability does not reveal different intentions of the responding speaker, but rather of the speaker who asks the question. In the antecedent sentences we used in Experiment 1 and 2, there is in fact a potential ambiguity, inherent to plural NPs, to which we turn our attention in Experiment 3.

3.4 Experiment 3: Distributive vs. Collective Readings

There is an alternative way[10] of analyzing the interpretative differences between the two pronunciations observed in Experiment 1, one that does not attribute the differences to the speaker's choice of antecedent, but rather attributes it to the speaker's interpretation of the context sentence. The existence of a plural NP in a sentence such as *Jolene and Dolly* or *the kids* often leads to a semantic ambiguity (Gillon 1987). The plural NP can be predicated distributively or collectively. In the case of (24a) each coordinated referent is understood to have written operas separately—this is the distributive reading. A plural NP can also be predicated collectively, as in (24b). It is understood that the composing of operas by Gilbert and Sullivan was a collective enterprise, undertaken by the referents together.

(24)   a.   Mozart and Handel wrote operas.

         b.   Gilbert and Sullivan wrote operas.

Similarly, in the case of the "Jolene and Dolly" example, repeated below, there are two possible readings. The collective reading is the most immediately obvious: Without further context, it seems natural to assume that the tent-pitching was a collective enterprise, a reading that is paraphrased in (25b). However, imagine a context in which the tent was pitched more than once within the day. In such a context, the first pitching could have been done by Jolene alone and the second by Dolly (25c).

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[10]It is due to the helpful advice of Bernhard Schwarz that we came across the question of whether distributivity plays a role in these contexts.

(25)   a.   Yesterday, Jolene and Dolly pitched the tent.

        b.   Yesterday, Jolene and Dolly pitched the tent together.

        c.   Yesterday, Jolene and Dolly each pitched the tent.

Because this ambiguity exists with respect to coordinated NPs, it seemed possible that it could be playing a role in determining prominence. Maybe participants interpreted the contexts differently, with either a distributive or collective interpretation of the coordinated antecedent. The distributive reading of the predication over the plural subject formally entails the singleton proposition *Jolene pitched the tent*. If the focus alternative cannot be entailed by its antecedent, we might expect that a prominence shift is not licensed under the distributive reading. On the other hand, only the distributive reading formally entails the contrasting alternative, *Dolly pitched the tent*. If a prominence requires this directly contrasting alternative, one might expect that the distributive reading *does* license a prominence shift.

To test what kind of role distributivity plays in determining prominence, we used the adverbials *each* and *together* to bring out the distributive and collective readings respectively in Experiment 3.[11] [12] If speakers are producing prominence based on whether the context sentence is interpreted to be distributive or collective, we should expect to see a distinction in the production of prominence between cases where *each* is used versus *together*.

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[11]If distributivity affects how well a constituent acts as an alternative, we can try to use disjunctions as test. Consider the following examples:

i.   a.   Dolly and Jolene each pitched the tent, or ?(only) Jolene pitched the tent.
        b.   Dolly and Jolene pitched the tent together, or Jolene pitched tent ?(alone).

Both disjunctions seem possible, but both seem better when an adverbial is used that breaks the entailment. Neither seems to form a particularly natural alternative without a further adverbial, already casting doubt on an explanation of the prosodic effect observed in Experiment 1 in terms of distributivity.

[12]Sometimes, particular predicates are analyzed as inherently distributive or collective. Both authors tried to classify predicates along these dimension and did some post-hoc analyses of the data from Experiment 1. We did not find any correlation with our intuitions on the likelihood of a distributive reading (that is, a reading that entails each of the conjuncts).

Condition	Set-up	Question
	"Last week at the student meeting,	
Contrast	. . . Mary ate a cupcake.	What happened this week?"
Collective	. . . John and Mary ate a cupcake together.	What happened this week?"
Distributive	. . . John and Mary each ate a cupcake.	What happened this week?"
New	. . . the food provided was extremely unhealthy.	What happened this week?"

Elicited response: "John ate a cupcake."

Table 3.5: Example dialogues from Experiment 2.

3.4.1 Methods

The methods used for Experiment 3 were identical to those in the prior experiments. The participants listened to a recorded context and question and were required to read the answer off of the screen—a full list of items is in Appendix A.3. The experiment was run on a different set of 35 English native-speakers.

3.4.2 Results

The perceptual prominence annotation shows that just as in Experiment 1, coordinated antecedents lead to an intermediate rate of prominence shift to the subject (Table 3.5). A logistic mixed effects regression with random intercept and slopes for item and participant [13] showed that the coordinated cases differed significantly from the Contrast case (Contrast.vs.Coordinated, $p<0.001$). This effect replicates the overall effect that coordinated antecedents had in Experiment 1. The manipulation of distributivity, however, failed to show a clear effect, with no significant difference between distributive and collective cases.

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[13]The full model converged in Experiment 3.
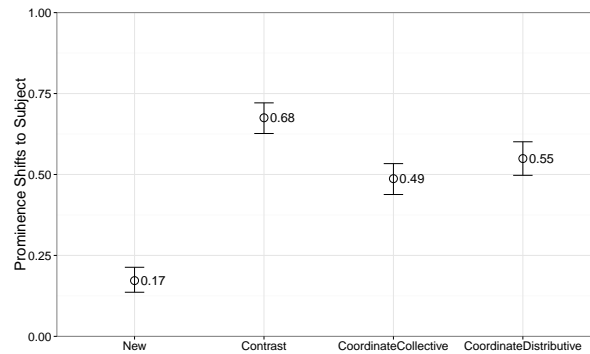
Figure 3.5: Proportion of prominence Shifts to the Subject based on perceptual annotation in Experiment 1.

The acoustic measures failed to differentiate distributive and collective cases, but they also failed to differentiate the contrast condition from the coordinated cases, compatible with the claim that the coordinated cases are overall similar to contexts that provide a clear contrast.
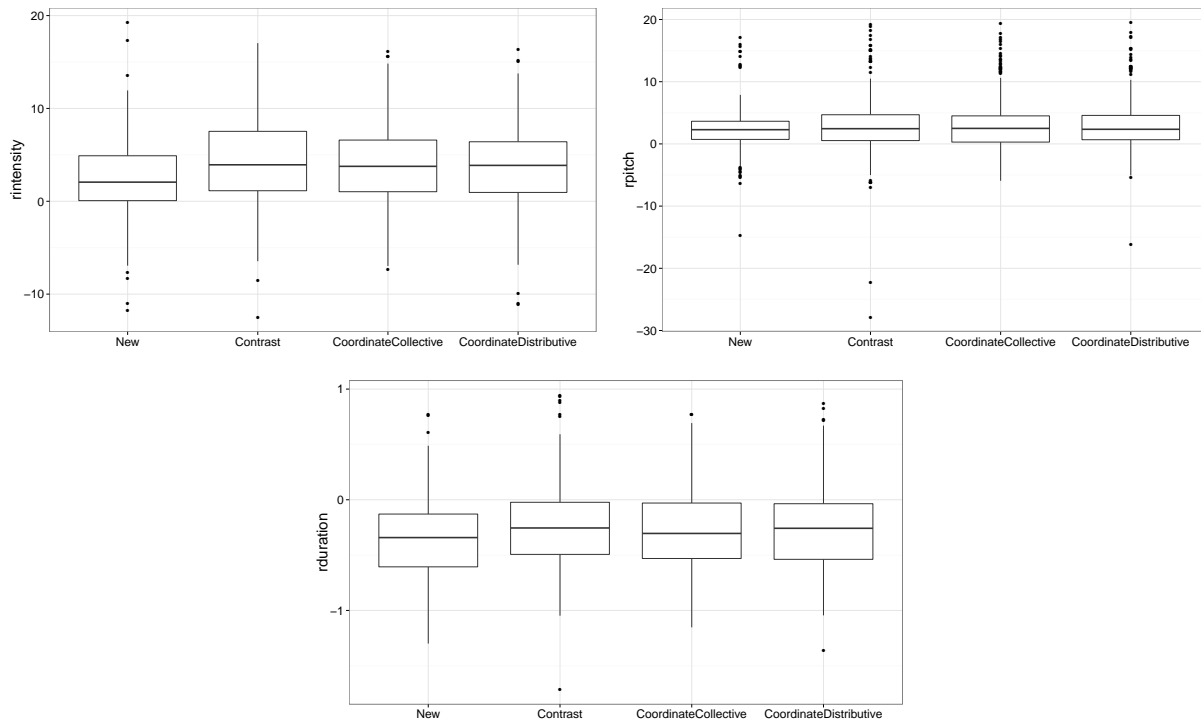
Figure 3.6: Acoustic measures of relative prominence from Experiment 1.

Table 3.6: Mixed Effects Regression Models for Experiment 3

	Dependent variable:			
	Prominence	Intensity	Pitch	Duration
	generalized linear mixed-effects	*linear mixed-effects*	*linear mixed-effects*	*linear mixed-effects*
	(1)	(2)	(3)	(4)
ContextNew.vs.Other	-2.591^{***} (0.454)	-1.432^{***} (0.265)	-0.650^{*} (0.365)	-0.081^{***} (0.015)
ContextContrast.vs.Coord	1.214^{***} (0.316)	0.390 (0.240)	-0.081 (0.275)	0.021 (0.013)
ContextCollect.vs.Distrib	-0.362 (0.241)	0.024 (0.290)	-0.142 (0.336)	-0.011 (0.016)
Constant	-0.308 (0.387)	3.542^{***} (0.607)	2.779^{***} (0.377)	-0.289^{***} (0.072)
Observations	1,554	1,554	1,419	1,554

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

3.4.3 Discussion

Experiment 3 tested an alternative hypothesis for the interpretative differences for the two variant pronunciations in the context of coordinated antecedents, one that is based on an ambiguity between collective and distributive readings of the antecedent in the context sentence (rather than of different intentions conveyed by the participant). The results we observed speak against this alternative interpretation, and in favour of the conclusion that the variability in the coordinated examples reveals different contrast sets that the speakers had in mind.

3.5 Conclusion

In a series of experiments, we explored the anaphoric nature of prosodic prominence shifts. Experiment 1 established that in contexts with coordinated NP antecedents, speakers show variability in the prosodic pattern of their responses. The alternatives theory of focus can explain this optionality as being due to different choices in the antecedent that a speaker considers to be relevant, which reveals differences as to the contrast that is intended to be conveyed. Theories that attribute prominence shifts to low-level activation due to previous mention or general accessibility fail to explain why cases with coordinated antecedents show an intermediate pattern that differs both from cases

of clear contrasts and from cases in which all material is discourse new. Also, they fail to explain why prominence shifts are not possible in cases of pure repetition, and why our manipulation of predictability (wh-question vs. broad question) failed to have an effect. Overall, an account in terms of repetition, accessibility, or predictability alone seems incompatible with the observed pattern. However, it could be the case that the intermediate values found in the coordinated NP condition of experiment 1 might not be a result of some bimodally-distributed optionality, but rather a truly intermediate value for intermediate prominence emerging in the case of coordinated NP antecedents. Although we do not directly show that our data is bimodally distributed in experiment 1, experiment 2 offers further evidence in favour of an optionality-based analysis.

The alternatives theory of focus makes additional predictions: If the proposed explanation of the observed variability is correct, different renditions should reveal different contrast sets, and ultimately different messages. Experiment 2 provides direct evidence that this is correct, exploiting the interaction of certain adverbs with the plausibility of choosing certain antecedents. Other theories fail to explain the sharp distinction in pronunciation elicited by the different adverbs. Experiment 3 ruled out an alternative interpretation of the semantic differences of the two variants.

Our results support the view that prominence shifts encode anaphoric relationships to antecedents in context. The nature of this anaphoric relation is similar to pronominal anaphora in at least one respect, which is that the choice of antecedent is determined by a speaker's intended meaning, and not an automatic reaction to the preceding linguistic material. Optionality in prominence placement revealed differences in individual speakers' intentions. In a context in which both a contrastive or non-contrastive alternative is available as an antecedent, as in the case of coordinated antecedents, prosodic prominence can reveal which anaphoric choice a speaker has made in their utterance and in this regard, focus anaphora resemble pronominal anaphora. Just as speaker's choices in reference to pronouns are determined grammatically by semantics, we argue that prosodic prominence shifts also involve a higher-level semantic mechanism, formalized by a syntactic focus operator and focus alternative sets.

Chapter 4

Second Language Acquisition Theory

4.1 Why Study Prosodic Focus in Adult Learners?

Native speakers are extremely sensitive to non-native prosody (Jilka 2000, Boula de Mareüil and Vieru-Dimulescu 2006, Mennen 2015). Employing sentences in Spanish and Italian that were essentially identical in that they fully employed cognates, such as in (1), Boula de Mareüil and Vieru-Dimulescu (2006) artificially grafted the prosody from one language onto sentences of the other.

(1)   *Spanish:* Un baño fresco lava naturalmente poco

        Italian: Un bagno fresco lava   naturalmente poco
              a   bath   fresh   washes   naturally   a.little
           "A cool bath naturally washes a little."

Native speakers of each language listened to the original sentences as well as the prosody-grafted sentences and sentences with artificially synthesized prosody. Listeners in both groups judged Italian with Spanish prosody to sound more "Spanish-like" than "Italian-like", even though the sentence employed Italian phonemes that may differ phonetically from Spanish, and similarly found Spanish with Italian prosody to sound more "Spanish-like". It therefore seemed in the case

of this study that prosody served as a stronger determinant than segmental cues in determining foreign accent.

Why native speakers are so attentive to non-native prosody is not clear, but it serves to show the importance in studying prosodic phenomena in second language acquisition. For many adult learners, the goal is to sound as native-like as possible; if prosody is a large determinant in native-sounding speech, it is a crucial topic of study. As yet, phenomena like prosodic focus have not been given much attention in the literature and so they present an important opportunity for investigation.

As can be understood from the previous chapters, sentence prosody does not simply involve speech sounds but also plays a role in determining meaning, even having an effect on truth conditions in certain cases. In order to master effective communication in a second language, it is therefore critical to properly acquire the system of prosodic discourse marking of that language. It is not currently known to what extent and in what ways a non-native prosodic representation affects L2 sentence comprehension. This thesis examines this question through the use of experiments measuring online processing.

4.2   Second Language Acquisition

Typically-developing young children are uniformly capable of acquiring whatever language(s) surround(s) them. Adults learning a second language are not perceived to reach the same level of proficiency as they do in the language(s) they learned as children. According to some researchers, the ability to acquire a language appears to decline in childhood, reaching a point around puberty where it is rare for learners to achieve proficiency at a level equivalent to their peers who learned the language from birth (Lenneberg 1967, Abrahamsson and Hyltenstam 2009, Abrahamsson 2012). Although examples of near-native speakers have been documented – and oftentimes are indistinguishable from native speakers on many measures (e.g. White and Genesee 1996)—some have argued that such individuals still process and produce their non-primary language in a manner

that it subtly different from native speakers (Clahsen and Felser 2006, Sorace 2011, Abrahamsson 2012).

In the study of adult language acquisition, one of the most common questions is thus what contributes to this perceived difference. One of the starting points in the literature was to ask whether a second/non-primary language learned in adulthood (henceforth L2) is produced and processed with the same cognitive mechanisms as a speaker's native language (L1). Certainly, this requires some definition of the cognitive status of the L1, of whether language a domain-specific ability or domain-general.

The major argument in favour of a domain-specific view of language is the so-called Poverty of the Stimulus (PoS) argument or "Logical Problem of Language Acquisition" (Baker and McCarthy 1981, Hornstein and Lightfoot 1981). The PoS argument was first put forth in relation to child language acquisition. The premise is that humans possess subtle grammatical distinctions that could not have been learned simply by starting from a completely blank slate. The guiding assumption of the PoS argument is that a learner cannot make accurate deductions about a grammar based on what structures are absent. Learners are only able to make use of what is termed positive evidence, or evidence derived from linguistic structures present in the input. However, the positive evidence available to learners is not nearly enough for it to be possible to acquire the complex structures of a language, unless learners begin with some prior knowledge of how language works. This is tested in Kam and Fodor (2012), where an n-gram statistical model is employed to show that a learner must minimally begin with certain innate assumptions about phrase structure in order to acquire auxiliary fronting in English. The PoS argument is used to support the existence of a universal grammar (UG), which is a genetically acquired aspect of human cognition that provides the structural backbone to all human linguistic grammars (Chomsky 1959, 1965) and greatly reduces the task of acquiring a language, since a learner need only clue into the particular variation within that underlying structure that their target language represents.

Among those researchers that have accepted the assumption that language arises from a domain-

specific ability, two schools of thought emerged, as far as L2 is concerned. The first theorized that a second language is represented in the mind of an adult learner in a manner that is fundamentally different from a child learner of a first language (Bley-Vroman 1989). The second school of thought theorized that an adult acquires a second language using language-specific mental representations that are identical to the ones used in childhood language acquisition[1] (White 1989, 2003, 2012, Schwartz and Sprouse 1996).

4.2.1   The Logical Problem of Second Language Acquisition

Bley-Vroman (1989) made the claim that the logical problem does not arise in the context of L2. Adults never achieve the same success as children in learning a language, and so according to Bley-Vroman, there is less to account for since the grammatical systems acquired by adults do not approach native language grammars in their complexity. Bley-Vroman therefore claims that the input received by adult learners is sufficient in explaining L2 grammar, without assuming prior knowledge of grammatical universals. Moreover, second language learners can draw from knowledge of how language works in the L1 to inform acquisition of the L2. Bley-Vroman (1989) therefore claims that adults learn an L2 in the same way that any other sort of skill is learned in adulthood: through conscious practice and rote learning of patterns.

Since the publication of Bley-Vroman's paper, a large body of evidence has in fact been found in opposition to this claim. It is indisputable that non-native speakers can differ from native speakers on many measures. However, despite this fact, they have still been shown to possess intricate linguistic judgments in their non-primary languages that could not have been transferred from their native language and could not have been deduced from positive linguistic evidence from the target grammar (Schwartz and Sprouse 1996, White 2003). One such case has to do with constraints on null pronouns. Many languages, such as Spanish and Japanese, are known to allow null subject

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[1]This is not to say that L2 is identical to L1 – factors like crosslinguistic transfer are said to play a role, for example, as will be explored in later sections.

pronouns, but the distribution of null pronouns is constrained by several syntactic factors, one of which being the Overt Pronoun Constraint (OPC) (Montalbetti 1984). This constraint states that if a pronoun has a null variant[2], the overt pronoun cannot take on a variable interpretation, where its meaning is bound by a quantifier. This means that only the null pronoun can be employed in contexts like (2), where it serves as a variable. However, in (3), the pronoun takes on a referential meaning and therefore both the null and overt variants are acceptable.

(2)   The whole class is competing for a prize, given to the student who gets a perfect score on the test. The students know that the test is very hard, so . . .

    a.   Nadie$_i$ cree   que ø$_i$ ganará   el premio.
        nobody thinks that *pro* win.FUT the prize

    b.   *Nadie$_i$ cree   que él$_i$ ganará   el premio.
        nobody thinks that he win.FUT the prize
        "Nobody thinks they'll win the prize."

(3)   The whole class is competing for a prize, given to the student who gets a perfect score on the test. The students know that John$_j$ never studies, so . . .

    a.   Nadie$_i$ cree   que ø$_j$ ganará   el premio.
        nobody thinks that *pro* win.FUT the prize

    b.   Nadie$_i$ cree   que él$_j$ ganará   el premio.
        nobody thinks that he win.FUT the prize
        "Nobody thinks he'll win the prize."

The OPC is considered to be a universal principle of grammar, since it holds across diverse language families (Montalbetti 1984, Pérez-Leroux and Glass 1999). English native speakers, however, never receive evidence as to its presence in English, since no English pronoun possesses a null variant. Therefore, if second language speakers do not have access to universal grammar in their L2, English speakers are predicted to be imperceptive of the distinction between variable

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[2]A pronoun has a null variant if it is able to be dropped in a particular syntactic position in a particular language. For example, all subject pronouns in Spanish have null variants, but object pronouns do not. However, in Japanese for instance, both subject and object pronouns may be dropped, and so the situation is different.

and non-variable readings in Spanish and Japanese. This distinction is not explicitly taught, nor is there direct positive evidence in the L2 as to its activity in the grammar, since as was stated before, an absent structure cannot be deduced to be ungrammatical (Pérez-Leroux and Glass 1999). Therefore, it is quite unlikely that English speakers would be able to acquire this distinction if Bley-Vroman's model is correct – the L1 offers no help, nor does the L2 input, nor can the rule be learned by rote if it is not included in standard classroom materials.

Several studies have shown that L2 grammars are indeed subject to the OPC. In a written production task in Pérez-Leroux and Glass (1999), English native speakers showed a distinction between the variable and referential readings of Spanish pronouns. The distinction was sharpest among those who were the most proficient in Spanish; however, even the "elementary" learners in Pérez-Leroux and Glass's study showed a statistically significant preference towards null pronouns in variable-reading contexts. The elementary learners had spent less than two years studying Spanish in a university classroom context, and so it is remarkable that they possessed this distinction. In L2 Japanese, Kanno (1997) similarly found that English learners of Japanese distinguished between variable and referential readings, rejecting overt pronouns with a variable reading in a judgment task. These studies are cited as evidence that adult learners draw upon universal grammatical principles in their second language. In other words, second language acquisition is no different from child language acquisition in its epistemological status (in the terms of Schwartz (1986)). This is known as the Full Access, because it is said that adult learners have *full access* to UG (Schwartz and Sprouse 1996). In addition to null pronouns, second language speakers have been shown to be sensitive to subtle grammatical distinctions with respect to such diverse phenomena as the interface of lexical semantics and syntax (Dekydtspotter et al. 1997) and subjacency violations (White and Juffs 1998), among other properties.

If it is to be assumed that adult learners have access to UG, it means that no *wild*[3] interlan-

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[3]In White (2003, p.43), it is noted that various terms have been employed to describe grammars that do not conform to principles of UG, including *impossible, rogue, illicit,* and, as employed here, *wild*.

guage grammars are predicted to occur, or grammars that violate the assumptions of UG. Instead, learners will create hypotheses about the target grammar based on the parameters of natural human language. This will become important when examining the acquisition of prosodic focus, where learners must be assumed to limit their hypothesis space to three parameter settings: a grammar in which prosodic focus marking is permitted for all types of focus (English type), a grammar in which prosodic focus is permitted only for corrective focus (Spanish type) and a grammar which never permits prosodic focus marking (Northern Sotho type).

4.2.2 Transfer from L1

Although Full Access argues that L2 grammar draws from the same knowledge resources as the L1, there is still a key difference between L1 and L2 acquisition. In L2 acquisition, there is the feeling that it is harder to learn a language that differs wildly from one's own. An undergraduate native speaker of Spanish probably feels that Italian poses fewer difficulties than Farsi as a language elective in university, for example. From the point of view of linguistics, this can be explained by the fact that linguistic knowledge from the L1 can be put to use in the L2. If a learner's first and second language both possess post-nominal modifiers, as do Spanish and Italian, this constitutes one less construction that needs to be acquired. Structures shared by both the first and second language essentially "come for free". A straightforward way to account for this is to assume that the starting point for a second language learner is the grammar of the native language. This is known as Full Transfer and in conjunction with Full Access (discussed in the previous section), makes up the Full Transfer/Full Access theory of second language acquisition (FTFA) (Schwartz and Sprouse 1996).

Studies that have shown evidence for transfer from the L1 are diverse and countless (e.g. Goto 1971, Ringbom 1992, Slabakova 2000, Goad and White 2006), but the most convincing ones are those that compare two different groups of learners, each with a different native language, acquiring

the same second language. For example, Yuan (1998) examined the acquisition of the Chinese reflexive pronoun, *ziji*, which can be bound by a non-local antecedent. Yuan tested two groups: English native speakers and Japanese native speakers. While English does not allow reflexives to have non-local antecedents, disallowing sentences like (4), both Japanese and Chinese allow reflexives to be non-locally bound (such that an equivalent sentence to (4) could potentially be grammatical in both languages).

(4)   *John$_i$ thought that Sally hated himself$_i$.

As would be predicted by a theory of transfer, the Japanese speakers accepted sentence meanings that required a non-local reading – resembling Chinese native speakers – while the English speakers did not.

Putting together now Full Transfer with Full Access, the FTFA provides a model of second language acquisition which makes very clear predictions for the learning pathway taken by adult learners. Beginning with the L1 grammar as the initial state, the L2 interlanguage grammars are a series of changes to this grammar that are triggered by the input and must conform to universal grammatical principles. Because this pathway has a different initial state from child language acquisition, the outcome is likely to be different, and "dead ends" are possible where the input does not provide enough evidence or a learner arrives at a non-native-like grammatical state that conforms to UG and is similar enough to the target grammar to not warrant a restructuring.

The FTFA makes predictions regarding grammatical phenomena in L2, but it is unclear what kind of predictions it would make regarding prosodic focus. For example, prosodic focus as an anaphoric phenomenon integrates knowledge that is not traditionally conceived as belonging to the "grammar proper". Additionally, as a prosodic phenomenon, it integrates knowledge of speech sounds and prosodic structure.

4.3 Focus – Multiple Mappings

Linguistic phenomena involving mappings between different grammatical modules have recently been given special attention in the generative language acquisition literature (White 2011b), for two main reasons. The first is that intermodular mappings in the grammar (interfaces) are of interest to linguistics in general, in that they help to display the architecture of linguistic derivation (Ramchand and Reiss 2007). The second is that learners have been shown to have difficulties with a variety of types of mappings: in Bruhn de Garavito and White (2002), learners showed difficulty mapping uninterpretable gender features to surface morphology; in Belletti et al. (2007), among other studies, it was found that learners showed difficulty mapping discourse features to the syntax; and in Goad and White (2004), it was found that learners showed difficulty mapping morphology to prosodic structure.

However, as Tsimpli and Sorace (2006) first observed, it is not the case that any type of interface will present problems to learners simply by virtue of it involving a mapping between two or more parts of the grammar. For example, in the case of syntax-semantics mappings, many studies – for example Dekydtspotter et al. (2001) – have found that learners possess native-like distinctions of grammatical phenomena at this interface. White (2011b) therefore concludes that: "interfaces are not monolithic: it is not the case that all interfaces lead to difficulties, it is not the case that all phenomena at a particular interface are necessarily problematic [and] it is not the case that acquisition failure is inevitable."

Two possible explanations for problems with interface phenomena in acquisition have been advanced: either the linguistic representations at the interfaces are somehow deficient, or learners' computational performance at the interfaces is deficient, failing to deal with complex derivations. Given that a variety of results have been found with respect to L2 interfaces, it is possible that both apply in different cases, depending on the interlanguage and target grammars in question.

Prosodic focus involves a number of different parts of the grammar: focus prominence involves

the coordination of several phonetic cues, and interacts with the prosodic structure of the language. In addition to this, focus is instantiated in the syntax, requiring a syntactic focus operator. Finally, discourse conditions are also involved in the interpretation of focus, as it is an anaphoric phenomenon.

4.3.1   Acquisition of Intonational Contours

In this thesis, I will be looking at English and Spanish methods of marking focus. English and Spanish both employ acoustic prominence to mark focus, but phonetic differences exist between focus prominence in English and in Spanish. Although it is the case that English and Spanish pitch accents have identical representations in the prosodic structure—a pitch accent being associated to a prosodic head—it has been proposed that Spanish differs phonologically from English in that a focus phrase must be followed by a phrasal boundary (Zubizarreta 1998). This presumably has a phonetic instantiation and there is some evidence for this: Face (2002) reports an intermediate phrase boundary (L- or H-) following contrastive focus in Spanish. The extent of the acoustic differences has not been previously examined in a comparative analysis. Moreover, the extent of the phonetic research on Spanish focus has primarily looked at the Spanish of Madrid (Face 2000, 2001, 2002). What was demonstrated in these previous studies on Madrid Spanish was that contrastive focus employs a particular pitch contour that is approximately similar to English, but that the timing of this contour does not always coincide with the stressed syllable as it does in English. Intensity and duration were not measured in these studies. It is therefore valuable to conduct production experiments in English and Spanish, examining all three acoustic cues for prominence, in order to construct a comparative analysis.

4.3.2 Acquisition of the Prosodic Structure of Focus

Studies like Goad and White (2004) suggest that a change from the L1 prosodic structure is difficult for learners to achieve, although their Prosodic Transfer Hypothesis (PTH) applies solely to prosodic structures at the level of the prosodic word and lower, and therefore cannot be easily generalized to higher phrasal structures. Predictions for acquisition of focus therefore must be made based on comparative analyses of the grammars in question since no clear theoretical precedent exists.

According to Zubizarreta (1998), prosodic boundary insertion is a possible, optional structure in English, while in Spanish, a focus phrase that is not flanked by a boundary is an illicit structure. This entails that Spanish learners of English would have an advantage over English learners of Spanish as the English grammar is a superset of Spanish, in the terms of White (1989). In other words, Spanish learners of English are availed with positive evidence for the acceptability of marking focus without prosodic boundary insertion. However, English learners of Spanish are simply faced with the absence of such structures, and therefore are not availed with positive evidence.

Two studies have examined the acquisition of English focus prosody by Spanish learners. The first is Zubizarreta and Nava (2011) which examined the unaccusative-unergative prosodic distinction and focus-driven prosodic stress shift in English[4]. Sentences with unaccusatives and unergatives in English have different prosodic properties. In unergative verbs, prominence is most naturally realized on the verb, as a result of the S-NSR, which assigns main prominence to the final element in the selectional chain.

(5)   A: What happened yesterday?

       B: [John CRIED]$_F$

However, unaccusatives behave differently because it is the verb that selects the subject, resulting

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[4]The study was parallel in design to Lozano (2006), an earlier study on Spanish syntactic movement; to be discussed in a later section.

in subject prominence[5]:

(6)   A: What happened yesterday?

       B: [JOHN arrived]$_F$(/[John ARRIVED]$_F$)

Zubizarreta and Nava cross verb type (unaccusative vs. unergative) with narrow focus (narrow subject focus vs. broad focus). The English pattern for narrow focus is such that narrowly focused subjects always bear the main prominence, regardless of verb type.

(7)   A: Who cried yesterday?

       B: [JOHN]$_F$ cried.

(8)   A: Who arrived yesterday?

       B: [JOHN]$_F$ arrived.

By means of a production study, Zubizarreta and Nava tested intermediate and advanced learners of English (L1 Spanish) and their results indicate that in the case of narrow subject focus, advanced speakers show the same rates of subject prominence as native speakers. English speakers shift stress to the focussed subject in 98% of the productions while the advanced learner group shifted stress 96% of the time. The intermediate speakers showed a numerical trend similar to the other groups – 68%. In contrast to the results for focus, neither the high nor low proficiency learners produced the native-like pattern with respect to verb-type: whereas native speakers produced subject prominence with unaccusative verbs 97% of the time, the high proficiency learners only did so in 36% of the cases, while the low proficiency only did so at a rate of 4%. In sum, the study indicated that stress shift in the case of informational focus on the subject was not troublesome for Spanish learners but argument-structure-driven prosodic alternations presented considerable difficulty. Since the S-NSR never applies in Spanish while prosodic focus-marking is a viable option,

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[5]Stress shift in the case of unaccusatives is optional according to Zubizarreta (1998) since speakers can opt to assign stress using the C-NSR.

at least for corrective focus, L1 transfer can account for much of the findings. However, it is interesting that in the case of the S-NSR, plentiful positive evidence exists to drive acquisition – why then did advanced speakers show such low rates of suppliance?

4.3.3 Acquisition of Syntactic Representation of Focus

With respect to the syntax of focus in L2, one main question has been investigated in the literature, which concerns syntactic focus movement in Spanish and Italian. According to the analysis given in the previous chapter, both Spanish and Italian exhibit pre-LF raising of presuppositional material to combine with $\sim$. It has been found that learners show particular difficulty in acquiring this overt movement pattern.

Lozano (2006) studied two groups of L2 Spanish speakers, one of English native speakers and another of Greek native speakers. The Lozano study compared the acquisition of narrow focus to the acquisition of unaccusative-unergative alternations. Remember that although the subject canonically precedes the verb in Spanish, the verb takes precedence over the subject with unaccusative verbs (Burzio 1986). The alternations in (9) are therefore thought to be driven by the syntax alone.

(9) a. Juan gritó.
          John shouted

     b. *Gritó   Juan.
          shouted John

     c. Llegó Juan.
          arrived John

     d. *Juan llegó.
          John arrived

Context is the sole determinant of another alternation in Spanish, where a narrowly focused subject takes up the sentence-final position. The narrow focus alternation is dependent on the structure of

the discourse – the focus structure is selected based on anaphoric dependencies; this is true for unergatives as well as for unaccusatives.

(10)   A: ¿Quién gritó?
              who   shouted

        B: Gritó   Juan/*Juan gritó
              shouted John/John   shouted

In the Lozano study, both the English and Greek learners showed evidence of having acquired native-like judgments with respect to unaccusative and unergative verbs. Both learner groups rated the word order in (9a) relatively higher than (9b); the same for (9c) versus (9d). The learners therefore patterned with native speakers with respect to these alternations. However, whereas native speakers showed a distinction between the two orders in (10), neither learner group showed a strong preference either way. Both orders were accepted at similar rates from a statistical perspective.

Similar results were reported in Belletti et al. (2007). In this study, the researchers elicited production of Italian narrow and wide focus from English native speakers. Italian shows the same alternations as Spanish with respect to unaccusative-unergative verbs as well as with narrow focus. Belletti et al. only examined narrow subject focus, shown in (11) to operate identically to Spanish: the focussed subject of an unergative must occur sentence-finally.

(11)   A: Chi parlerà?
              who talk:FUT
              "Who will talk?"

        B: Parlerà   Gianni
              talk:FUT Gianni

        B′: *Gianni parlerà
              Gianni talk:FUT
              "Gianni$_F$ will talk."

Native speakers produced the VS order 93% of the time in Belletti et al.'s production task, while the learners, who were classified as near-natives on an independent measure, only produced the VS order 29% of the time. The other 71% of the time, it was reported that they produced SV ordering, with sentential stress on the subject. In other words, the majority of the productions followed the L1-like pattern for focus.

Adult learners do not always show persisting problems with syntactic focus in their second language. The first evidence for this is from L2 Greek, which exhibits focus fronting. The object moved to the left periphery has a focus interpretation:

(12)   *Greek: "Did your sister meet Marcus?"*

        [TON   PETRO$_i$]$_F$ sinandise t_i i   adhelfi mu
        the-ACC Petro   met-3S   the-NOM sister my
        "It was PETRO$_F$ that my sister met."

Russian does not exhibit the same pattern. However, word order is rather flexible in Russian and it exhibits other types of movement in response to discourse conditions. For example, given material moves leftward in the following example (Bailyn 2003):

(13)   *Russian: "What is the opinion about the new president?"*

    B: Novogo presidenta narod ljubit
        new   president people love

    B′: #Narod ljubit novogo presidenta
        people love new   president
        "People love the new president."

Tsimpli and Sorace (2006) show that Russian L1 learners of Greek fronted objects in focussed contexts almost 100% of the time in an oral production task. What this might show is that even if the L1 does not employ precisely the same types of syntactic strategies to mark focus, a freer word order in the L1 could give an advantage to L2 acquisition of syntactic focus phenomena.

An issue that has not yet been examined with respect to the acquisition of the syntactic representation of focus has to do with the syntactic scope of ~. Previous studies in Spanish and Italian have only examined cases of informational focus in which the operator scopes over the clause. When considering the study by vander Klok et al. (2014), it seems that this approach might be missing out on a great deal of variability. For example, the assumption in Zubizarreta and Nava (2011) as well as in Klassen (2013c)[6] is that English stress shift is a non-native pattern that must be acquired by Spanish speakers – it cannot transfer. However, it is frequently mentioned that prosodic focus marking does occur in Spanish in contrastive contexts (Zubizarreta 1998, Face 2002, Domínguez 2013, Bocci 2013). It therefore is important to look at cases where ~ takes scope over smaller syntactic constituents, as this is where Spanish is hypothesized to differ from English. If the Scope Hypothesis is correct, the task for the Spanish learner is not to acquire prosodic stress shift, but to acquire the unrestricted scope of ~ in English. The task of moving from a restricted system of prosodic focus marking to an unrestricted system, in classic acquisition terms, simply requires the availability of positive evidence. A learner need only be exposed to input in which prosodic focus is marked in contexts where it is not marked in their first language in order to acquire knowledge of prosodic focus in the L2. On the other hand, an English learner of Spanish may have problems since there is no positive evidence available to signal to ungrammatical status of sentences involving a non-clausal focus domain.

4.3.4   Acquisition of Discourse and Pragmatics of Focus

Pragmatic phenomena in L2 have been of particular interest in recent years in light of the proposal that interfaces involving the discourse are more problematic than others in acquisition (Platzack 2001, Sorace 2011). Research on L2 pragmatics has included the research on focus discussed in the previous section, as well as studies on pronominal anaphora (e.g. Sorace and Filiaci 2006),

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[6]A version of Klassen (2013c) will be presented in the following chapter.

pro-drop (e.g. Rothman 2009) and scalar implicature (e.g. Slabakova 2010).

Proposals such as the Interface Hypothesis (Sorace 2011) maintain that pragmatics are *external* to the grammar. The syntax-discourse interface under this view is a linking between a grammatical module and a non-grammatical module, and therefore differs ontologically from other types of interfaces. This architectural framework is used to explain results from studies that show latent difficulties among L2ers with discourse-related elements of the grammar. One such study is Sorace and Filiaci (2006), which tested near-native speakers of Italian (English L1) on pronominal anaphora. In Italian, an overt subject signals a shift in topic. In (14a), *lei* must refer to *figlia*, because the overt pronoun signals a shift in topic in relation to the matrix clause[7]. In (14b), the null pronoun *pro* can refer to either *mamma* or *figlia*, since a shift in topic has not been implied.

(14) a. La mamma$_i$ dà un bacio alla figlia$_j$ mentre lei$_{*i/j}$ si mette il cappotto.
          the mother gives a kiss to.the girl while she REFL puts the coat
          "The mother kisses the girl$_i$ while she$_i$ puts on the coat."

      b. La mamma$_i$ dà un bacio alla figlia$_j$ mentre *pro*$_{i/j}$ si mette il cappotto.
          the mother gives a kiss to.the girl while she REFL puts the coat
          "The mother$_i$ kisses the girl$_j$ while she$_{i/j}$ puts on the coat."

The L2ers showed target-like knowledge of the types of discourse features associated with overt pronouns in Italian ([+topic shift] in the authors' terms) in that they showed a higher preference for interpretations in which *lei* referred to *figlia* (the task involved choosing a picture that best illustrated the sentence). However, they diverged from native speakers in that they still accepted [-topic shift] interpretations for overt pronouns at a slightly higher rate. For null pronouns, they patterned identically to native speakers, accepting both interpretations (reference to *mamma* or *figlia*) equally. Given that the L2ers were considered to be at the highest level of proficiency in Italian, as established according to lexical, morphological, syntactic and phonological criteria, these results were taken to mean that anaphoric phenomena are subject to protracted, perhaps permanent, difficulties among adult learners.

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[7]The topic within the matrix clause is assumed to be *mamma* since it occupies subject position.

From this observation was developed a hypothesis which integrated previous claims from Platzack (2001) who stated that a variety of different non-typical language populations (bilingual child learners, attrited L1, disordered acquisition) have difficulty with elements in the C-domain of the grammar (clause-level syntax). This ambitious hypothesis stated that the syntax-discourse interface was a locus of impairment among these diverse groups, which creates a testable prediction for L2 acquisition: Any syntax-discourse phenomenon is predicted to be problematic for learners under this view – in fact, this domain of the grammar is predicted to be permanently impaired. This hypothesis came to be known as the Interface Hypothesis (IH) (Sorace 2011)[8] . However, it has eventually taken two forms, the weaker form which I will refer to as IH_1, asserts that syntax-discourse is difficult while IH_2 asserts that it is impossible to acquire for adult learners.

(15) IH_1: Syntax-discourse is difficult to acquire but native-like proficiency can be attained (Rothman 2009).

IH_2: Syntax-discourse is impossible to acquire, resulting in non-native-like behaviour even at extremely advanced stages of L2 development (Sorace 2011).

Evidence against the IH_2 has emerged in many studies, however – some already mentioned with respect to the acquisition of focus. For example, Tsimpli and Sorace (2006) reported native-like production of syntactic focus-movement in Greek by Russian learners. And while prosodic focus does not directly involve syntactic movement, the evidence from Zubizarreta and Nava (2011) (and Klassen (2013c), discussed in the following chapter) could also be taken as evidence against the IH_2. With respect to null pronouns, Rothman (2009) conducted a study with L2ers of Spanish (English L1) and found that advanced speakers were completely native-like in their distribution of null and overt pronouns in production. The intermediate speakers in the study showed an oversuppliance of both null and overt pronouns, which Rothman (2009) took to signify that the difficulty

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[8]Sorace (2011) excludes learners that are not near-native from the theory, but I take the position put forth in White (2011a), which is that there is no principled reason that the IH should not apply to lower-level learners as well.

did not arise from transfer: Transfer from English would instead only result in oversuppliance of overt pronouns but the null variant is not available in the L1 grammar. Rothman (2009) therefore attributes the non-native-like behaviour of the intermediates in the study to the fact that the syntactic properties of pronouns in Spanish are acquired earlier than the pragmatic properties. This fact results in free variation of null and overt subjects in intermediate learners' interlanguage grammar which later disappears once the pragmatic conditions have been acquired. This is a more nuanced argument against the Interface Hypothesis than just demonstrating that discourse-driven phenomena like topic and focus can ultimately be attained. Yes, Rothman (2009) agrees that at least some elements at the syntax-discourse interface are harder to acquire (in line with IH_1), but only because the pragmatic features are representationally complex and not because the mapping is somehow essentially different from other mappings in the grammar; moreover, the difficulty in acquiring complex discourse properties is not insurmountable for learners and therefore cannot indicate any sort of permanent impairment.

4.3.5 Language Processing in L2 and Online Generation of Predictions

Until now, this chapter has mostly discussed the nature of linguistic knowledge in L2, claiming that learners draw upon the same knowledge base as native speakers. However, this does not exclude the possibility that learners may make use of different processing resources. As stated in Juffs and Rodríguez (2015, p.12), an important question in L2 processing is whether L2ers use the same processing resources in their L2 as they do in L1. Two distinct approaches have emerged in the literature, the first asserting that L2 processing does not differ qualitatively from L1 processing besides the obvious interfering role of the L1 grammar and individual differences in performance (e.g. working memory capacity) (Juffs and Harrington 1995). The second approach claims to identify instances of L2 processing outside cases of transfer that differ from L1 processing (Clahsen and Felser 2006). This thesis will argue for the first framework, in which any differences between

L1 and L2 processing can be explained by the role of the L1 grammar and individual differences in processing.

In native language processing, recent work has put emphasis on the predictive nature of language processing, showing that listeners use a variety of cues to predict upcoming material (e.g. Bar 2009, Clark 2013, Pickering and Garrod 2013). Although the online generation of predictions is generally accepted to occur among native speakers, much research has shown that L2ers do not generate online predictions, at least not to the same extent (Grüter et al. 2012, Grüter and Rohde 2013, Kaan 2014). Grüter and Rohde (2013) put forth the RAGE (Reduced Ability to Generate Expectations) model: L2ers have trouble generating predictions online. However, as Kaan (2014) points out, "[r]ather than stipulating qualitative differences between L2 and native processing, research should aim to determine what drives the apparent differences between language learners and native speakers." There are several factors modulating the generation of predictions online, having to do with information storage and retrieval and computational resources. These factors are independent of linguistic knowledge: for example, in Grüter et al. (2012), learners showed target-like production and judgments of gender morphology in offline tasks but, in an eye-tracking task, were unable to predict upcoming referents based on gender cues. The processing of cataphoric focus involves the management of expectations with regards to upcoming referents, and therefore provides a good test case for the RAGE model[9].

4.4   Research Questions and Hypotheses

A goal of this thesis is to observe the L2 acquisition of prosodic focus and to provide insight into crosslinguistic variation in focus marking. It has been established in the preceding chapters

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[9]In communication with Grüter, it is clear that the RAGE model is not meant to be an explanatory model, but instead a general observation of L2 behaviour; a generalization which "is almost certainly false," but provides a falsifiable hypothesis for processing phenomena involving expectations and prediction generation (Theres Grüter, personal communication, June 19th, 2015).

that prosodic focus is a relatively new topic of study in language acquisition, and several lines of questioning have yet to be followed. Since focus involves multiple mappings in the grammar, an important question is what types of mappings will be difficult for learners. This in turn can potentially provide information as to the structure of the grammar. The research questions can therefore be divided into theories concerning the linguistic knowledge of adult learners, and general linguistic theories of focus and prosody.

4.4.1 Language Acquisition Hypotheses

Table 4.1 outlines the various L2 theories and their predictions regarding prosodic focus. While English allows stress shift to mark focus in a broad variety of contexts, Spanish is more restrictive. Working from the assumption that the grammar of a learner's first language transfers to the second language (Schwartz and Sprouse 1996)—including intonational categories (Mennen 2015)—it is expected that learners' grammars will show evidence of transfer. Evidence of transfer might show up in production: Spanish learners of English might fail to shift stress in contexts where it is required in English or use non-native-like intonational contours. Conversely, English speakers may shift stress in contexts where it is inappropriate in Spanish. Evidence of transfer might also show up in comprehension: Spanish learners may fail to interpret English focus if it violates prosodic rules of the L1[10]. This thesis will test both comprehension and production: Study 2, reported upon in chapter 5, examines the comprehension of English prosodic focus by Spanish native speakers by means of a naturalness rating task. Study 3, in chapter 6 and chapter 7, examines two groups of learners: Spanish learners of English and vice versa. The study is comprised of a production task, designed to elicit contrastive focus in both English and Spanish, and a visual world eye-tracking task, which requires the comprehension cataphoric focus, only in English.

The second difference between English and Spanish is that in English, focus can be marked

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[10]Another possible effect is that the lack of focus-marking in certain contexts in Spanish could affect processing by native English speakers, but this was not tested.

cataphorically while in Spanish, it cannot (at least not within the sentence). This difference could potentially show up in production as well as in comprehension for Spanish native speakers. Evidence of transfer of this knowledge from Spanish might mean that Spanish speakers do not mark cataphoric focus in English in production, and it could mean that they cannot interpret it in comprehension. However, transfer is not the only consideration: cataphoric focus marking is rare in Spanish, but this does not mean that it is completely ruled out.

One advantage of including a comprehension-based task with a phenomenon like focus is that focus-marking, notably cataphoric focus-marking, is often optional in nature. This is to say that even if anticipatory focus-marking is not consistently produced by an individual in a production task, it is not necessarily the case that the individual is incapable of interpreting such cues. An eye-tracking experiment more reliably tests whether learners can make use of anticipatory focus.

Finally, although a production experiment can reveal important information pertaining to the grammar of a speaker, online processing experiments like eye-tracking can reveal fine-grained information pertaining to language processing that may not show up with other types of methodology. This is directly relevant to recent discussions of the creation of online predictions (e.g. Kaan 2014). The recent proposal that learners consistently exhibit an inability to create predictions online will be tested in the eye-tracking study, which requires the interpretation of cataphoric focus in order to generate predictions as to the upcoming referent in real-time.

4.4.2   General Linguistic Questions

There is a strong correlation in between prosodic prominence and focus in both English and Spanish. However, Spanish speakers are perhaps less likely to shift stress than English speakers, and are more prone to use syntactic methods of focus marking. By manipulating where focus lies in the sentence, it is possible to see whether speakers are more likely to mark focus when it coincides with a prosodic boundary or occurred within a prosodic phrase. According to a phonological ex-

	Premise	Predictions for Prosodic Focus	Source
Full Transfer/Full Access	All elements of L1 grammar transfer to L2, full access to UG	Where L1 and L2 diverge, success is possible in late stages but not guaranteed	(Schwartz and Sprouse 1996)
Interface Hypothesis	External interfaces lead to permanent difficulty	No success (unless aided by transfer)	(Sorace 2011)
Scope Hypothesis	English and Spanish differ in scope options of focus operator	Success in L2 English; No success in L2 Spanish	(vander Klok et al. 2014)
RAGE	Reduced ability to generate expectations online in L2	Success in offline tasks, no success in online tasks requiring expectations	(Grüter et al. 2012, Grüter and Rohde 2013)

Table 4.1: Various Theories of L2 Prosodic Focus and Related Predictions

planation of the crosslinguistic variation, (e.g. Féry 2001, Büring 2010), speakers should avoid shifting stress away from the prosodic head in Spanish. This would predict that Spanish speakers would avoid marking focus prosodically in cases where it violates this constraint – namely, when the head noun is focused. According to the Scope hypothesis (vander Klok et al. 2014), Spanish should disallow marking focus prosodically if it requires the focus operator to scope below the clausal level. Therefore, it would be predicted that Spanish speakers would show this distinction in production, only reliably producing prosodic focus in the "Super-clausal" condition (see Table 6.2 for reference).

In English, although it is generally accepted that focus can be marked cataphorically, it has not been observed previously in a production experiment. The production experiments were designed to elicit sentences in which cataphoric focus could optionally be marked. It is predicted that cataphoric focus should not appear in the Spanish productions by Spanish native speakers, as this phenomenon does not exist in Spanish.

Finally, an acoustic analysis of the production data can shed light on which acoustic cues are the most reliable in English and which are the most reliable in Spanish. In English, it is often found that intensity, duration and F0 work in tandem. However, not all three correlates are always found to be present and intensity is generally considered the most reliable marker of focus. In Spanish, Face (2002) reports that pitch constitutes the most reliable cue for contrastive focus marking in Spanish. Other acoustic variables have not been previously tested for Spanish contrastive focus. The acoustic analysis of the production data will provide us with a comparative analysis of Spanish and English focus acoustics.

With respect to the eye-tracking experiment, the importance was to show that cataphoric focus (and anticipatory de-accenting) plays a facilitatory role in language processing, echoing the findings in Carbary et al. (2014) (which did not report eye-tracking data). This effect has not been observed in an eye-tracking paradigm. Another value of the eye-tracking experiment is that it employs post-nominal modifiers and looks at both focus on the modifier and on the head. The majority of eye-tracking experiments on focus prosody have simply looked at the effect of focused pre-nominal modifiers (i.e. Place the GREEN ball . . .), and have not examined the effect of focus on the head noun (i.e. Place the green BALL . . .).

Chapter 5

Study 2: Information Focus in a Second Language

Aspects of this chapter have been presented at various conferences[1] and published as a proceedings paper.[2]

5.1 Introduction

The study in this chapter was concerned with the comprehension of informational focus by Spanish learners of English. In Spanish, information focus involves syntactic movement, which is characterized by the given material moving leftward, having as a consequence the alignment of the focussed material with the right edge, which is most prominent position in the sentence— (1). Stress shift is not utilized in this case[3]. In English, informational focus is instead marked in-situ using stress shift: stress is shifted to the focussed constituent, as seen in (3). The focus prominence is accompanied by an H* accent, which signals new information.

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[1](Klassen 2013a,b)

[2](Klassen 2013c)

[3]Later, in chapter 6, it will shown empirically that Spanish native speakers do not shift stress in cases like these.

(1)   *Spanish* ([Lozano 2006](#))

    A: ¿Quién gritó anoche en la calle?

        "Who shouted last night in the street?"

    B: #[Una MUJER]$_F$ gritó
        a   woman   shouted

    B′:   Gritó   [una MUJER]$_F$
        shouted a   woman

(2)   *English*

    A: Who shouted last night in the street?

    B: [A WOMAN]$_F$ shouted.

The study therefore tested the interpretation of stress shift in English by Spanish speakers in contexts where stress shift would not be a viable option in Spanish. In addition, the H* accent is a new intonational category for the learners, since this pitch accent does not exist in the Spanish inventory. As a control, we presented the participants with sentences that marked focus with an alternative, syntactic method, by use of the cleft construction, as shown in (3).

(3)   *English*

    A: Who shouted last night in the street?

    B: It was [JOHN]$_F$ who shouted.

This syntactic method of marking focus is slightly marked, but still offers a practical control condition, as the structure is shared by both the target grammar and the L1 Spanish grammar.

5.1.1   Full Transfer/Full Access

It is predicted by the Full Transfer/Full Access theory that Spanish learners' knowledge of the syntax and semantics of clefting can be put to use in English. However, knowledge of English stress shift must be acquired: it is therefore predicted that lower proficiency learners may show

non-native-like judgments with respect to stress shift sentences.

5.1.2 Interface Hypothesis

The Interface Hypothesis (IH), introduced in chapter 4, makes additional predictions regarding the acquisition of focus. The study in chapter 2 provides justification for the extension of the IH to include stress shift. Since it is an anaphoric phenomenon, it can be considered to involve the syntax-discourse interface, therefore constituting an *external* interface in Sorace's terms. Parallel to what was found for the acquisition of Spanish syntactic focus, where English speakers at an advanced level of proficiency showed non-native-like judgments, if the Interface Hypothesis is extended to include prosodic focus, it would predict that Spanish learners have difficulty arriving at a native-like representation of English focus. Therefore, on this task, the learners—who are at an intermediate level of proficiency—should not be able to distinguish correct and incorrect focus-marking. This requires a further expansion of the IH to include intermediate learners, a suggestion that was made in White (2011a).

The IH does not subscribe to a particular theory regarding the initial state, but a Full Transfer theory is not incompatible with the IH. Under this view, effects of the IH should only be visible in cases where the grammar of the L1 and L2 differ. This means that with respect to cleft sentences, the IH should not be expected to apply because positive transfer aids with judgments, whereas it is expected to apply for stress shift, leading to non-native-like judgments even among the most advanced learners. Consequently, native-like judgments for prosodic stress shift would constitute evidence against the IH, while native-like judgments for cleft sentences would simply be evidence of L1 transfer.

5.1.3 L2 Intonation Learning Theory

Mennen (2015) offers a review of the L2 literature on intonation. According to Mennen (2015), no

theory of acquisition of intonational phonology currently exists (besides theories on lexical tones) and the author therefore makes the first step in creating such a theory. Mennen (2015) constructs a theory derived from Flege's (1995) Speech Learning Model (SLM) and Best's (1995) Perceptual Assimilation Model (PAM), which make reference to meaningful contrasts, relative similarity between the L1 and L2 inventory and universal constraints on markedness. The Mennen's L2 Intonation Learning Theory (LILt) predicts that intonational categories in the L2 which do not exist in the L1 can lead to difficulty in acquisition, especially since such categories may be continuously distributed: for example, the size of the pitch range can indicate a larger or smaller degree of contrastiveness.

In the case of the present study, Spanish learners of English must acquire a new perceptual category, which is essentially the H* accent, signifying new information in English. In Spanish, new information is marked by syntactic movement. The LILt does not make strong predictions for ultimate attainment in L2, but having its roots in the speech learning theories presented in Flege (1995) and Best (1995), in which it is assumed that the ability to form new perceptual categories in an L2 declines with age, it is predicted that adult learners should exhibit at least some difficulty with new intonational categories like H* in English. Wennerstrom (1994) found that Spanish learners did exhibit difficulty in producing H* accents for new information but did not show whether this was permanent or even if they had difficulty interpreting H*, since it was a spoken production study. Eventual success with this category in L2—which would be exhibited in the form of native-like judgments in the case of the present experiment—would indicate that the formation of a new intonational category is not necessarily a permanent barrier in acquisition for adult learners.

5.2   Methods

Prior to the experiment, learners were shown an English word list in order to familiarize them with the words they were to hear in the experiment. This confirmed that participants would have

sufficient lexical knowledge to comprehend the test sentences. After completion of the word familiarization, proficiency testing and a language background questionnaire, the participants were led into a soundproof booth to begin testing. The instructions told participants to listen to the dialogues and to rate them on a five-point scale, where 1 represented a completely unnatural-sounding dialogue and 5 represented a perfectly natural dialogue. Items were presented in a Latin-square design, randomized within blocks.

Thirty individuals participated in the study; 16 native speakers of English and 14 native speakers of Spanish. Participants were found through the use of internet advertisements for the Montreal area (e.g. Kijiji.ca and craigslist.com). All participants completed a test of English proficiency (Cloze test) which was designed to measure lexical and syntactic knowledge in English. Each participant also completed a language background questionnaire which documented, among other details, the age of acquisition of the L2. The Spanish speakers were required to have started learning English after the age of seven.

There were four experimental conditions, manipulated according to two dimensions: focus strategy (stress-shift, clefting) and focus suitability (correct focus, incorrect focus). An additional condition manipulated whether focus was elicited on the subject or the object. A sentence with narrow focus on the subject is phonologically distinct while narrow focus on the object is not phonologically contrastive with VP focus or wide focus. It was unknown how this might affect the perceptual salience of these two types of focus; thus, this factor had to be controlled. The conditions are shown in table 5.1.

QUD: Who met David? (Subject focus)	Stress shift	Clefting
Correct Focus:	LISA met David.	It was LISA who met David.
Incorrect Focus:	#Lisa met DAVID.	#It was DAVID who Lisa met.
QUD: Who did Lisa meet? (Object focus)	**Stress shift**	**Clefting**
Correct Focus:	Lisa met DAVID.	It was DAVID who Lisa met.
Incorrect Focus:	#LISA met David.	#It was LISA who met David.

Table 5.1: Experimental conditions

Two male voices were recorded reading dialogues such as those in Table 5.2, which were designed to elicit focus onto particular constituents. For example, "LISA met David" was elicited with the question "Who met David?". For cleft sentences, cleft questions were used in order to accommodate the marked structure: "It was LISA who met David" was elicited with "Who was it that met David?"[4] The recording resulted in a long sound file. Each recorded question and answer was extracted from the long sound file and given a label. This label was entered into a data table which served as the input for the experimental script; a question and an answer sound file were specified for each experimental item. This resulted in spliced dialogues matching the conditions in Table 5.1.

Eliciting Question	Experimental Item
Who did Lisa meet?	Lisa met DAVID.
Who met David?	LISA met David.
Who was it that Lisa met?	It was DAVID who Lisa met.
Who was it that met David?	It was LISA who met David.

Table 5.2: Stimuli elicitation

The stimuli sentences employed 12 high-frequency verbs in order to accommodate for possible

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[4]Only simple questions, not cleft questions, were used as stimuli.

lexical deficiencies in the L2 group (call, eat, find, follow, hear, help, lose, meet, open, see, sell, throw). Each verb was used twice, once with subject focus and once with object focus, resulting in a total of 96 ($2 * 2 * 2 * 12$) experimental tokens.

5.3 Results

5.3.1 Cloze Test

The native speakers did not, as a whole, score perfectly on the cloze test; the mean score for native speakers was 28.38. The learners' average score was 20.85, which can be classified as an intermediate level of proficiency. For later analysis, the learners were divided according to a median split into high and low intermediate speakers (median score = 21.5). The high intermediates' group mean was 24.29 while the low intermediates' group mean was 16.57.

5.3.2 Experiment

The experimental results are plotted in figure 5.1. On the whole, sentences with clefting were given a lower naturalness rating than sentences with stress shift, a difference which was statistically significant (Estimate = 1.15, t = 6.85, p < 0.0001). The main effect of strategy (Clefting vs. Stress shift) did not significantly interact with L1 (Estimate = -0.56, t = -1.72, p = 0.11). Sentences with incorrect focus were given lower ratings than sentences with correct focus (Estimate = -0.69, t = -5.66, p < 0.0001) but the interaction with L1 was not significant (Estimate = 0.33, t = 1.35, p = 0.11).
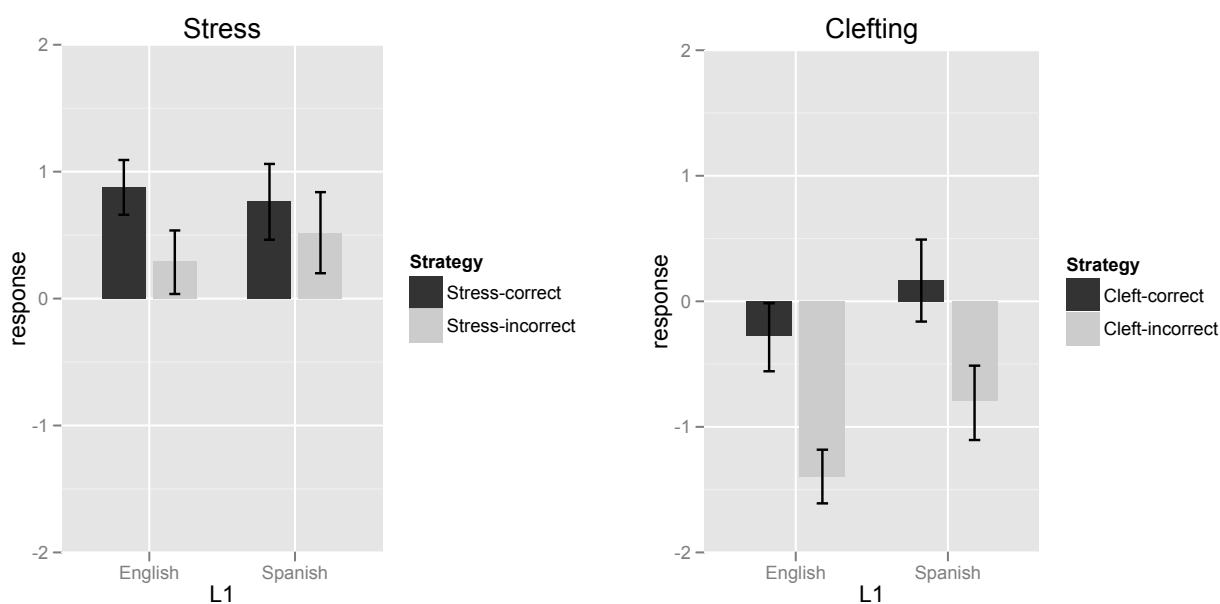
Figure 5.1: Centered naturalness ratings by L1 and focus strategy

A mixed regression model measured a significant difference between Stress-correct and Stress-incorrect (Estimate = -0.38, t = -3.14, p < 0.0001). The model did not measure a significant interaction between L1 and stress shift (Estimate = 0.42, t = 2.03, p = 0.13). A similar model with different contrasts found a significant difference between Cleft-correct and Cleft-incorrect (Estimate = -1.01, t = -4.84, p < 0.0001) but again, no interaction was found with L1 (Estimate = 0.24, t = 0.65, p = 0.11).

A second analysis was performed based on the Cloze scores rather than L1. A graphical representation of this analysis is shown in Figure 5.2, which plots on the *y*-axis the difference between the mean response for stress-correct and for stress-incorrect for each participant, and on the *x*-axis, the Cloze score for that participant. A regression line shows a positive correlation.
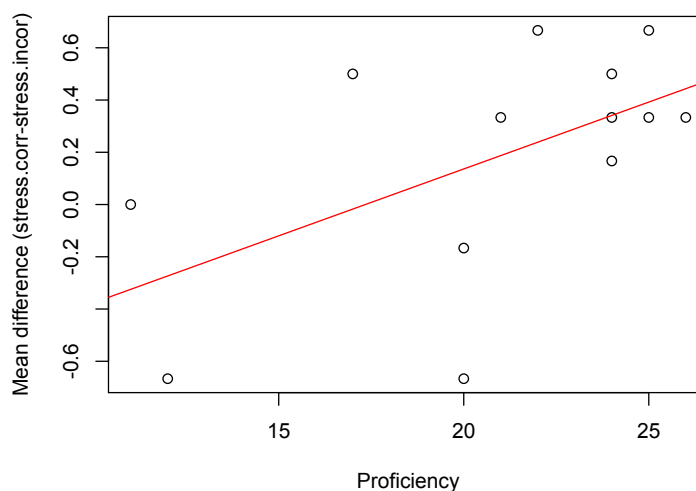
Figure 5.2: Correlation of stress shift and proficiency. Each point represents a participant.

The relationship between proficiency and the mean difference in the stress shift and clefting conditions can be observed qualitatively in Figures 5.3 & 5.4. When splitting the L2 group into 2 subgroups, high and low proficiency, it is shown that the high proficiency subgroup shows a difference between stress-correct and stress-incorrect while the low proficiency subgroup shows no such difference. In the clefting conditions, both the high and low proficiency groups show a distinction between correct and incorrect focus.
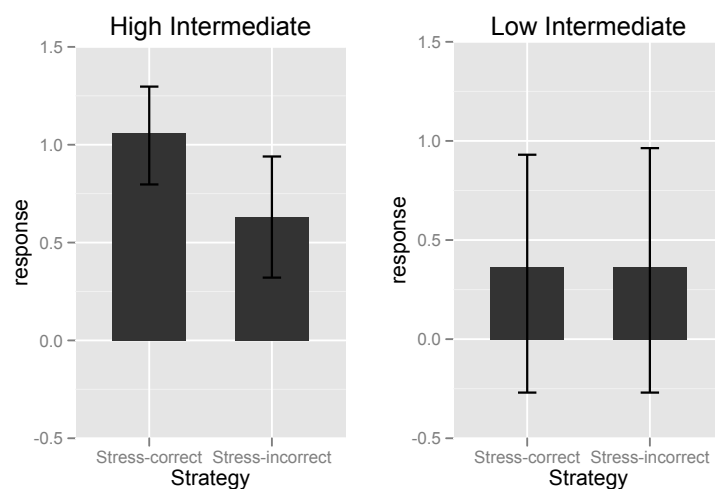
Figure 5.3: Stress-shift conditions by proficiency (L2s only)
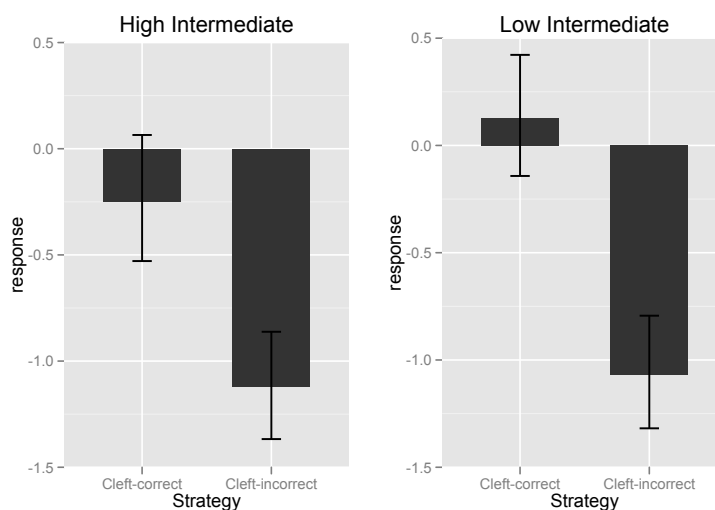
Figure 5.4: Clefting conditions by proficiency (L2s only)

A mixed regression modelling showed that the interaction illustrated in Figure 5.3 between proficiency and stress-correct vs. incorrect was statistically significant within the L2 group (Estimate = -0.05, t = -1.39, p = 0.01). Similar modelling did not come up with a significant interaction for clefting (Estimate = -0.05, t = -1.05, p = 0.72).

5.3.3   Summary of Results

The results of this experiment show that L1 Spanish/L2 English speakers judge English sentences with incorrect focus to be less natural sounding than sentences with correct focus, even when focus was marked using stress shift only, without additional syntactic means. There was no statistically significant difference between the two groups with respect to the distinction between correct and incorrect focus marking.

Generally, cleft sentences were judged to be less natural than sentences which marked focus with stress shift by both L1 English and L1 Spanish/L2 English speakers. The L2 group did not differ from the L1 group in how it judged incorrect cleft sentences in relation to correct ones. Additionally, the L2 group did not differ with the L1 group in how it judged incorrect stress-shift in relation to correct stress-shift sentences.

Finally, it was found that within the L2 group, an individual's proficiency had a statistically significant effect on his/her ratings within the stress-shift conditions. Higher proficiency subjects judged a distinction between stress-correct and stress-incorrect while lower proficiency subjects did not. Proficiency did not affect the distinction between cleft-correct and cleft-incorrect in a statistically significant way.

5.4   Discussion

With respect to the cleft sentences, the learners showed no difference from the native speakers in their judgments, even in the subset analysis. This result is in line with a Full Transfer account, which would predict that such knowledge from the L1 is directly available in the L2. Since English and Spanish do not differ in how cleft sentences are formed or in their meaning, Spanish native speakers do not have to acquire a new structure.

However, information focus in Spanish is marked with syntactic movement instead of with

prosody. This means that the English pattern must be acquired through a restructuring of the grammar. Additionally, the IH would predict that this aspect of the grammar is difficult to acquire because the prosody-syntax-discourse interface is implicated. Although the lower-level learners were not able to distinguish between correct and incorrect stress shift, the advanced group were able to do so, and this constitutes evidence against the IH. Therefore, it would seem that the interface hypothesis does not apply in the case of prosodic focus.

It is also shown in this study that adult learners are capable of creating new perceptual categories in their L2 with respect to intonational contours. The higher-level learners in this study, exhibiting native-like judgments, have acquired a new intonational contour and its associated meaning. This offers evidence that the reduced ability to create perceptual distinctions in L2 is not necessarily a permanent one with respect to this aspect of intonation.

Chapter 6

Study 3: Contrastive Focus in Second Language Production

This chapter is the result of joint work with Annie Tremblay, presented as a co-authored poster[1] and talk[2].

6.1 Introduction

This study has two parts: the first establishes the proper means of characterizing the crosslinguistic variation seen in focus marking between English and Spanish. The second part examines the same issues but in the context of second language acquisition. Many papers have examined the relationship between focus and prominence in English (Halliday 1967, Chomsky 1969, Bolinger 1972, Jackendoff 1972). The general observation is that the main stress of the sentence in English shifts away from given material, onto whatever is focussed. For material to count as given, it must have a salient antecedent in the discourse; therefore, focus can be viewed as a type of anaphor (Rooth 1992, Klassen and Wagner 2015). For example, in (1), *Roger* receives the greatest stress in the sentence because it is focussed; stress is shifted away from the given constituent, *ran a*

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[1](Klassen and Tremblay 2015b)
[2](Klassen and Tremblay 2015a)

marathon in Seattle. By formal convention, the focussed material is focus-marked or F-marked (subscript F) to indicate its focussed status.

(1)   A: Did Mary run a marathon in Seattle?

       B: No, ∼[ROGER$_F$ ran a marathon in Seattle.]

The F-marked constituent, along with the given/anaphoric material, make up a semantic domain, described in Truckenbrodt (1995) as the *domain of focus*. In (1), the domain of focus is marked by square brackets and it is preceded by a silent focus operator, ∼ (Rooth 1992).

In the lines of Rooth (1992), we argue that the interpretation of focus is determined by replacing the F-marked constituent with a variable, which varies over a set of relevant alternatives, resembling (2). In order for a particular focus configuration to be pragmatically accommodable, at least one element of the focus-alternative set must be salient in the context.

(2)   { Mary ran a marathon in Seattle, Sue ran a marathon in Seattle, Mark ran a marathon in Seattle . . . }

This study examines the factors driving differences in prosodic focus marking in Spanish and English. There have been numerous proposals regarding the nature of crosslinguistic differences, which can be divided into two broad claims: the first being that differences in the syntactic or pragmatic grammar are the driving factor (e.g. Ladd 2008, vander Klok et al. 2014), the second being that focus differs crosslinguistically because of differences in the phonological realization of focus or the phonetic cues used to mark it (e.g. Féry 2001, 2013, Hamlaoui et al. 2012).

6.1.1   Constraints on the Focus Operator: The Scope Hypothesis

As it was stated in chapter 2, it is the case in English that a constituent of almost any size can serve as a focus phrase, and similarly the semantic scope of focus can occur at many different levels in the structure. Various options for the size of domain of focus and focus phrase are seen in (3).

(3) a. I didn't say that Bill was president, ∼[I said that [HILLARY]$_F$ was president.]

b. What happened today? ∼[[John fought BILL!]$_F$]

c. A Canadian farmer was speaking to ∼[an [AMERICAN]$_F$ farmer] ...

Along with the size of the focus phrase varying, the domain of focus varies according to the scope of ∼. vander Klok et al. (2014) identify several different levels at which ∼ can take scope. For example, the ∼ can take scope at the level of the speech act – Krifka (2009) describes speech acts as operating upon propositions, the corresponding syntactic category being the IP. It is in this level of the structure where it is determined whether a sentence forms an assertion, an imperative, or another type of speech act. Focus scopes over the entire speech act when assertions are being contrasted, which is the case of corrective focus:

(4) John brought a cold soup to the picnic. No, wait. [∼ ASSERT [He brought WARM soup]]

In (4), the focus operator scopes over the speech act because the sentence negates a preceding assertion. I refer to this scope level as "super-clausal".

In addition to taking scope over the speech act, the focus operator may also take scope over lower constituents. The next level of scope described in vander Klok et al. (2014) is at the level of the clause – I will therefore refer to it as "clausal" scope. Instead of correcting or revising a previous assertion, clausal-level focus requires an antecedent in the form of a clause:

(5) John brought cold soup to the picnic. On the other hand, ∼[Mary brought WARM soup]

Focus can operate at levels even lower than the clause. In example (6), the contrast occurs at the level of the DP. These so-called "farmer sentences," first introduced in Rooth (1992), have been greatly discussed in the literature[3].

(6) A Canadian farmer was speaking to ∼[an [AMERICAN]$_F$ farmer] ...

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[3]In the first NP, *Canadian* can also be focussed, a fact that will be discussed in a later section concerning cataphoric focus marking

The example in (6) involves parallel NP conjuncts and therefore in vander Klok et al. (2014), these sentences are referred to as parallel focus, although again this name is perhaps a little misleading since cases of parallelism can also occur at higher levels of scope. I will instead refer to this type of focus as sub-clausal focus.

In the English examples, focus is marked by means of prosodic prominence at all levels of scope. However, Ladd (2008) makes the claim that this is not true for Romance languages, which have often been observed not to employ prosodic stress shift in contexts where in English, it is required. Ladd (2008) argues that stress shift in Romance is only likely to occur in cases referred to as "metalinguistic correction," in which a correction is made to the common ground. This type of focus can be characterized by the super-clausal level of scope of the focus operator, as in (4), in which two assertions are contrasted. Zubizarreta (1998) makes a similar claim specifically for Spanish, which is that the only type of focus marked with prosodic stress shift is what she refers to as "contrastive" focus[4]. Ladd (2008) and Zubizarreta (1998) differ on the details and breadth of their theoretical accounts; however, the generalization is that Romance speakers only use prosody to mark focus in corrective contexts.

Experimental evidence to this effect is offered in vander Klok et al. (2014). The study exhibited a production experiment that tested English and French speakers in each respective native language on sentences containing varying scope options for the focus operator. English speakers consistently marked focus with prosodic prominence regardless of the scope of the operator whereas in French, the only type of focus that was consistently marked with prosodic prominence was super-clausal (i.e. corrective) focus.

---

[4]An example given in Zubizarreta (1998) of contrastive focus is the following; note that it can also be characterized as corrective:

(i)   JUAN llamó por teléfono (no Pedro)
        John   phoned   (not Pedro)

Utterance

IP   IP

PP   PP   PP

PWd   PWd   PWd   PWd

An   AMERICAN$_F$ farmer   was talking to   a   CANADIAN$_F$ farmer
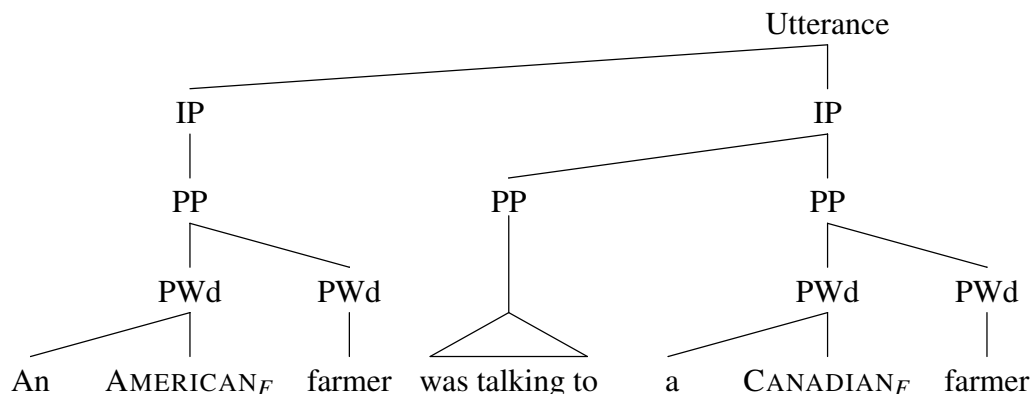
Figure 6.1: Prosodic Structure of the "Farmer Sentence"

6.1.2   Small Focus Phrases – Alternative to Scope Hypothesis

Féry (2001, 2013) and Hamlaoui et al. (2012) all argue in favour of a prosodic explanation instead of a syntactic one, an issue introduced in chapter 2 which will be reiterated here. The argument made in these papers is that focus-marking in French functions by means of prosodic phrasing. Hamlaoui et al. (2012) summarizes the theory by stating that a word in focus forms its own prosodic phrase; however, at least according to Truckenbrodt (1995), prosodic phrases must map to entire syntactic phrases. If this constraint on the mapping of prosodic constituents to syntactic ones is inviolable in French, it means that within a DP, focus cannot be marked prosodically because it would require the mapping of a prosodic phrase to a smaller syntactic constituent than is allowed.

Consider the "farmer sentence" that was discussed in (6). The prosodic structure of this sentence is illustrated in Figure 6.1. Because it contains two focussed phrases, the sentence is divided into two intonational phrases to accommodate the two pitch accents. Both occurrences of focus require the shifting of the prosodic head within the prosodic phrase.

Indeed, lack of deaccentuation within the DP was found for French (Hamlaoui et al. 2012), Spanish (van Maastricht et al. 2015) and Italian (Swerts et al. 2002), all of which tested noun-adjective combinations and found that given adjectives had the same intonational contour as non-given adjectives. Nevertheless, vander Klok et al. (2014) offer experimental evidence that shows

prominence shifted within the syntactic domain of the DP. The main acoustic cue that was used was intensity, which had not been tested in many similar studies (e.g. Swerts et al. 2002, van Maastricht et al. 2015). In other words, *salade* is produced with greater intensity than *froide* in the following example:

(7)   A: Pour le piquenique, Jean apportera une soupe froide.

         B: Non, il apportera une SALADE$_F$ froide.

The authors found a smaller effect for pitch, but interestingly, although *salade* was produced with greater duration, European French speakers did not produce *froide* with a reduced duration compared to contexts where it was non-given. The duration result is slightly in line with the claim that Romance disallows prosodic givenness reduction. However, the relative prominence difference between the two constituents found on all measures negates claims that the prosodic head cannot be moved within the domain of the prosodic phrase. Indeed, this raises the question of whether the same would be found in Spanish or Italian, for which relative prominence within prosodic phrases has not yet been investigated.

6.1.3   Anaphoricity and Cataphoricity of Focus

Recall from chapter 2 that a property of focus is that it can be cataphoric in nature.

(8)   a.   John didn't just fail [the TEST]$_F$. He failed [the WHOLE COURSE]$_F$!

For example, in (8), focus on *the test* sets up an expectation for the listener which is fulfilled in the following sentence. Put simply, the first sentence leaves the listener hanging; it sets up a contrast that must yet be satisfied. In fact, if the speaker had only uttered the first sentence of (8), an astute listener could understand what is implied by the focus structure. The communicative function of the focus in (8) is clear, as the alternative set triggers a scalar implicature (Rooth 1992). However, the communicative function of cataphoric focus is not always so clear. Let us revisit the

farmer sentence in (6), much-discussed in the literature because such focus marking is disallowed in Romance languages. In a sentence like (6), reiterated in (9), focus can optionally be marked on the first adjective, *Canadian* (*farmer* is subsequently reduced).

(9)   A ∼[[CANADIAN]*F* farmer] was speaking to an ∼[[AMERICAN]*F* farmer]. . .

The focussing of *Canadian* in (9) signals an upcoming contrast in the discourse, but it is difficult to know whether listeners actually make use of this information. It may be that a speaker focusses *Canadian* simply because having already planned the utterance, *American farmer* is already salient in their mind. Carbary et al. (2014) test this type of cataphoric focus in online processing, and find a facilitatory effect in comprehension, which means that cataphoric focus marking is used by listeners to predict upcoming information in the sentence.

The prevailing intuition for Romance is that farmer sentences are ill-formed in these languages (Bocci 2013). However, both the Scope hypothesis and the Phrasing hypothesis would predict that in a sentence like (9), stress shift cannot occur—under the first account, this is because the scope of the focus operator is below the level of the speech act while under the second, it is because de-accenting would have to occur within a prosodic phrase. In domains larger than the sentence, however, it may also be the case that cataphoric focus marking cannot operate through prosody alone in Romance. Consider, for example, the marginality of the following sentences:

(10)   a. ??Jean n'a   pas RÉUSSI à l'examen. *(cannot imply he aced the test)*
                John NEG.has not passed   at the.test

         b. ??Juan no PASÓ el   examen *(cannot imply he aced the test)*
                John not pass   the test
                "John didn't PASS the test."

In order to arrive at the same implicature as is found in English, a different syntactic formulation is needed (e.g. "Jean a non seulement réussi à l'examen. . ."). In English (recall the examples in (1)), the implicature is expressed through a particular intonational contour already discussed, the

fall-rise contour, which does not exist in the French or Spanish intonational inventories. Therefore, it is the case that in general, Romance speakers are less habituated to the use of cataphoric focus marking than English speakers, relying much more on syntactic methods of deriving this kind of meaning.

6.2   Methods

The Scope Hypothesis (SH), which predicts that speakers of Romance languages only shift prominence within an utterance in cases where the focus operator scopes over the speech act, has not yet been tested in Spanish. If the SH applies to Spanish, it would be expected that native speakers should show a higher rate of stress shift in conditions with corrective focus as compared to other types of focus. We tested this prediction by means of two production experiments, one carried out in Spanish with Spanish native speakers, and the second in English with English native speakers, as well as with the same participants in their L2s (talked about further in the second part of the chapter). The experiments elicited focus within DPs, either on the head noun or the modifier, and at different levels of scope. If the syntactic theory of crosslinguistic variation in focus marking is correct, it is expected that scope should turn out to be a significant factor in the experiment. If the phonological theory of crosslinguistic variation is correct, it is predicted that speakers should not shift stress within the DP, regardless of scope.

A secondary research question relates to the marking of cataphoric (anticipatory) focus in English and Spanish. This question is more exploratory in nature, as the exact conditions governing cataphoric stress shift are not yet known, neither in English nor in Spanish. However, if Spanish speakers are less likely to mark cataphoric than English speakers, even in corrective contexts, it could indicate that there is a general dispreference against cataphoric focus in Spanish, which would constitute a new finding.

6.2.1 Procedures

The participant was recorded with the use of a digital head-mounted microphone. The participant sat in front of a screen and the experimenter sat at a second screen that was turned away from the participant at a perpendicular angle. The participant was required to instruct the experimenter to move or click images on the screen based on different symbols that appeared with the images. A practice session ran through each type of move: "move," which was indicated with an arrow (Figure 6.2), "click...then, click," which was indicated with two green squares and an arrow (Figure 6.3), and "don't click...click," which was indicated with a red square and a green square (Figure 6.4). The participant had the chance to practice saying each type of sentence, followed by 9 practice trials. The practice block could be repeated if needed.
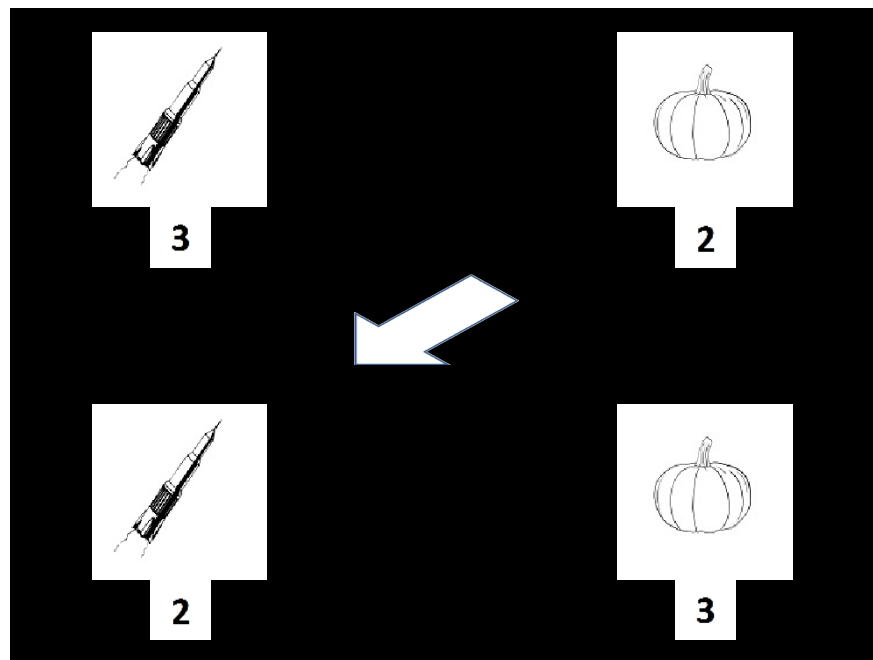
Figure 6.2: Visual Array – "Move pumpkin number two to rocket number two."
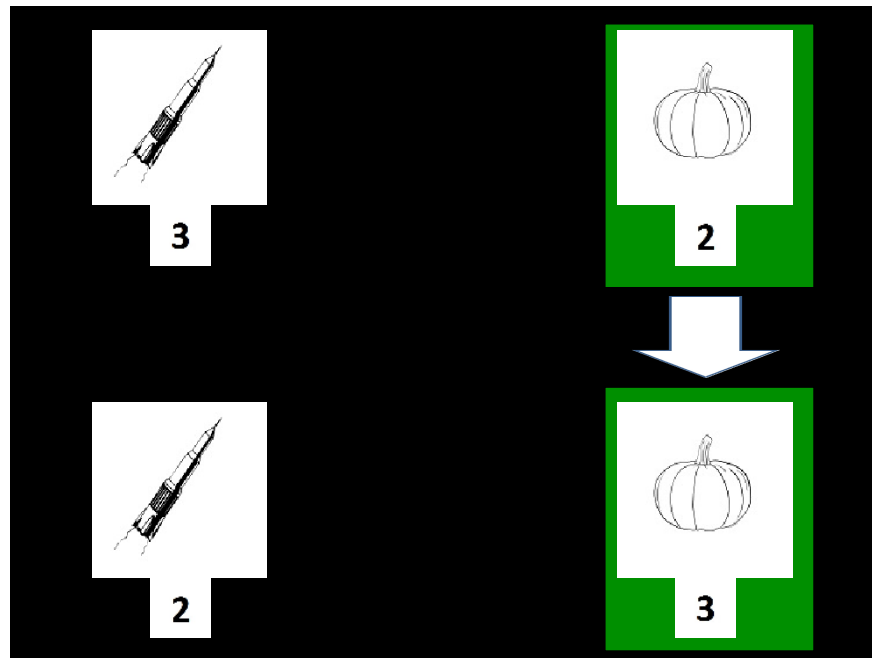
Figure 6.3: Visual Array – "Click pumpkin number two. Then, click pumpkin number three."
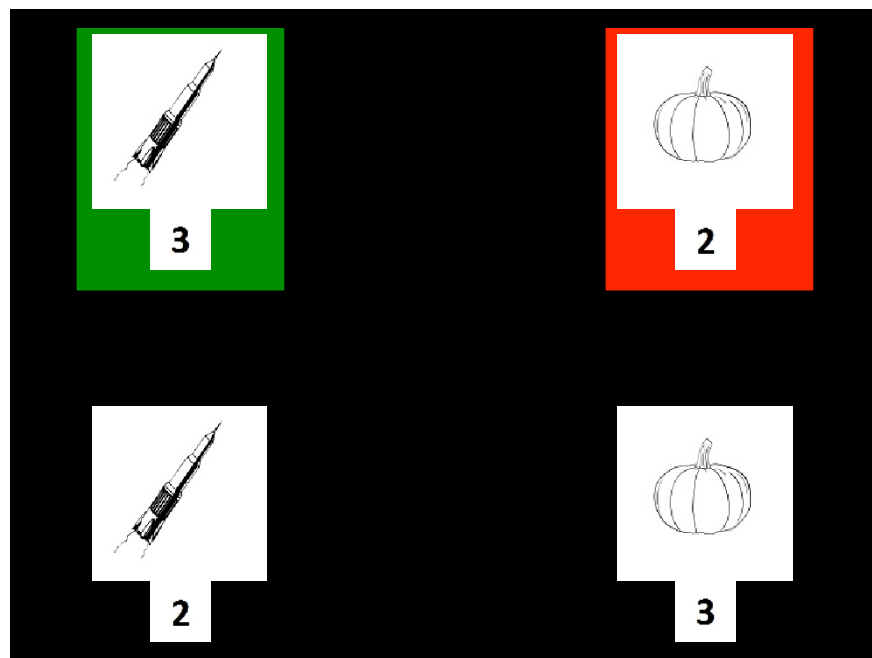
Figure 6.4: Visual Array – "Don't click pumpkin number two. Click rocket number three."

The experimental items were presented in a Latin Square design, randomized within blocks. During the experiment, each visual array was presented for 4 seconds before the appearance of the symbols in order for the participant to fully process the visual information and access the corresponding lexical items. Once the symbols appeared, the recording began. After each instruction, the experimenter would cue the participant to continue to the next item. The participants were given the impression that the experimenter could not see the symbols, only the pictures (in actuality, the experimenter's screen was completely synchronized with the participant's screen). This was done to make the participant believe that the instructions communicated important information for the experimenter and was hypothesized to make it more likely for the participant to employ functional prosody.

Data were coded for prominence impressionistically by trained annotators. For each item, it was recorded whether the main stress of the phrase had been shifted to the head noun (stress shift) or if it remained in the default position (no stress shift). The prominence annotations were validated by modelling the correlation between the annotations and the acoustic values: as will be shown in a later section, items marked as "stress shift" consistently showed a larger difference in prominence between the head noun and the modifier (relative prominence).

6.2.2 Participants

Participants were recruited into two groups: a North American English native speaker group of 16 participants (10 female, born in USA and Canada[5]) and a (North-, South- and Central-) American Spanish[6] native speaker group of 17 participants (14 female). Of the 17 Spanish speakers, 9 were born in Colombia, 3 were born in Mexico, 2 were born in Venezuela and 1 each was born in Chile, Cuba and the Dominican Republic. Additionally, because this was also an L2 study, the

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[5]One native English speaker was born in the United Kingdom but moved to the US at a young age and spoke with a North American accent.

[6]Argentinean Spanish speakers were excluded since the dialect is known to differ greatly from other dialects of the Americas, particularly with respect to information structural components (Gabriel 2010).

English speakers were required to possess an intermediate to advanced knowledge of Spanish, and similarly the Spanish speakers possessed intermediate to advanced knowledge of English. Further information on L2 characteristics are found in a later section.

6.2.3   Word Familiarization

Before each production study, the participants underwent a familiarization session in which they were presented with the words that were to be used in the experiment. They were shown pictures on a screen, in random order, illustrating the objects that were to be used in the experiment along with the word written beneath. The participants were allowed to pronounce each word out loud and were given help with pronunciation if needed. They were told to only use the words given in this session during the production experiment, even if another word might also be appropriate. For example, if in the English experiment they were shown a picture of a dog, they were required to only ever say "dog," and never "puppy". Similarly, in Spanish, when shown a picture of a boy, they were only to ever use "niño," and never "criatura," for example. The participants were allowed to complete the familiarization session a second time if desired.

Materials

Typical visual arrays are shown in Figures 6.2, 6.3 & 6.4. Upon seeing Figure 6.2 for example, the participant would be required to produce the following sentence: "Move pumpkin number two to rocket number two," using only the words shown to them in the familiarization session and never dropping any word of the sentence.

The experiment was composed of 72 items presented in a Latin Square design – there were 9 conditions and therefore 9 separate lists, counterbalanced across participants. The items were presented in random order. The list of 72 objects used in Spanish and English are given in Appendices C.3 & C.4. The same referents were also used in the eye-tracking experiment. The objects

were chosen to be relatively high frequency nouns referring to concrete, easily illustratable objects like animals, articles of clothing and food items. They consisted of only disyllabic words in both Spanish and English. The numbers two, three and six (*dos*, *tres* and *séis*) were used because they are monosyllabic in both languages. Number modifiers (number two, number three...) were used because they are postnominal in both English and Spanish. Keeping these factors constant would simplify acoustic analysis between languages.

The nine conditions are presented in Tables 6.1 and 6.2[7]. Two factors with three levels each formed the basis for the conditions: Type of contrast (Head Noun, Modifier, Both) and Type of scope (Sub-clausal, Clausal, Super-clausal).

Type of contrast varied as to where the focus was expected to fall in each phrase; for example, when the head nouns were contrasted, focus would fall on the head noun (e.g. Move [pumpkin]$_F$ number two to [rocket]$_F$ number two). When the numbers were contrasted, focus fell on the number modifiers (e.g. Move pumpkin [number two]$_F$ to pumpkin [number three]$_F$). Finally, when both contrasted, the phrase contained two foci, on both the head noun and the modifier (e.g Move [pumpkin]$_F$ [number two]$_F$ to [rocket]$_F$ [number three]$_F$).

Type of scope manipulated the level at which the focus operator took scope in the syntax. Each type of instruction elicited a different level of scope. The focus operator takes scope over the DP in the Sub-clausal scope condition (e.g. Move $\sim$[[pumpkin]$_F$ number two $_{DP}$] to $\sim$[[rocket]$_F$ number two $_{DP}$].), over the IP in the Clausal Scope condition (e.g. $\sim$[Click [pumpkin]$_F$ number two $_{IP}$]. Then $\sim$[click [rocket]$_F$ number two $_{IP}$].), and over the entire speech act in the Super-clausal Scope condition (e.g. Don't $\sim$[DIRECT[8] [click [pumpkin]$_F$ number two]]. $\sim$[DIRECT [Click [rocket]$_F$ number two]].).

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[7]F-marking in the tables is intended to reflect the semantic content of the expected utterances—contrastive referents are F-marked. Prominence is not shown in these tables, although the prediction is that if prosodic focus marking is being employed, F-marked constituents should receive higher prominence relative to neighbouring constituents.

[8]For imperatives, Krifka (2009) uses the DIRECT operator for the speech act.

	Sub-clausal Scope		
Head Noun	Move ∼[[pumpkin]$_F$ number two $_{DP}$] to ∼[[rocket]$_F$ number two $_{DP}$]		
Modifier	Move ∼[pumpkin [number two]$_{F\ DP}$] to ∼[pumpkin [number three]$_{F\ DP}$]		
Both	Move ∼[[pumpkin]$_F$ [number two]$_{F\ DP}$] to ∼[[rocket]$_F$ [number three]$_{F\ DP}$]		
	Clausal Scope		
Head Noun	∼[Click [pumpkin]$_F$ number two $_{IP}$]. Then ∼[click [rocket]$_F$ number two $_{IP}$]		
Modifier	∼[Click pumpkin [number two]$_{F\ IP}$]. Then ∼[click pumpkin [number three]$_{F\ IP}$]		
Both	∼[Click [pumpkin]$_F$ [number two]$_{F\ IP}$]. Then ∼[click [rocket]$_F$ [number three]$_{F\ IP}$]		
	Super-clausal Scope		
Head Noun	Don't ∼[DIRECT [click [pumpkin]$_F$ number two]]. ∼[DIRECT [Click [rocket]$_F$ number two]]		
Modifier	Don't ∼[DIRECT [click pumpkin [number two]$_F$]]. ∼[DIRECT [Click pumpkin [number three]$_F$]]		
Both	Don't ∼[DIRECT [click [pumpkin]$_F$ [number two]$_F$]]. ∼[DIRECT [Click [rocket]$_F$ [number three]$_F$]]		

Table 6.1: English production task conditions

	Sub-clausal Scope		
Head Noun	Ponga ∼[el [ángel]$_F$ número dos $_{DP}$] en ∼[el [niño]$_F$ número dos $_{DP}$]		
Modifier	Ponga ∼[el ángel [número dos]$_{F\ DP}$] en ∼[el ángel [número tres]$_{F\ DP}$]		
Both	Ponga ∼[el [ángel]$_F$ [número dos]$_{F\ DP}$] en ∼[el [niño]$_F$ [número tres]$_{F\ DP}$]		
	Clausal Scope		
Head Noun	∼[Haga clic en el [ángel]$_F$ número dos $_{IP}$]. Después ∼[haga clic en el [niño]$_F$ número dos $_{IP}$]		
Modifier	∼[Haga clic en el ángel [número dos]$_{F\ IP}$]. Después ∼[haga clic en el ángel [número tres]$_{F\ IP}$]		
Both	∼[Haga clic en el [ángel]$_F$ [número dos]$_{F\ IP}$]. Después ∼[haga clic en el [niño]$_F$ [número tres]$_{F\ IP}$]		
	Super-clausal Scope		
Head Noun	No ∼[DIRECT [haga clic en el [ángel]$_F$ número dos]]. ∼[DIRECT [Haga clic en el [niño]$_F$ número dos]]		
Modifier	No ∼[DIRECT [haga clic en el ángel [número dos]$_F$]]. ∼[DIRECT [Haga clic en el ángel [número tres]$_F$]]		
Both	No ∼[DIRECT [haga clic en el [ángel]$_F$ [número dos]$_F$]]. ∼[DIRECT [Haga clic en el [niño]$_F$ [número tres]$_F$]]		

Table 6.2: Spanish production task conditions

6.3   L1 Results

6.3.1   Anaphoric Focus (NP2)

As seen in Figure 6.5, English speakers shifted stress to the head noun of NP2 in cases where the modifier was given (i.e. Head Noun condition) in 92-93% of the trials, whereas in cases where the modifier was not given (Both and Modifier conditions), the English native speakers shifted stress much less frequently. Looking only at cases where the modifier was given, scope was not a significant factor in determining stress shift. To show this, we ran a generalized linear mixed

model on the L1 data; the significant scope ∗ language interaction, shown in Table 6.3, suggests that scope was only a significant factor for L1 Spanish.
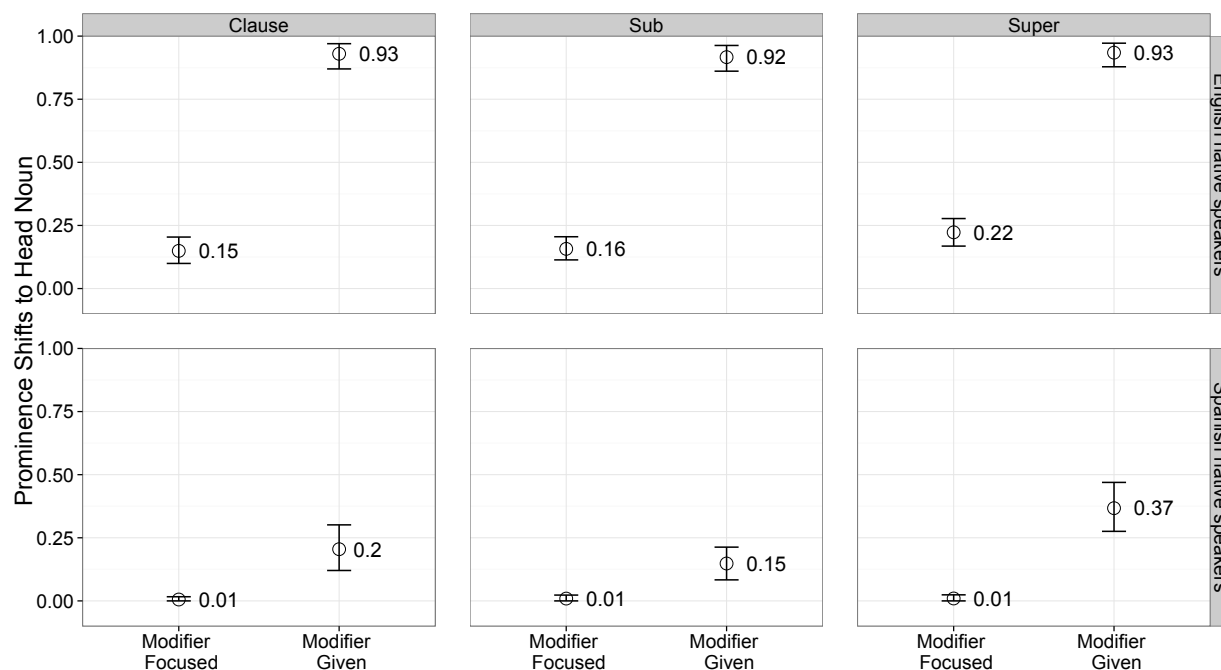
Figure 6.5: Prominence annotations for NP2—L1 Data (Spanish and English native speakers)

In Spanish, native speakers shifted stress altogether less frequently than what was seen for English speakers. As seen in Figure 6.5, the Spanish native speakers shifted stress to the head noun only 20-37% of the trials, depending on the level of scope of the focus operator. As mentioned eariler, the interaction between scope and language is statistically significant, characterized by a higher rate of stress shift in the Super-clausal scope condition as compared to the two other scope conditions for Spanish native speakers (Table 6.3).

When setting aside cases where the modifier was given and only comparing the Both and Modifier conditions (illustrated in Figure 6.6), it is the case that English L1 subjects shifted stress to the head noun much more frequently in the Both condition (28-39%) than in the Modifier condition (3-5%). This suggests that when the head noun is given, as it is in the Modifier condition, stress shift is not possible. However, in the Both condition, where a double focus occurs, the head noun

	Coeff (SE)
(Intercept)	$-1.46\ (0.11)^{***}$
scope1 (Super vs. other)	$0.53\ (0.15)^{***}$
scope2 (Clause vs. sub)	$-0.23\ (0.21)$
language (Eng. vs. Span.)	$2.26\ (0.22)^{***}$
scope1:language	$-0.60\ (0.29)^{*}$
scope2:language	$0.34\ (0.42)$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 6.3: Generalized linear mixed model - L1 English vs. L1 Spanish. Formula: Annotation $\sim$ scope $*$ language $+$ (scope|participant) $+$ (scope|item)

is allowed to be more prominent than the modifier (although this is less preferred, considering that the rate of stress shift in the Both condition is nowhere near as high as in the Head Noun condition). When stress shift did occur in the Both condition, it was more frequent in the Super scope condition, which is an unexpected result. In Spanish, the rate of stress shift in the Both and Modifier conditions was effectively at 0%, regardless of scope.
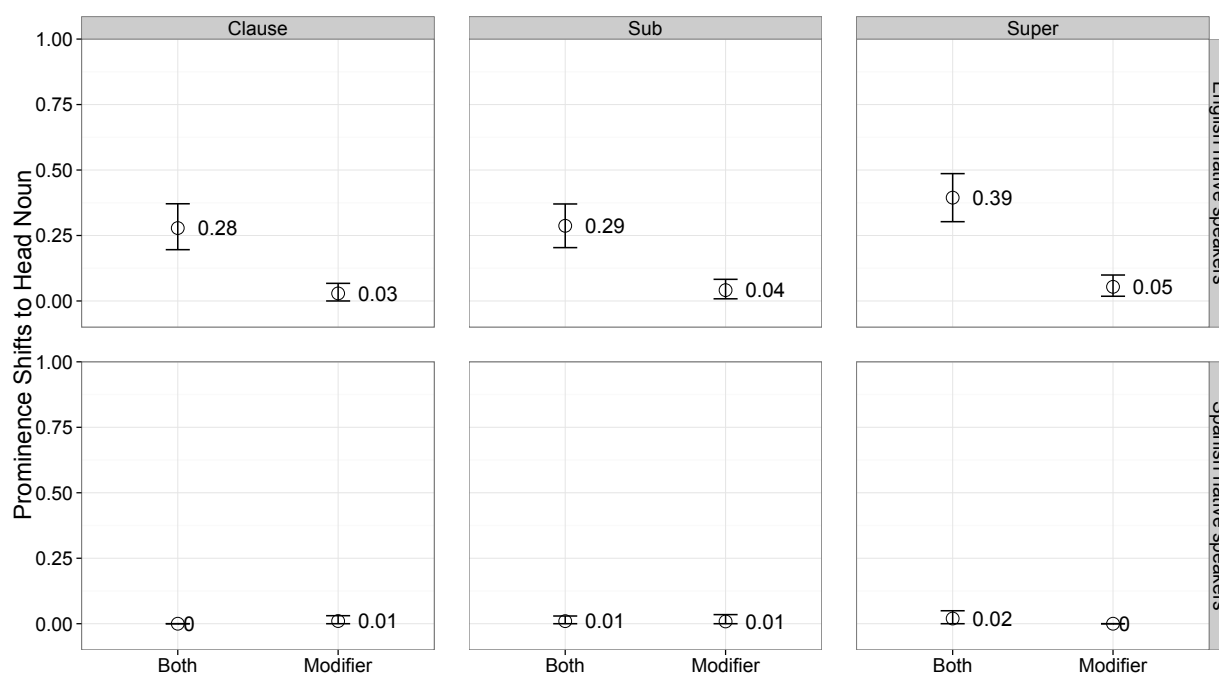
Figure 6.6: Stress shift in NP2 when Modifier is focused and Both constituents are focused

In order to validate the prominence annotations, we took acoustic measurements of the productions in order to observe the correlation between the acoustic prominence and the prominence annotations. Stress shift was characterized by significantly higher intensity and duration of the head noun relative to the modifier in both languages—Figure 6.7—while pitch was not a significant predictor of prominence (although there is a numerical trend characterized by higher relative pitch in trials labeled as having stress shift). This was tested by means of a generalized linear mixed model, shown in Table 6.4, where the acoustic variables tested are relative maximum intensity (rmaxint2fit), relative maximum pitch (rmaxpitch2fit) and relative duration (rdur2fit). The acoustic values are normalized by participant by means of a linear regression (residual values were extracted from a simple linear regression of a given acoustic variable by participant).

	Coeff (SE)
(Intercept)	$-1.53\ (0.19)^{***}$
rmaxint2fit	$0.44\ (0.11)^{***}$
rmaxpitch2fit	$0.08\ (0.08)$
rdur2fit	$0.22\ (0.07)^{**}$

$^{***}p < 0.001, {}^{**}p < 0.01, {}^{*}p < 0.05$

Table 6.4: Generalized linear mixed model - Acoustic Predictors. Formula: Annotations $\sim$ rel.max.intNP2 + rel.max.pitchNP2 + rel.durationNP2 + (rel.max.intNP2 + rel.max.pitchNP2 + rel.durationNP2 | participant) + (rel.max.intNP2 + rel.max.pitchNP2 + rel.durationNP2 | item)
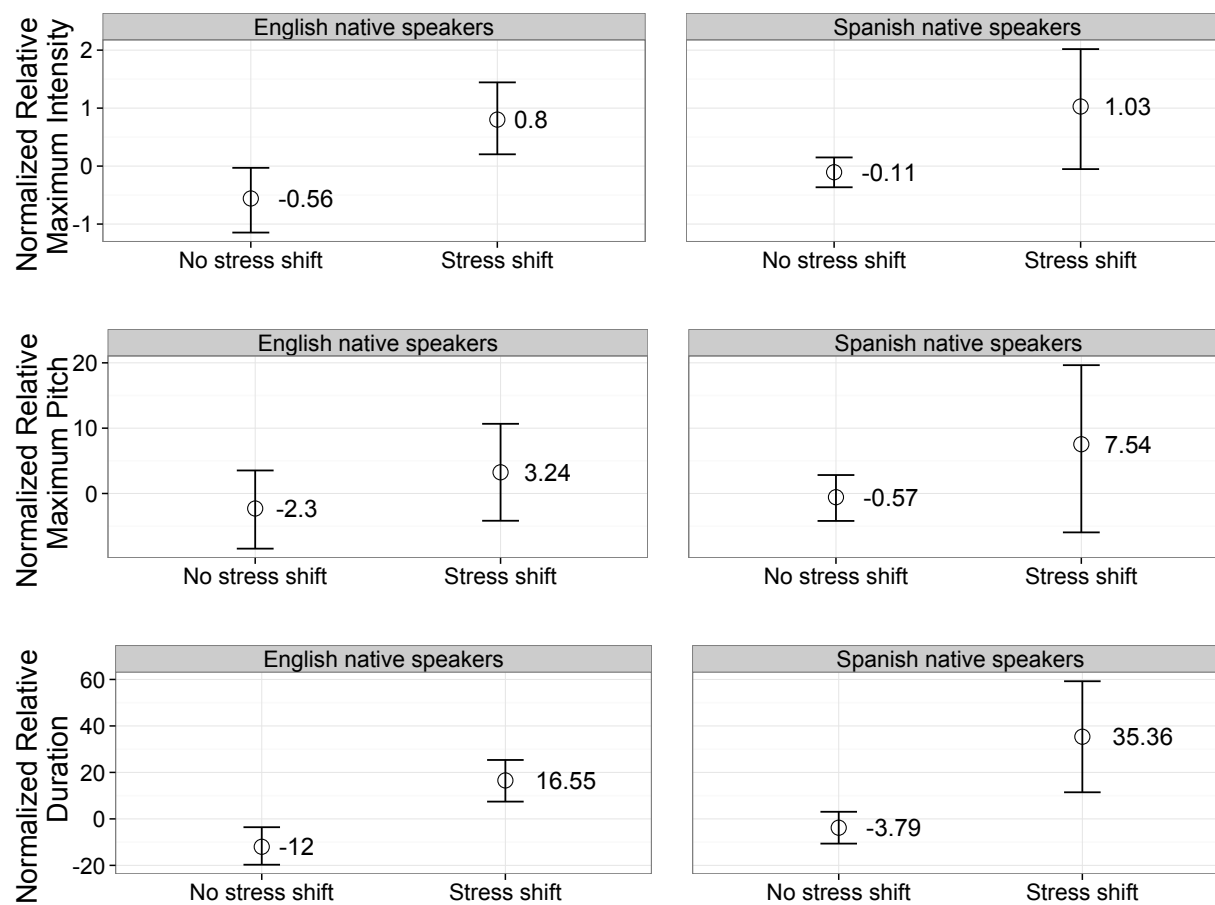
Figure 6.7: Acoustic Correlates of Stress Shift in NP2—L1 Data

6.3.2 Cataphoric Focus (NP1)

The rate of stress shift in NP1 is much lower on the whole as compared to NP2. However, as seen in Figure 6.8, English native speakers shifted stress to the head noun in cataphoric focus contexts in cases where the modifier was cataphoric (i.e. present in upcoming material). Spanish native speakers marked cataphoric focus at a negligible rate. The difference in the rate of cataphoric stress shift between the English and Spanish experiments is characterized by a significant main effect of test language in the model shown in Table 6.5. Scope was not a significant predictor and so was eliminated from the model.
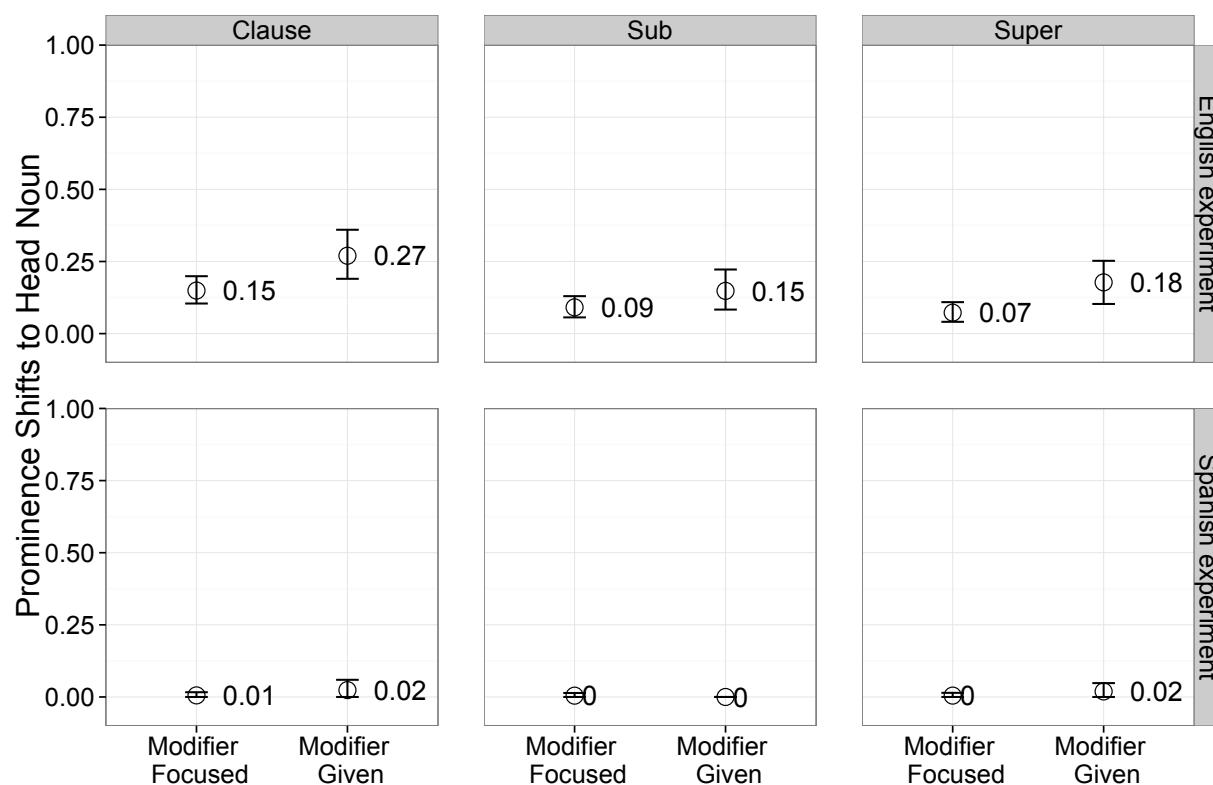
Figure 6.8: L1 Data—Cataphoric Focus

	Model 1
(Intercept)	$-3.67\,(0.29)^{***}$
focus	$-0.99\,(0.45)^{*}$
language	$3.22\,(0.52)^{***}$
focus:language	$0.21\,(0.84)$

$^{***}p < 0.001, \,^{**}p < 0.01, \,^{*}p < 0.05$

Table 6.5: Generalized linear mixed model; stress shift in NP1 (L1 data). Formula: Annotation $\sim$ focus $*$ language $+ (0 + $focus$|$participant$) + (1|$item$)$

6.3.3   Discussion of L1 Results

Spanish speakers marked prosodic focus much more frequently in the Super scope condition, where the focus operator took wide scope over the speech act, as compared to the other two conditions with narrower scope. This lends support to the Scope Hypothesis and mirrors the results seen in vander Klok et al. (2014). However, when comparing across languages, English speakers are more likely in general to shift stress, with rates close to 100% in all conditions. If the Scope Hypothesis were the only factor in determining crosslinguistic variation, we would expect the Spanish native speakers to shift stress at this same high rate in the Super scope condition, which is not the case. It therefore seems that the scope of the operator is not the only factor, but instead, as has been said by other researchers (e.g. Ladd 2008), what is important in determining stress shift in Spanish is that the focus plays a specifically corrective function.

Our experimental items in the Super scope condition were limited in this manner, since although two speech acts are contrasted by the use of negation, and therefore the scope of focus is surely wide, the discursive relationship between the speech acts are not specified. The sentences can be interpreted to have a contrastive connector, paraphrased with the use of *but* in (11a), or they can be interpreted to be related through simple coordination, paraphrased with *and* in (11b).

(11)   a.   Don't click on tiger number two *but* click on tiger number three.

         b.   Don't click on tiger number two *and* click on tiger number three.

Based on the fact that Spanish speakers only shifted stress 37% of the time in the Super scope condition, it is possible that speakers are sometimes choosing the coordinated reading in planning their productions, and that Spanish only requires stress shift with the contrastive reading. What would mean then is that not only is the scope of $\sim$ restricted in Spanish, its interpretation differs from English: Whereas in English, $\sim$ simply has an anaphoric interpretation, in Spanish, $\sim$ must express a contrast.

Because the Spanish speakers originated from a variety of Latin American countries, to rule out the possibility that native dialect is playing a role in the L1 Spanish results, we divided the results by birth country (Chile, Colombia, Cuba, Dominican Republic, Mexico, Venezuela). These groups were not balanced but the largest difference that arose was among those born in Mexico, who had a higher rate of stress shift in the Sub and Clausal scope conditions as compared to all other groups. Only 3 participants belonged to this group, but the result could be related to previous findings that Mexican Spanish varies from other Latin American dialects in how focus is marked (Hoot 2012).

With respect to cataphoric focus, Spanish speakers did not mark cataphoric focus in any context, which supports the hypothesis that there is a general dispreference against backwards anaphora in Spanish focus-marking. However, the rates of cataphoric focus marking in English were very low, suggesting that the experiment did not create favourable conditions for this type of focus. It could therefore be the case that we are observing a floor effect in Spanish, where the low general rate of stress shift simply washes out any possible cataphoric focus marking. This therefore remains a question for further research.

6.4 L2 Acquisition of Prosodic Focus Marking

The particular syntactic-pragmatic approach to syntax discussed in the first part of this chapter has not yet been examined with respect to second language acquisition. Previous studies with Span-

ish and English learners have only examined cases of informational focus in which the operator scopes over the clause (L2 Spanish: Lozano 2006; L2 English: Zubizarreta and Nava 2011, Klassen 2013c). When considering the data presented in the previous section, it seems that this approach might be missing out on a great deal of variability. The assumption made in previous L2 studies is that stress shift is a non-native pattern that is unavailable in the grammar of Spanish speakers. However, it is clear based on the present study, and previous intuitions (e.g. Zubizarreta 1998, Face 2002, Domínguez 2013), that prosodic focus marking does occur in Spanish in corrective contexts. It therefore is important to look at cases where $\sim$ takes scope over smaller syntactic constituents, as this is where Spanish is hypothesized to differ from English. If the Scope Hypothesis is correct, the task for the Spanish learner is not to acquire prosodic stress shift, but to acquire the unrestricted scope of $\sim$ in English. On the other hand, an English learner of Spanish must acquire the more restrictive conditions governing the scope options of $\sim$. The predictions as to the learnability of prosodic focus in each direction of acquisition are dependent types of evidence that trigger changes to the grammar in L2 acquisition.

6.4.1   Linguistic Evidence and Full Transfer/Full Access

We start with the assumption that the initial state of L2 acquisition is the L1 grammar—this is commonly known as the Full Transfer/Full Access (FT/FA) theory (Schwartz and Sprouse 1996, White 2003). Therefore, in the initial state, all input from the target language is processed through the lens of the learner's native language. All of the input received by the adult learner can be used to make inferences about what is an acceptable structure in the L2: if the learner hears a native speaker of the L2 utter a particular sentence, the structure can be inferred to be an acceptable one. This is known as *positive evidence*—input that provides information as to the grammaticality of a structure. Barring input from other learners (in a classroom setting for instance) or speech errors from native speakers, the adult learner will only be exposed to sentences in the L2 which are

acceptable in this grammar and will not therefore be able to make inferences based on the direct input about what is ungrammatical in the target language. Realistically, adult language learners also receive *negative evidence* in the form of corrections and adverse reactions that signal that the learner has outputted an unacceptable structure. However, it will be seen that the pattern that emerges in this particular set of data can be explained without having to assume that such negative evidence plays an important role in L2 acquisition.

Instead, we form a hypothesis with respect to positive evidence. Positive evidence is in essence exposure to an Acceptable Structure (AS) from the target language. However, the presence of an AS is not sufficient to drive learning; instead, learners must be exposed to a structure in the L2 which would be unacceptable in their L1, thereby violating their expectations about acceptability (White 1987, Schwartz and Sprouse 1996, White 2003). We term this subtype of positive evidence Unexpectedly Acceptable Structures (UAS) which, in contrast to Expectedly Acceptable Structures (EAS), are the only type of input that can drive acquisition. We define UAS in (12).

(12)   A structure is an Unexpectedly Acceptable Structure (UAS) if it is unacceptable in the current grammar (G_n)

In (12), *current grammar* refers to either the L1 (G_1), in the case of the initial state, or the revised interlanguage grammar (G_{1+x}).

6.4.2   Flipping Between Grammars

Optionality often appears in L2 production, and it is therefore important to account for such variability[9]. When a pattern emerges wherein learners' productions lie in an intermediate state between the L1 and the target grammar, one possible way to account for such variation is by positing that speakers may flip between multiple grammars. The phenomenon of optionality in grammar has

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[9]Amaral and Roeper (2014, pp.15–20) offer a review of two existing frameworks for explaining optionality in L2; we have already encountered one of the them—the Interface Hypothesis—in this thesis.

been tackled with several differing computational approaches. Boersma (1998) explains option-
ality in the grammar through an Optimality Theoretical framework, where ranked constraints are
weighted probabilistically leading to a greater or lesser degree of optionality. Roeper (1999) and
Yang (2003) (and later, Amaral and Roeper (2014) in particular for L2 acquisition) claim that in-
dividual speakers entertain multiple grammars at all times. In Yang (2003) each grammar is given
a probability; at the beginning of acquisition, the probability associated to each grammar may
be equal, but the linguistic input subsequently changes these probabilistic weightings by reward-
ing grammars that predict the correct outputs and punishing those that do not. Our approach most
closely resembles the Multiple Grammars approach, but contrary to Yang (2003), we adopt a model
in which grammars can only be punished and never rewarded, so to speak. In other words, positive
evidence drives learning only by disconfirming the learner's hypotheses about the grammar.

6.4.3   Predictions for Prosodic Focus

In relation to prosodic focus, this creates several predictions. For English native speakers acquiring
the Spanish stress shift system, UASs are encountered in non-corrective focus contexts. The En-
glish native speaker will expect in these contexts for stress to be shifted, but in the Spanish input,
will be exposed to unexpected cases where stress is not shifted. The English speaker can make the
inference that this structure is acceptable in Spanish and therefore revise their grammar. However,
an important feature of this theory is that Expectedly Acceptable Structures do not trigger a revi-
sion: therefore, cases where corrective focus is marked in Spanish will effectively be ignored. This
means that based on the available evidence, the hypothesis space holds two potential states for G_2;
one where prosodic focus is marked only in corrective contexts and one where prosodic focus is
never marked. Both possibilities are attested in natural language: Northern Sotho, for example,
never uses prosodic prominence to signal information structure (Zerbian 2006, 2015). This could
mean that the grammar does not employ the $\sim$ operator or it could mean that the grammar does not

map the prosodic focus operator to prosodic prominence. Figure 6.9, which illustrates the parameters of prosodic focus, assumes that the latter is true[10]—in other words, Truckenbrodt's constraint, introduced in Chapter 2, example (12), is assumed to be inactive in Northern Sotho. At the stage of G_1, no evidence will be available to the learner to disambiguate between these two potential G_2s (i.e. Spanish versus Sotho).

Now, presume that a learner arrives at a new current grammar that resembles Sotho in that it never marks prosodic focus. They will again be faced with UASs from the Spanish input in the form of corrective focus. Again, they will be forced to revise their current grammar to one that accommodates prosodic stress shift. Unfortunately, this does not guarantee they will arrive at Spanish. In fact, it is possible for a learner to waver between an English-type and a Sotho-type grammar indefinitely. In this unsteady state, the only way for a learner to arrive at the correct grammar is if they succeed at integrating two different pieces of positive evidence: evidence that a single speaker shifts stress in a corrective context but not in a parallelism context, for example. If the positive evidence does not come from a single speaker, the learner may simply assume that multiple dialects of Spanish exist. Additionally, it is arguably a harder task to synthesize grammar rules based on the integration of two data points rather than a single data point.

For Spanish native speakers, UASs are also encountered in non-corrective focus contexts. The learners receive evidence that stress is shifted in cases where the focus operator would scope lower than is allowed in Spanish. They would force them to revise the current grammar by allowing stress to be shifted in cases of non-corrective focus (where $\sim$ has narrow scope). This simple revision would lead to a stable grammar G_2, as it conforms to the target English grammar and therefore no UASs will arise in the input that contradict G_2.

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[10]A grammar free of $\sim$ has unintended consequences for the anaphoric theory of prominence, since Rooth (1992) maintains that $\sim$ is used in judging question-answer congruence.

$$\sim\!\rightarrow prom. \qquad \sim\!\nrightarrow prom.$$
$$\text{(N. Sotho)}$$
$$+embeddable \qquad -embeddable$$
$$\text{(English)} \qquad \text{(Spanish)}$$
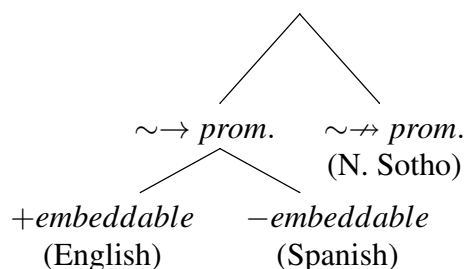
Figure 6.9: Typology of Prosodic Focus

6.5   L2 Methods

The same sentences were used as in the L1 experiment, which were shown in Tables 6.1 and 6.2, and the procedure was also identical, in which participants gave instructions to the experimenter with respect to pictures on the screen. Since each participant was tested in two languages, the Spanish and English sessions were held on separate days in order to minimize the effect of one language on the other. The order was counterbalanced by language group, so that half of participants in each language group completed the English session before the Spanish session while the other half did the opposite order.

The same participants are used in the L2 study as were in the preceding L1 experiment in this chapter. Inclusion in the study was based on the following criteria: For English native speakers, it was required that the participant's first language be English, learned from birth and spoken as a dominant language for the majority of his/her life, and that the participant spoke Spanish as a second language. If the participant spoke a third language, it was required that this language be less dominant than Spanish. The criteria were identical for Spanish speakers: it was required that the participant's first language be Spanish, learned from birth and spoken as a dominant language throughout his/her lifetime, and that English was spoken as a dominant non-primary language.

The inclusion criteria were enforced by the use of a language background questionnaire, which each participant completed before testing. The participants were asked to list every language that they spoke, age of acquisition of each language, self-reported proficiency (speaking, understand-

	English Native Speakers n=16		Spanish Native Speakers n=17	
	Mean	(SD)	Mean	(SD)
Age	23.56	(3.54)	30.00	(5.92)
Age of Acquisition of Second Language	7.75	(3.86)	8.71	(4.96)
Age of Arrival in English-speaking Country	N/A	N/A	26.18	(7.07)
Total Exposure to L2 (years)	15.81	(6.07)	20.94	(8.32)
Self-reported L2 Speaking Skills	3.63/5	(0.72)	3.71/5	(0.77)
Self-reported L2 Oral Comprehension	3.69/5	(0.70)	4.24/5	(0.66)
Self-reported L2 Reading Skills	4.00/5	(0.63)	4.18/5	(0.64)
Self-reported L2 Writing Skills	3.94/5	(0.85)	3.71/5	(0.69)
Proficiency Score	32.75/50	(9.04)	21.59/30	(4.12)

Table 6.6: Participant Data

ing, writing & reading) in each language, self-reported frequency of use of each language, duration of residence in Canada/USA, cultural identity[11] and musical ability.

Summary participant data is laid out in Table 6.6, where it is seen that on average, the Spanish native speakers are slightly older than the English native speakers and started learning English slightly earlier. This entails a larger amount of total exposure to the L2 within the Spanish group. All Spanish native speakers had immigrated to an English-speaking country (United States or Canada) during early adulthood. Participants in both groups most frequently reported speaking their second language on a daily basis although on average, Spanish native speakers had a higher self-reported frequency of use than English speakers. All learners began acquiring their second language in a classroom context. Nine English speakers additionally had immersion experience with Spanish (visiting or living in a foreign country). It is self-evident that all Spanish speakers had immersion experience with English in view of the fact that they all inhabited an English-speaking country (average duration: 3.82 years).

Proficiency was measured by means of a cloze test in each respective language. The English test consisted in 30 multiple-choice questions for a total of 30 points; the Spanish test was longer,

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[11]Asking about cultural identity was meant to help eliminate heritage speakers; in particular those who identify as Chicano, Hispanic-American or American are likely to speak a different dialect of Spanish than those who identify with their country of origin.

with 50 questions. Testing occurred in Lawrence, Kansas and Montreal, Quebec. Many participants in Montreal – of both language groups – had additional knowledge of French, but effort was taken to ensure that it was less dominant than either English or Spanish: those who had learned French before English or Spanish were excluded, as well as those who self-reported a higher proficiency in French in relation to either test language.

6.6   L2 Results

6.6.1   Anaphoric Focus (NP2)

Figure 6.10 shows the rate of stress shift in cases where the modifier is given, and therefore the head noun is focussed and a leftward shift in stress is possible (but not necessary, depending on language and scope). English native speakers in Spanish showed a lower rate of stress shift in NP2 than what was found for their English productions. Both in cases where the focus operator is non-embedded (Super scope) and in cases where it is embedded (Clausal and Sub scope), the rate of stress shift reaches only 64%-66% (whereas it was at 92-93% in English; shown in adjacent column for comparison).

In their L2, the Spanish native speakers showed a slightly higher rate of stress shift in NP2 than in their native language: in Figure 6.10 it can be seen that this group shifts stress in up to 58% of the trials of the Non-embedded condition, with their L1 results in the adjacent column for comparison. This rate of stress shift still does not reach the levels seen for English native speakers (92-93%).

A generalized linear mixed model of the entire dataset (both experiments, both language groups) is shown in Table 6.7. It is seen that a significant interaction between L1 and scope emerges, which is due to the L1 effect reported upon in the previous section: English native speakers do not differ their rates of stress shift according to scope, while Spanish native speakers shift stress most
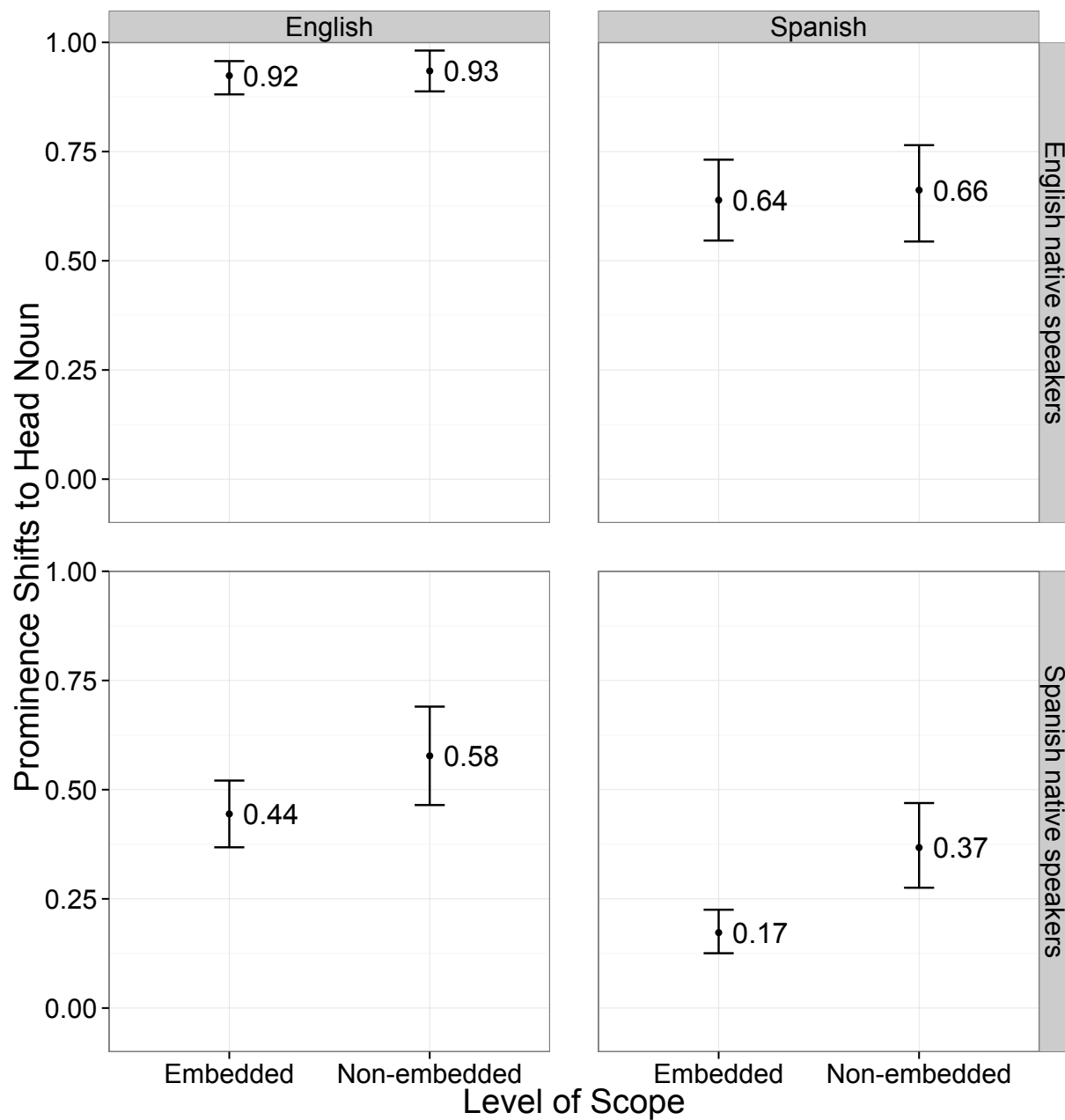
Figure 6.10: Prominence annotations for NP2 where modifier is given

frequently in non-embedded (Super scope) contexts. The fact that a three-way interaction did not

come out as significant could indicate that each language group transfers their L1 pattern to the

L2: English speakers do not distinguish scope contexts in Spanish whereas Spanish speakers do so

in English.

	Coeff (SE)
(Intercept)	$0.64 \ (0.21)^{**}$
language (Eng. vs. Span)	$1.74 \ (0.29)^{***}$
L1 (Anglo. vs. hisp)	$2.75 \ (0.43)^{***}$
scope (Embedded vs. no)	$-0.51 \ (0.23)^{*}$
language:L1	$1.20 \ (0.61)$
language:scope	$0.23 \ (0.40)$
L1:scope	$1.15 \ (0.49)^{*}$
language:L1:scope	$-0.56 \ (0.78)$

$^{***}p < 0.001, \ ^{**}p < 0.01, \ ^{*}p < 0.05$

Table 6.7: Generalized linear mixed model of English and Spanish data; L2 included. Formula: Annotations $\sim$ scope $*$ L1 $*$ language $+$ (language|participant) $+$ (scope|participant) $+$ (1|item)

On the other hand, the lack of interaction could be due to a lack of statistical power owing to smaller sample sizes. Indeed, when subsetting the data by experiment and comparing the rates of stress shift between L1s and L2s of a particular language, we see that a more nuanced pattern could possibly be at work. Table 6.8 shows a generalized linear mixed model of the Spanish data, comparing the stress shift rate of English native speakers to Spanish native speakers. Native language is a significant factor in the model, owing to the fact that overall, English speakers were more likely to shift stress in Spanish than the native speakers. There was a significant scope $*$ L1 interaction, characterized by a lower rate of stress shift in the Clause and Sub conditions for the Spanish native speakers: In other words, English speakers' stress shift rate in Spanish did not vary according to scope. This pattern does not diverge from what was found from the larger model. However, when looking at the model of the English data, shown in 6.9, we see that the overall stress shift rate between the L1 and L2 groups differs significantly, but the scope$*$L1 interaction did not reach significance. This could indicate that the Spanish speakers are indeed approaching the English-like pattern in that they are no longer differentiating between embedded and non-embedded contexts in their English productions. No matter which model is taken into account, there is no evidence for English native speakers acquiring the opposite pattern (in which focus is

only marked in non-embedded contexts).

	Coeff (SE)
(Intercept)	$-0.44\ (0.27)$
L1 (Anglo.vs hisp)	$2.57\ (0.58)^{***}$
scope1 (Super vs. other)	$0.75\ (0.35)^{*}$
scope2 (Clause vs. sub)	$-0.84\ (0.51)$
L1:scope1	$-1.78\ (0.79)^{*}$
L1:scope2	$0.84\ (1.22)$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 6.8: Generalized linear mixed model of Spanish data; L1 vs. L2. Formula: Annotations $\sim$ L1 $*$ scope $+$ (scope|participant) $+$ (scope|item) $+$ (L1|item.div)

	Coeff (SE)
(Intercept)	$1.51\ (0.31)^{***}$
L1 (Anglo vs. hisp)	$3.61\ (0.64)^{***}$
scope1 (Super vs. other)	$0.34\ (0.39)$
scope2 (Clause vs. sub)	$0.07\ (0.45)$
L1:scope1	$-1.05\ (0.82)$
L1:scope2	$0.60\ (1.07)$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 6.9: Generalized linear mixed model of English data; L1 vs. L2. Formula: Annotations $\sim$ L1 $*$ scope $+$ (scope|participant) $+$ (1|item) $+$ (0+scope|item) $+$ (0+L1|item)

6.6.2 Cataphoric Focus (NP1)

Just as the rates of cataphoric stress shift was quite low in the native speaker data, the rates for the L2 speakers are also quite low. A pattern that emerged was that cataphoric focus-marking was virtually non-existent in Spanish, regardless of L1 status. In Figure 6.11, this is exemplified by the values close to floor for the native English speakers (top plots): these values differ significantly from their rates of stress shift in English (Table 6.10). However, since cataphoric focus requires a certain amount of production planning, the lower rates for English speakers in Spanish may not
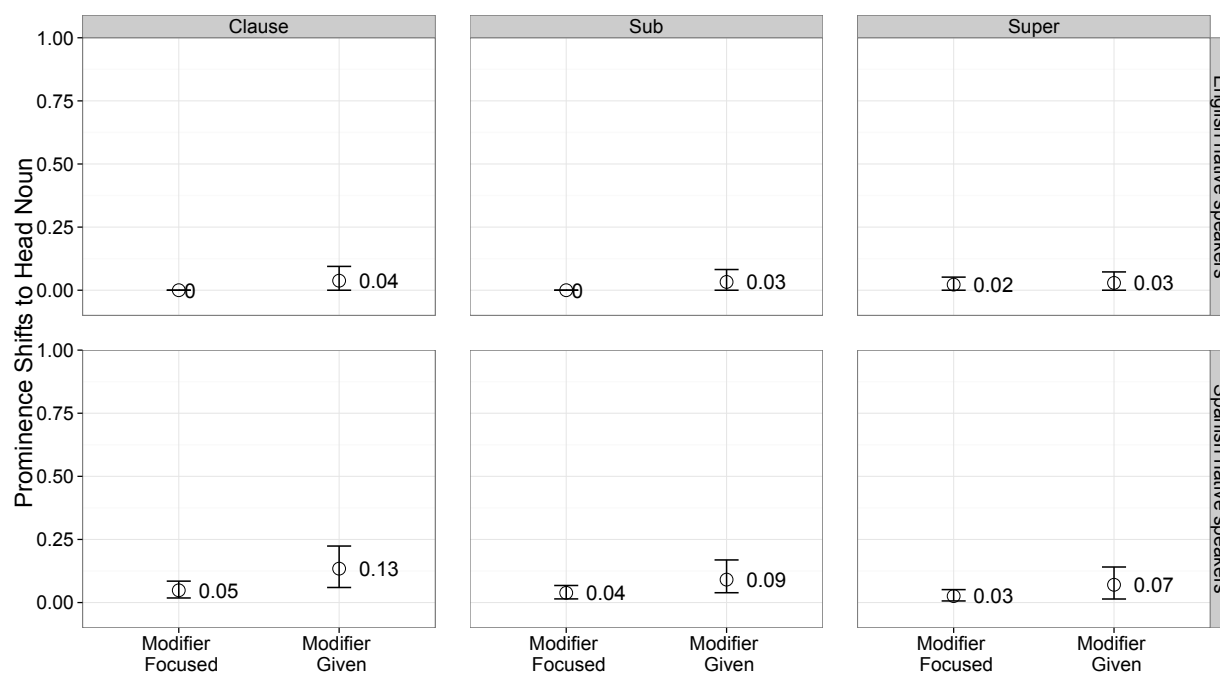
Figure 6.11: Prominence annotations for NP1; L2 data from Spanish (top) and English (bottom)

actually reflect a move away from the L1 grammar, but may simply be reflecting the fact that it is
more difficult to anticipate structure in the L2.

	Coeff (SE)
(Intercept)	$2.01\,(0.35)^{***}$
languageEng.vs.Span	$2.32\,(0.55)^{***}$
$^{***}p < 0.001, \,^{**}p < 0.01, \,^{*}p < 0.05$	

Table 6.10: Generalized linear mixed model of NP1 annotations - English native speakers; Spanish
vs. English. Formula: Annotation $\sim$ language + (language|participant) + (1|item)

	Coeff (SE)
(Intercept)	$2.01\,(0.35)^{***}$
languageEng.vs.Span	$2.32\,(0.55)^{***}$
$^{***}p < 0.001, \,^{**}p < 0.01, \,^{*}p < 0.05$	

Table 6.11: Generalized linear mixed model of NP1 annotations - Spanish native speakers; Spanish
vs. English. Formula: Annotations $\sim$ language + (language|participant) + (1|item)

The second important pattern to emerge in the L2 data for NP1 was that Spanish native speakers showed an elevated rate of cataphoric stress shift in English as compared to their Spanish productions (where rates of stress shift were effectively at floor). In English, Spanish native speakers marked cataphoric focus in 7-13% of the trials, which is a small but significant difference from their rates in Spanish, as seen from the model in Table 6.11.

6.6.3 L2 Discussion

The English speakers did not produce a difference between the different scope conditions in Spanish. For this group, corrective focus is just as likely to trigger a stress shift as other types of focus, suggesting that the Spanish-like pattern has not been attained. However, we do observe that the English native speakers generally showed reduced rates of stress shift as compared to their L1 productions, which indicates that their L2 interlanguage grammar departs from the L1, albeit in a way that does not resemble the target grammar. What instead appears to be the case is that the group is wavering between a grammar that marks prosodic focus at all levels of scope and a grammar that never marks prosodic focus; a Sotho-type grammar which lacks the prosodic focus operator. The English native-speaker data therefore provide confirmatory evidence for our hypothesis: because the acquisition of the Spanish ($\sim \rightarrow prom., -embeddable$) grammar requires the integration of two different pieces of positive evidence, it presents a true challenge to learners.

The Spanish native speakers have also not reached native-like status in their productions of English prosodic focus. However, they have boosted their rates of stress shift as compared to Spanish, therefore indicating a departure from the L1 grammar. In addition, although the rates of stress shift in the Super scope condition are numerically higher than in the other two conditions, the interaction is no longer calculated to be significant under certain models. It could possibly be concluded that the Spanish speakers are moving towards a target-like grammar in English. Even if it is difficult to make use of a null result to draw conclusions, it is certain that the Spanish group

has boosted their levels of stress shift within the Embedded conditions, which would be difficult to account for if it is not assumed that individual speakers optionally allow the prosodic focus operator to be embedded. Such optionality could also be captured by a multiple grammars account, in that it could easily be assumed that the group is flipping between their L1 Spanish grammar and an English-type grammar which allows the operator to be embedded.

In short, the data offer a detailed picture into the effect of transfer in an intermediate stage of the learning trajectory. The Spanish input seems not to be sufficient to trigger the proper restructuring in the English grammar at this stage. On the other hand, the Spanish learners may have begun to produce the English pattern, increasing their rates of stress shift in contexts where the Spanish grammar would not allow such structures. The next obvious step would be to test advanced speakers to see if this hypothesis can be extended: the strongest evidence would be if advanced English L1/Spanish L2ers showed little difference in their productions with respect to the intermediates, lacking a distinction between embedded and non-embedded contexts. In contrast, advanced Spanish L1/English L2ers would be expected to produce the English native-like pattern, with high rates of stress shift both in contexts where the operator is embedded and those where it is not.

A look at individual differences in mean stress shift rates (in the Head Noun condition) lends further evidence of transfer from the L1. Figure 6.12 plots the correlation between each participant's rate of stress shift in their L1 and their stress shift rate in the L2. There exists a healthy degree of individual variation even within the L1 results of both languages, which is in itself a normal finding, probably stemming from performance factors (for prosody, diverse factors ranging from processing limitations (Arnold and Watson 2015) to autism-spectrum traits (Jun and Bishop 2015) have been said drive individual differences). For English NSs, no strong correlation was found between the mean rate of stress shift in their L1 and their L2 (simple linear regression, Estimate = 0.25, Std. Error = 0.22, t value = 1.15, p = 0.27), although this may have to do with the fact that stress shift values are clustered at ceiling in both languages. For Spanish NSs, however, a significant correlation was found between L1 stress shift rate and L2 stress shift rate (simple linear

regression, Estimate = 0.59, Std. Error = 0.19, t value = 3.08, p < 0.01). This correlation suggests that individual variation is partially driving the L2 optionality; an individual's likelihood to shift stress in their L1 transfers to the L2 in a significant manner.
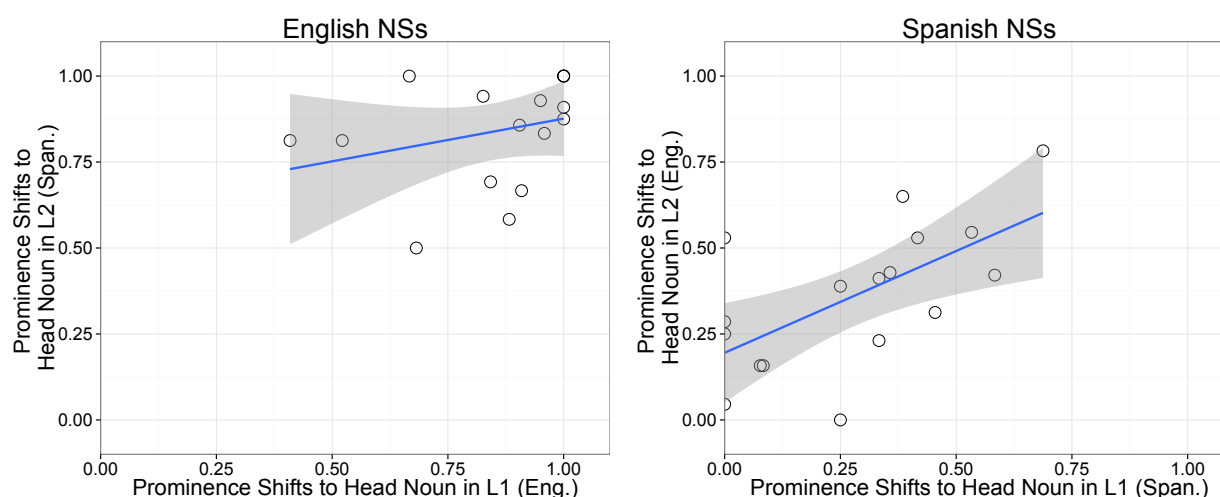
Figure 6.12: Individual Stress Shift Rates in L1 versus L2

6.7 Conclusion

This study showed that the correct generalization describing the differences between English and Spanish stress shift is a syntactic-semantic approach. Because Spanish speakers are shown to shift stress within DPs at a significant rate in corrective conditions, it is unlikely that there is a phonological restriction against Spanish stress shift. Instead, the differences have to do with the fact that the Spanish focus operator cannot take narrow scope, only wide scope over the entire speech act. A secondary difference may have to do with the interpretation of the focus operator: in Spanish, stress shift may only have a contrastive interpretation.

We formed a hypothesis about the acquisition of stress shift in this bidirectional context (English learners of Spanish, Spanish learners of English) based on what is available through positive evidence. English speakers can only arrive at the correct grammar if they integrate two pieces of

evidence; otherwise, they are bound to flip between an English and a Sotho-type grammar. We hypothesized that Spanish speakers do not have this same disadvantage in learning English stress shift. The L2 data support our hypothesis in that English speakers seem to waver between a grammar in which stress shift is allowed in all contexts (provided there is a proper antecedent, as was the case in the Head Noun condition) and a grammar where it is never allowed. Although the Spanish native speakers of this experiment had not yet achieved native-like production of English focus, there is evidence that they are moving towards the correct grammar. Individual differences may account for some of the variation in the Spanish native speaker data. Our hypothesis would benefit from further research with advanced learners from each group.

Chapter 7

Study 3: Contrastive Focus in Second Language Processing

This chapter is the result of joint work with Annie Tremblay, presented as a co-authored poster[1] and talk[2].

7.1   Introduction

This study tested the comprehension of cataphoric focus by adult learners of English. Cataphoric focus, recalling from chapter 2, occurs when a focus precedes its antecedent. This results in an expectation for upcoming content, an anticipatory effect found to occur in real time (Carbary et al. 2014). Second language processing is an important topic of study, since it is often found that second language learners show difficulties in processing (e.g. Juffs and Harrington 1995). However, the source of difficulty in L2 processing has not been agreed upon, especially where the online generation of expectations is concerned (Kaan 2014).

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[1](Klassen and Tremblay 2015b)
[2](Klassen and Tremblay 2015a)

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7.1.1   Prosodic Focus in Sentence Processing

The idea of cataphoricity, and prosodic focus in general, has been put to use in sentence processing and has been tested with online measures, hoping to answer the question of whether prosodic cues are put to use during the processing of a sentence.

According to a comprehensive review of visual world eye-tracking research in language processing by Huettig et al. (2011), the first study to demonstrate a connection between visual attention and language processing was conducted by Cooper (1974). The study showed that listeners were more likely to look at a visual referent immediately after it had been presented aurally. This fact was not put to use in language processing research until Tanenhaus et al. (1995) used the method to study the comprehension of sentences containing syntactic ambiguity. Then, in Dahan et al. (2002), the first visual world experiment on prosodic focus was reported in the literature. The general finding was that when a word was accented, listeners were less likely to look at previously mentioned referents than if the word was deaccented. This was tested by choosing referents which shared the same first syllable: candle vs. candy, for example. When both a candle and candy appear in the visual array, the target referent is not disambiguated until the advent of the second syllable.

(1)   a.   Put the candle above the square. Now, put the CAN(-dle/-dy) . . .

        b.   Put the candle above the square. Now, put the <u>can</u>(-dle/-dy) . . .

Therefore, upon hearing the first syllable of the target in (1a), the listeners anticipated a contrastive referent and therefore were more likely to look at the *candy*. The opposite was true in (1b), where the deaccented status of the word caused listeners to anticipate the non-contrastive, given referent: *candle*.

The bulk of the literature on visual world experiments with prosody are similar to Dahan et al. (2002) in that although they examine the anticipatory effect of focus, they technically do not examine cataphoric focus, as the focus antecedent still precedes the anaphor. Ito and Speer (2008) and

Braun and Tagliapietra (2010) test the effect of contrastive focus accents on pre-nominal modifiers in English and German, respectively. Both papers again found that prosody facilitated comprehension.

The first and only paper to test cataphoric focus in online processing is Carbary et al. (2014), where a facilitatory effect in comprehension was found. They do not report on an eye-tracking task but instead a simple picture-choosing task in which responses and reaction times were measured[3]. In this task, the subjects were required to move pictures on a screen. The instructions were presented aurally and the prosody was manipulated in order to see if it would facilitate response times.

(2)   a.   Drag the SQUARE with the <u>house</u> to the TRIANGLE with the <u>house</u>.

       b.   Drag the SQUARE with the HOUSE to the TRIANGLE with the MOUSE.

In (2a), the deaccentuation of *house* signals an upcoming contrast in the discourse. The listener constructs a focus presupposition of the form $\exists x[x \to$ with the house], and therefore anticipates a phrase of this same form.

In addition to manipulating the prosody, Carbary et al. included a condition in which the word-initial phoneme of the target word was obscured by a coughing sound (spliced in with phonetic software). The rest of the word did not differ segmentally from the source word, which meant that the listener could not use segmental cues to interpret which referent was supposed to be the target.

(3)   a.   Drag the SQUARE with the <u>house</u> to the TRIANGLE with the %<u>ouse</u>.

       b.   Drag the SQUARE with the HOUSE to the TRIANGLE with the %OUSE.

In (3), the % sign signifies the spliced-in noise. The target referent is segmentally ambiguous in both (3a) and (3b) – it could be "mouse" or "house" (both appear on the screen). It was predicted that in (3a), subjects would be more likely to choose *house* because it is reduced in the preceding

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[3]In fact, the task was originally eye-tracking, but did not yield significant results and so was not included in the paper.

phrase. It was also predicted that subjects would choose *mouse* in the case of (3b), since the accented status of *house* in the first phrase creates the expectation of a contrastive referent.

This is indeed what Carbary et al. found: a higher proportion of responses in the ambiguous "cough"-splice conditions was found for the non-contrastive referent when it was deaccented in the first phrase, while the opposite was true when the referent was accented in the first phrase. Reaction times also reflected this: in non-ambiguous trials, the subjects responded faster when the prosody matched the information structure of the sentence. The paper also reports on an offline gated decision task: In such a task, the participant is presented the sentence aurally, fragment-by-fragment, and at each sentential segment ("gate"), they are to try to predict what the target will be. The results showed that the participants already began to anticipate the "correct" target upon the presentation of the contrastive prosody in the preceding NP.

Although prosodic focus seems to have a facilitatory effect which allows English speakers to predict upcoming information, the same may not be true in other languages. As already stated, the general intuition about Romance languages is that prosodic stress shift does not occur in the same way as in English. Namjoshi and Tremblay (2014) set out to test whether French native speakers made use of French contrastive focus prosody in online processing. The study consisted in sentences like (4) – *chocolat* bears a H*-L accent in this example.

(4)   Clique le macaron de Marie-Hélène. Maintenant, clique le CHOCOLAT de
        click   the macaron of Marie-Helene now   click the chocolate   of
    Marie-Hélène.
    Marie-Helene
    "Click on Marie-Helene's macaron. Now click on Marie-Helene's chocolate."

If native French speakers make use of contrastive cues in processing French in the same way that English speakers do in English, it would be predicted that contrastive focus on *chocolat* in (4) would lead listeners to predict that the upcoming referent is *Marie-Hélène*, and not *Jean-Sébastien*, for example. Contrary to this prediction, native French speakers did not use the contrastive prosody

to predict an upcoming referent in Namjoshi and Tremblay's eye-tracking experiment—no effect of prosody was found preceding the disambiguation of the speech signal. Instead, the listeners made use of the information following lexical disambiguation: after the onset of the target noun the listeners were faster in the "helpful" prosody condition than in the other conditions. Therefore, French speakers were shown to integrate prosodic cues in order to constrain lexical access, but not to predict upcoming content, differing therefore from English native speakers, who often use prosody to predict upcoming content in experiments (e.g. Dahan et al. 2002).

The current literature, in sum, has mostly only looked at cases of anaphoric focus in a small collection of languages (English, German and French). There has been one study looking at cataphoric focus in English, but did not report on eye-tracking data. No studies as yet have conducted research on cataphoric focus in Romance – the difficulty being that sentences involving cataphoric focus are ungrammatical. However, another potential way to test this is to examine Romance learners of Germanic to see if they are able to use the same prosodic cues in processing – this is precisely what was investigated in this thesis.

7.1.2 Sentence Processing in L2

In the previous chapter, we examined the production of prosodic focus marking in English and Spanish, discussing the correct characterization of the differences between the languages. We also looked at the effect of L1 transfer on the acquisition of prosodic focus. What was found was that Spanish native speakers shift stress at a much lower rate than English native speakers, and that, in Spanish, stress shift virtually only ever occurs when focus is corrective in nature. The Spanish native speakers tested were at an intermediate stage of acquisition and, in English, did exhibit a higher rate of stress shift than they did in Spanish, but this effect was not large. Therefore, this final experiment begins with an assumption about the Spanish grammar, which is that stress shift is illicit in Spanish when it does not play a corrective role in focus-marking. This aspect of Spanish

prosodic grammar transfers to the L2, affecting the production of English focus. With lingering effects in production, it remains to be seen whether or not the learners have reached a native-like processing of English stress shift, or whether it is also subject to L1 transfer effects.

The question that is therefore to be addressed in this final experiment is to what extent an individual's L1 influences their processing of an L2. The nature of L2 processing has been explored in the context of multiple hypotheses in the literature. There are those who argue that adults process their second language in a way that is qualitatively different than their native language (e.g. Clahsen and Felser 2006). Under this hypothesis, the processing of a language by learners and native speakers is expected to appear different even when L1 transfer does not play a role. However, no specific claim under this theory has been made with respect to the processing of prosody in L2.

In native language processing, recent work has revealed that individuals are able to make use of many types of cues (morphosyntactic, semantic, prosodic) to predict upcoming content (e.g. Bar 2009, Clark 2013, Pickering and Garrod 2013). Applying this theory to L2, there is an emerging hypothesis known as the Reduced Ability to Generate Expectations (RAGE) hypothesis (Grüter et al. 2012, Grüter and Rohde 2013), which also posits a qualitative difference between learners and native speakers: learners are claimed to have a reduced ability to anticipate upcoming material. Grüter et al. (2012) maintains that the attainment of native-like grammatical representations in L2 is possible; learners may have access to or acquire the same types of knowledge as native speakers. However, differences in predictive processing may lead to non-native-like behaviour in online tasks.

In opposition to those theories that posit a qualitative difference between L1 and L2 processing, there are theories which explain differences between learners and native speakers as stemming from the same factors that drive individual differences in L1 processing: individual characteristics like working memory capacity, executive function and others (Juffs and Harrington 1995, White and Juffs 1998, McDonald 2006, Hopp 2010, i.a.). Particularly in connection with the generation of

expectations in real time, Kaan (2014) offers a counterhypothesis to RAGE, in which the ability to generate expectations is an individual difference independent of L1 status.

7.2 Methods

In this experiment, we test the processing of cataphoric focus marking in non-corrective contexts by English native speakers and intermediate learners whose first language is Spanish. We did so by means of a visual world paradigm eye-tracking experiment that used prosody to signal upcoming referents. We manipulated whether the prosody involved stress shift away from the prosodic head or not, and whether prosodic focus was marked cataphorically or not. If L1 transfer plays a role in L2 processing, we might observe that the learners are unable to make use of prosodic cues in the same way as native speakers. In particular, we predict that learners should not be able to make use of prosodic cues when they involve a shift in stress, because stress shift in this context would not be allowed by the L1 grammar. If L2 processing also differs qualitatively from L1 processing above and beyond the effects of transfer, we create an additional prediction: in the context of this experiment, which requires that individuals generate predictions in real time, the learners should show a disadvantage across the board in comparison to native speakers.

7.2.1 Design

The eye-tracking experiment consisted of 72 items presented in 4 blocks in a Latin Square design. The order of trials was randomized within blocks, with the order of the blocks counterbalanced across experiments. The experiment design was comprised of two factors, anticipation (anticipatory prosody vs. no anticipatory prosody) and focus location (focus on noun head, focus on number modifier, focus on both, new). In the Both condition, the target had a phonological competitor – an identical image with a different number (see the array in Figure 7.1). In the New condition, the target did not have a corresponding phonological competitor within the array. Besides this fact,

both the Both condition and the New condition had a double contrast within the sentence (both the source head noun and source number contrasted with the target head noun and target number). Because of this fact, these conditions could be considered control conditions, since the focus marking of a double contrast within the first sentence is not enough to disambiguate the target.
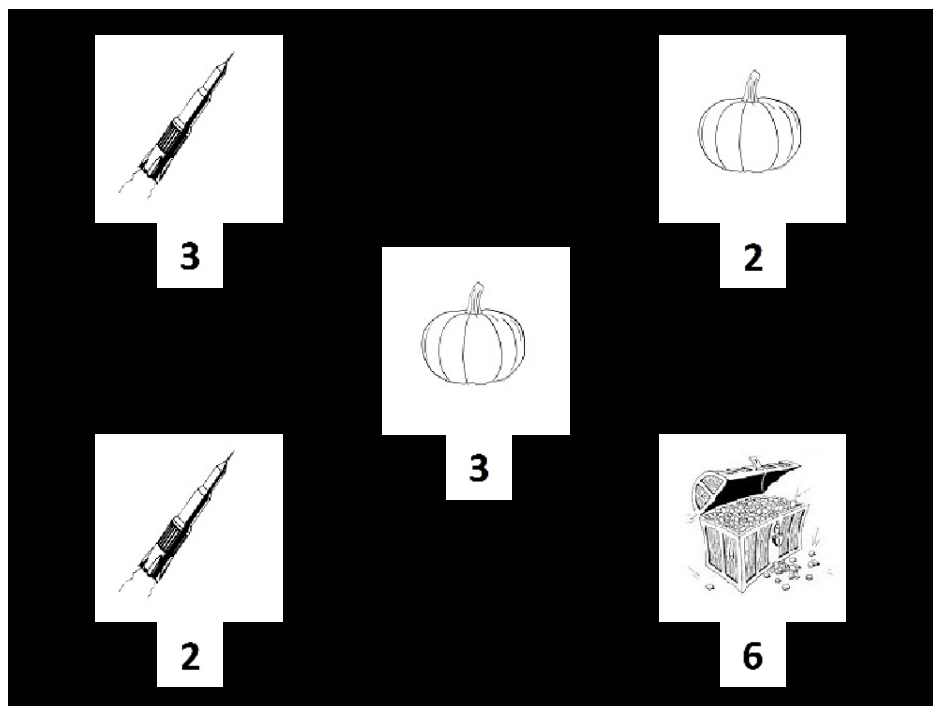
Figure 7.1: Visual Array in Eye-tracking Experiment

These factors were crossed, resulting in 8 conditions – see Table 7.1. In the sentences with Anticipatory Prosody, Phrase 1 contained clear L-H* pitch accents on the focussed constituents: when the noun head was contrasted, a pitch accent fell on the noun head, and so on and so forth. SMALL CAPS denote a constituent bearing a pitch accent. In the Non-anticipatory conditions, Phrase 1 did not contain any pitch accents. Instead, the noun head and number both were produced with a down-stepped H* accent, which is neutral and does not evoke alternatives. Phrase 2 did not vary between the Anticipatory and Non-anticipatory conditions. Recall that cataphoric prosodic focus is optional but anaphoric prosodic focus is not. Therefore, none of the sentences violated the

		Phrase 1	Phrase 2
Anticipatory Prosody	Noun head	Move PUMPKIN number three [A]	to ROCKET number three. [F]
	Number	Move pumpkin number THREE [B]	to pumpkin number TWO [G]
	Both	Move PUMPKIN number THREE [C]	to ROCKET number TWO [H]
	New	Move PUMPKIN number THREE [D]	to TREASURE number SIX [I]
No Anticipatory Prosody	Noun head	Move pumpkin number three [E]	to ROCKET number three. [F]
	Number	Move pumpkin number three [E]	to pumpkin number TWO [G]
	Both	Move pumpkin number three [E]	to ROCKET number TWO [H]
	New	Move pumpkin number three [E]	to TREASURE number SIX [I]

Table 7.1: Conditions for Eye-tracking Experiment

rules of English focus-marking – prosodic focus was consistently realized in the second phrase, where it is obligatory.

7.2.2 Stimuli Creation

Each box in Table 7.1 corresponds to a piece of spliced speech, labelled A, B, C, etc. The stimuli were created by splicing parts of sentences that were elicited in a recording session. The speaker was a male native speaker of Canadian English and trained in prosody and phonetics. During the elicitation session, the speaker read sentences from the screen of the form in Table 7.2. The splicing pieces were extracted from the elicited sentences by hand in Praat, then normalized for intensity and finally spliced together using a Praat script (Boersma and Weenink 2015). The splicing script inserted 700ms of silence from the offset of the final word in Phrase 1 to the onset of the first word in Phrase 2, which served as the interest period for statistical measurement.

In the interest of illustrating how the pitch accents were realized acoustically, acoustic measures were extracted from the stimuli sentences. This was done by processing the data using the McGill Prosodylab Forced-Aligner (Gorman et al. 2011), which aligns recorded speech to a Praat text grid containing a word tier. The words of interest were then annotated using a separate script and finally the acoustic measures were extracted for each word of interest. Measures extracted included

I.	Move PUMPKIN number three $\boxed{\text{A}}$	to ROCKET number three. $\boxed{\text{F}}$
II.	Move pumpkin number THREE $\boxed{\text{B}}$	to pumpkin number TWO $\boxed{\text{G}}$
III.	Move PUMPKIN number THREE $\boxed{\text{C}}$	to ROCKET number TWO $\boxed{\text{H}}$
IV.	Move PUMPKIN number THREE $\boxed{\text{D}}$	to TREASURE number SIX $\boxed{\text{I}}$
V.	Move pumpkin number three $\boxed{\text{E}}$	to another spot on the screen.

Table 7.2: Stimuli Elicitation Design

maximum pitch (F0), maximum intensity (dB) and duration. Table 7.3 contains these measures for each condition. Although the *No anticipation* phrases are spliced from identical intervals across all conditions, the Forced-Aligner exhibited small probabilistic differences in where segment boundaries are placed, resulting in slightly different acoustic measures across conditions which are not statistically significant. When a word was focussed, it exhibited significantly higher values for each measure in comparison to its *No anticipation* counterpart (i.e. "pumpkin$_F$">"pumpkin"; "three$_F$">"three"). Additionally, in the *Head noun – Anticipation* condition, the focussed word showed higher measures relative to the unfocussed word (i.e. "pumpkin$_F$">"three"). The same was true for the *Number – Anticipation* condition ("pumpkin"<"three$_F$").

When both words were focussed, there was no difference in prominence within Phrase 1. The two main cues for prominence in these cases were a longer duration on the head noun as well as a reduced second word ("number"). In comparison to the No Anticipation conditions, this second word was produced with lower pitch, less intensity and shorter duration. This means that the two focussed words in the *Both* and *New* conditions were prominent relative to the rest of the phrase, but not relative to each other (i.e. "pumpkin$_F$","three$_F$">"number").

7.2.3 Task and Procedure

The visual array is shown in Figure 7.1. Four potential target images were placed in equidistant corners of a black screen, with a source image at the centre. The task involved moving the center ("Source") image to one of the surrounding images, depending on the auditory instruction. The

Head Noun	"Move	pumpkin$_F$	number	three…"
Anticipation				
Maximum F0 (Hz)		290.58	170.01	184.17
Maximum Intensity (dB)		86.18	78.55	79.66
Duration (ms)		362.46	283.33	242.12
No anticipation				
Maximum F0 (Hz)		223.29	272.95	240.33
Maximum Intensity (dB)		84.92	81.39	83.91
Duration (ms)		333.53	277.92	376.12
Number	"Move	pumpkin	number	three$_F$…"
Anticipation				
Maximum F0 (Hz)		177.51	132.61	265.53
Maximum Intensity (dB)		83.47	77.49	85.62
Duration (ms)		326.15	282.36	387.16
No anticipation				
Maximum F0 (Hz)		226.45	272.91	250.34
Maximum Intensity (dB)		84.94	81.39	83.77
Duration (ms)		334.31	277.50	377.76
Both	"Move	pumpkin$_F$	number	three$_F$…"
Anticipation				
Maximum F0 (Hz)		253.38	161.76	247.39
Maximum Intensity (dB)		85.55	77.51	83.97
Duration (ms)		478.00	273.19	389.39
No anticipation				
Maximum F0 (Hz)		225.92	273.13	242.67
Maximum Intensity (dB)		84.92	81.39	83.85
Duration (ms)		334.15	277.64	377.16
New	"Move	pumpkin$_F$	number	three$_F$…"
Anticipation				
Maximum F0 (Hz)		252.88	160.03	238.10
Maximum Intensity (dB)		85.41	77.76	83.75
Duration (ms)		465.08	271.67	376.57
No anticipation				
Maximum F0 (Hz)		224.56	272.91	250.34
Maximum Intensity (dB)		84.93	81.39	83.73
Duration (ms)		334.46	277.50	372.99

Table 7.3: Mean Acoustic Measures Extracted from Stimuli Data – Phrase 1

participant needed only to click on the target image in order to complete each move. Upon clicking the target, the center image would move to that corner of the screen.

Eye movements were recorded using an EyeLink eye-tracking camera, with SR Research Experiment Builder as the software interface. The participants being testing in Kansas were fitted with an EyeLink II head-mounted eye-tracking camera while the laboratory in Montreal used an EyeLink 1000 desk-mounted eye-tracker. Both types of camera allow for participants to move their head freely during the task and deliver similar output (the EyeLink II collected data at a rate of 250Hz while the EyeLink 1000 collected data at a rate of 500Hz[4]). For the analysis, the data were converted into 20ms time bins by means of a Python script, and the proportion of looks to each interest area within each time bin was calculated using an R script. Eye movement data were time-locked to the auditory stimuli at the offset of the 700ms silent period between Phrase 1 and Phrase 2.

7.2.4   Participants

The same participants were used as in the previous chapter, and the further details on participants can be found there. We tested 16 native speakers of English and 16 native speakers of Spanish whose second language was English. In addition, it was required that each participant have normal vision (with or without correction), normal hearing (with or without hearing aids) and not wear contact lenses or heavy eye make-up during the study (both of which interfere with the eye-tracking camera). One Spanish speaker who had participated in the production experiment did not participate in the eye-tracking experiment because of technical issues with the camera.

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[4]The maximum sample rate for each camera is 250Hz and 1000Hz respectively.

7.2.5 Eye-tracking Results

Results are illustrated in Figure 7.2, divided by condition and by group. The 700ms silent period between Phrase 1 and Phrase 2, in addition to a 200ms reaction period[5], formed the time window in which we calculated our statistics. This 900ms period is marked in red in Figure 7.2; its onset coincides with the offset of Phrase 1 and its offset roughly coincides with the onset of the head noun in Phrase 2, although duration is not normalized across conditions. In fact, it was for this reason that we analyzed each condition separately, added to the fact that the baseline biases for each condition differ in theory. For example, previous mention of a referent can create a bias towards that referent. In the Number condition, the target head noun is always mentioned previously (Move tiger number one to tiger number two), which could have as a result a general bias towards the target in this condition (regardless of the presence or absence of prosody). To account for these possible baseline biases, our analysis compared looks to the target with looks to other referents (pooled). Pooling the non-target referents does not increase the likelihood of a spurious statistical effect in the regression model, as the program we used, lme4 (Bates et al. 2014), is designed to handle unbalanced group comparisons. In addition to this, the method avoids the confusion of comparing 4 factor levels. We converted the proportional sample data (proportions of samples in a given interest area within each time bin) to log odds, a data transformation that is argued to better fit the assumptions of a linear regression (Barr 2008). Because our models did not converge using a three-way interaction between referent type, prosody and L1, we performed statistical analyses on the language status groups separately.

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[5]This 200ms reaction period reflects the well-established time delay for eye movements to react to a speech stimulus (Matin et al. 1993).
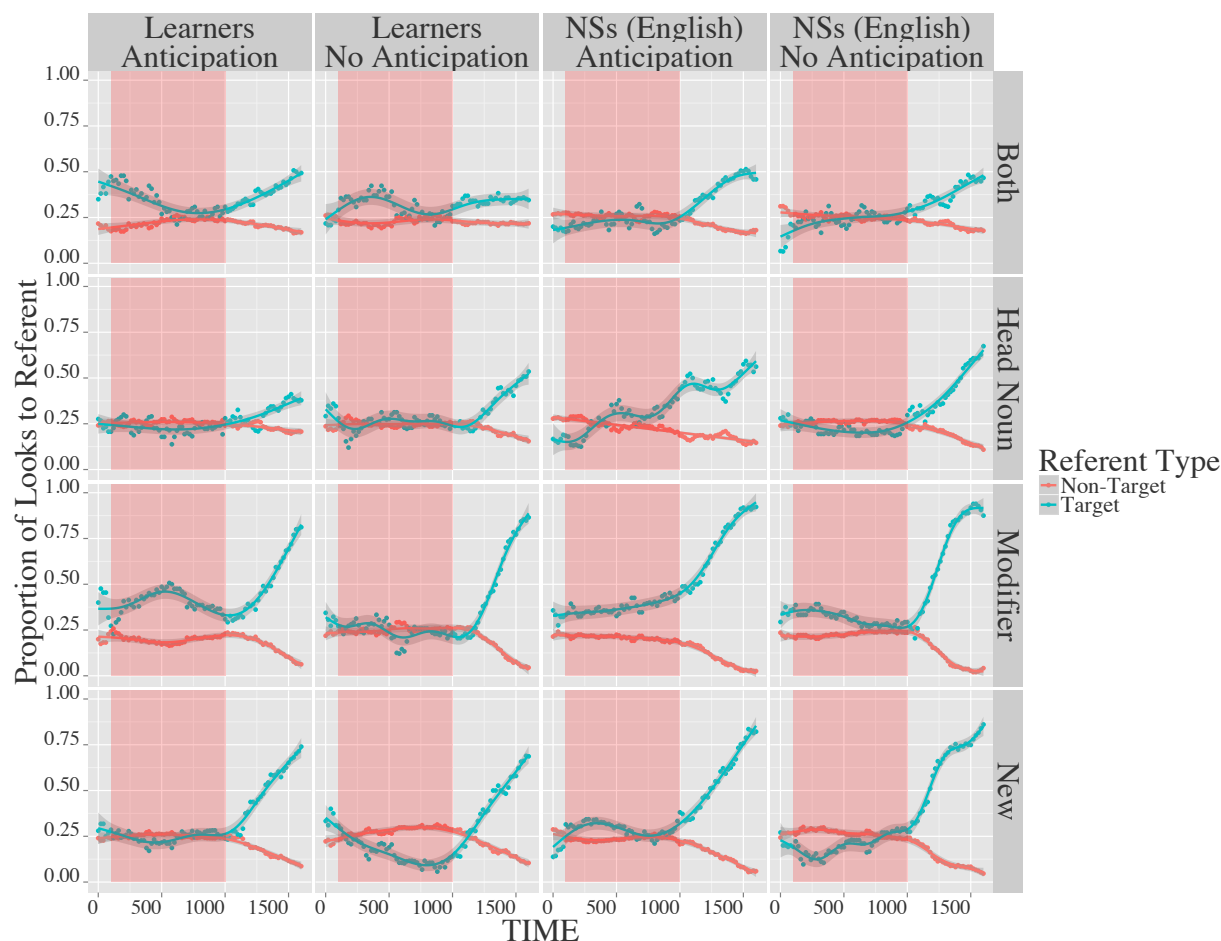
Figure 7.2: Eye-tracking Results – 900ms interest period in pink

In the **Head Noun** condition, we observe among the native speakers an increase in looks to the target through the 900ms interest period in the presence of anticipatory prosody. This is shown by the significant interaction in Table 7.4 between referent type (ref2) and prosody (anticipation) in the native speakers' model. However, among in the learners' model (also Table 7.4), we observe a negative coefficient for this interaction, indicating that the numerical difference is in the opposite direction, and this difference is not significant. This indicates that prosody did not have a facilitatory effect in this condition for the learner group.

In the **Number** condition, we observe among the native speakers and the learners a consider-

	Native speakers	Learners
	Coeff (SE)	Coeff (SE)
(Intercept)	$-2.17\ (0.20)^{***}$	$-2.01\ (0.14)^{***}$
anticipation (ant. vs. no ant.)	$-0.15\ (0.08)$	$0.08\ (0.08)$
referent (Target vs. other)	$-0.28\ (0.78)$	$-0.94\ (0.56)$
anticipation:referent	$0.60\ (0.22)^{**}$	$-0.34\ (0.19)$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 7.4: Linear mixed model; Head Noun Condition. Formula: qlogis(samples) $\sim$ prosody $*$ referent.type $+$ (prosody|item) $+$ (referent.type|item) $+$ (prosody|participant) $+$ (referent.type|participant)

able increase in looks to the target within the interest period when anticipatory prosody preceded. This is shown by the significant interactions between prosody and referent type found for both groups in this condition, shown in Table 7.5.

	Native speakers	Learners
	Coeff (SE)	Coeff (SE)
(Intercept)	$-2.49\ (0.21)^{***}$	$-2.57\ (0.23)^{***}$
anticipation (ant. vs. no ant.)	$-0.32\ (0.07)^{***}$	$-0.65\ (0.08)^{***}$
referent (Target vs. other)	$0.99\ (0.83)$	$1.30\ (0.91)$
anticipation:referent	$1.26\ (0.16)^{***}$	$2.60\ (0.19)^{***}$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 7.5: Linear mixed model; Number Condition. Formula: qlogis(samples) $\sim$ prosody $*$ referent.type $+$ (prosody|item) $+$ (referent.type|item) $+$ (prosody|participant) $+$ (referent.type|participant)

In the **Both** condition, we do not observe any large effects of prosody for any group, although the L2 speakers are in fact slower in the anticipatory prosody condition (Table 7.6). In the **New** condition, we do see a facilitatory effect of prosody: both groups have a higher average proportion of looks to the target within this condition when anticipatory prosody was present (Table 7.7).

	Native Speakers Coeff (SE)	Learners Coeff (SE)
(Intercept)	$-2.11\ (0.17)^{***}$	$-2.43\ (0.15)^{***}$
anticipation (ant. vs. no ant.)	$-0.05\ (0.08)$	$0.13\ (0.09)$
referent (Target vs. other)	$-0.55\ (0.69)$	$0.73\ (0.60)$
anticipation:referent	$0.18\ (0.22)$	$-0.51\ (0.20)^{*}$

$^{***}p < 0.001, ^{**}p < 0.01, ^{*}p < 0.05$

Table 7.6: Linear mixed model; Both Condition. Formula: qlogis(samples) $\sim$ prosody $*$ referent.type $+$ (prosody|item) $+$ (referent.type|item) $+$ (prosody|participant) $+$ (referent.type|participant)

	Native Speakers Coeff (SE)	Learners Coeff (SE)
(Intercept)	$-2.28\ (0.15)^{***}$	$-2.04\ (0.15)^{***}$
anticipation (ant. vs. no ant.)	$-0.26\ (0.08)^{***}$	$-0.21\ (0.08)^{**}$
referent (Target vs. other)	$0.14\ (0.58)$	$-0.83\ (0.59)$
anticipation:referent	$1.04\ (0.19)^{***}$	$0.85\ (0.19)^{***}$

$^{***}p < 0.001, ^{**}p < 0.01, ^{*}p < 0.05$

Table 7.7: Linear mixed model; New Condition. Formula: qlogis(samples) $\sim$ prosody $*$ referent.type $+$ (prosody|item) $+$ (referent.type|item) $+$ (prosody|participant) $+$ (referent.type|participant)

Individual Variation

In the **Head Noun** condition, we wanted to probe the source of variation in the learners. If the difference found in this condition is due primarily to transfer from the L1 grammar, we expect a correlation between the learners' rate of stress shift in English (as measured in the experiment in chapter 6). If there is no significant correlation, the variation could possibly be due to other types of factors such as a lowered ability to generate expectations in L2. To test the correlation, we reran the L2 model shown in Table 7.4, adding the individual rates of stress shift in English as a fixed effect. The results of this model are shown in Table 7.8. The addition of the individual rates of stress shift in L2 English proved to be a significant factor in the model. The more an individual shifted stress in English, the more they were likely to look at the target image following

the presentation of helpful prosody in the head noun condition. This helps to confirm the role of L1 transfer in the processing of prosodic cataphoric focus in English.

	Coeff (SE)
(Intercept)	$-2.19\,(0.23)^{***}$
anticipation (ant. vs. no ant.)	$0.71\,(0.18)^{***}$
referent (Target vs. other)	$-0.21\,(0.88)$
mean stress shift rate, English	$0.47\,(0.49)$
anticipation:referent	$-2.85\,(0.48)^{***}$
anticipation:shift.rate	$-1.81\,(0.46)^{***}$
referent:shift.rate	$-1.87\,(1.82)$
anticipation:referent:shift.rate	$7.24\,(1.25)^{***}$

$^{***}p < 0.001,\ ^{**}p < 0.01,\ ^{*}p < 0.05$

Table 7.8: Linear mixed model; Head Noun Condition, learners. Formula: qlogis(samples) $\sim$ prosody $*$ referent.type $*$ mean.shift.rate $+$ (prosody|item) $+$ (referent.type|item) $+$ (mean.shift.rate|item) $+$ (prosody|participant) $+$ (referent.type|participant)

7.3 Discussion

Although native speakers are able to predict upcoming referents in the Head Noun condition, the learners were unable to do so, showing no facilitatory effect in their eye-movements. This is almost certainly due to the fact that the Spanish grammar does not allow stress to be shifted in these cases, a fact that is supported by a significant correlation between eye-movements and the L2 production data. In most cases, English pattern has not yet been acquired and therefore the learners are unable to make use of the prosodic cues to predict upcoming information. However, it is not the case that learners are completely unable to use of prosody to generate online predictions in L2, because they show a clear effect in the Number condition[6], consistent with what is permitted in Spanish. Therefore, our results support the role of L1 interference in L2 processing and do not support a qualitative difference between L1 and L2 processing.

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[6]Since we do not analyze the learners and native speakers in the same model, it still could be the case that the learners are slower to make use of the prosody.

However, this interpretation is dependent on a certain idea of stress shift in Spanish, which is that although leftward shifts in stress are not permitted in embedded contexts (such as is the case in the Head Noun condition), rightward shifts in stress are indeed permitted—cases where the focussed constituent lies at the right edge of a prosodic phrase and material to the left is prosodically reduced. Rightward stress shift is observed in the Modifier condition, and was easily interpretable by the L2 group, which could lend support to such a view. However, the theories of prominence developed in previous chapters do not make a distinction between rightward and leftward stress shift and therefore have difficulty supporting such an account. What is more, another explanation could simply be that learners are slower to process leftward stress shift as compared to rightward. Indeed, it has been claimed that learners show slower processing times in comparison to native speakers (Clahsen and Felser 2006). This topic has the potential for further research and cannot be settled conclusively in this thesis.

In the previous chapter, the Spanish native speakers (identical to those in the current chapter) were found to have diverged from their L1 grammar in their L2 productions, in that their overall rates of stress shift in English were elevated in comparison to Spanish. Some accounts of phonological acquisition, such as the Speech Learning Model (Flege 1995), and more recently in direct relation to intonation, the L2 Intonation Learning Theory (LILt) (Mennen 2015), predict that target-like perceptual abilities should precede production. However, we do not find in this experiment that the perceptual abilities of the learners have surpassed production. If it were the case, we might expect the learners to exhibit native-like processing of prosody in their L2 well before they increase their rates of stress shift in their L2. Instead, the results are more in line with a framework such as in Pickering and Garrod (2013, and responses in same volume), in which comprehension and production go hand-in-hand: language comprehension involves prediction based on the same mechanisms used to plan productions.

Our production experiment did not find evidence of cataphoric focus marking in L1 Spanish. This could have been due to multiple reasons: it is true that it is possible that cataphoric focus

marking simply does not exist in Spanish. However, the rate of cataphoric focus marking in English was very low in comparison to anaphoric focus marking, suggesting that cataphoric focus is generally difficult to elicit in an experimental setting. This fact weakens the possibility that cataphoric focus marking does not exist in Spanish. Taking into account the processing evidence in the current experiment, it seems even less likely that this is the case. Although cataphoric focus marking may be rare in Spanish—perhaps simply because the use of stress shift is restricted—it seems to be available to the learners in processing.

Although the Both and New conditions were less crucial to testing our hypotheses, the results offer an interesting observation. When two foci existed in the sentence, the upcoming target remains ambiguous: it could either be the referent which has a second match in the visual display or a referent that is completely different from the other images. The participants of both language groups are still making use of the prosodic cues when confronted with this ambiguity, and the overwhelming trend is towards a specific strategy: they choose the image that stands out the most. Both groups seem equally efficient at this processing strategy, although only among the learners did we observe that this strategy detracted from the Both condition: they are slower in this condition, owing to their preference for the "New" referent.

7.4 Conclusion

This study found strong evidence of the role of the L1 grammar in the L2 processing of prosodic focus, and little evidence of a qualitative difference in processing strategies between native speakers and learners. Therefore, we conclude that L1 interference is a large determinant in processing efficiency of prosodic focus among adult learners. However, in cases of positive transfer, where an individual can draw upon knowledge from the L1 to aid in processing the L2, there does not appear to be any large qualitative differences in processing prosodic focus. Learners are just as able in these contexts to put prosody to use in order to form online predictions about upcoming content.

For example, in the Number condition, the learners show a clear anticipatory effect in response to cataphoric focus prosody. When the target is not fully disambiguated, as is the case in the New and Both conditions, learners show bias towards the most unique referent in the set of images, a strategy which is identical to the native speakers. This could be taken as additional evidence that the learners are drawing upon the same processing resources as the native speakers. Finally, there was a correlation between an individual's rate of stress shift in their L2 and their ability to make use of prosodic cues that do not exist in their L1, which gives further evidence for the role of transfer.

Chapter 8

Conclusion

8.1 Prosodic Focus in English

Study 1 showed that focus encodes an anaphoric relationship in the grammar, which is similar to pronominal anaphora in at least one respect: the choice of antecedent is determined by a speaker's intention. When two possible antecedents exist in the context, an optionality arises in production. In the first experiment of this study, we showed that when multiple possible antecedents exist, the rates of stress shift were measured at an intermediate value. In order to rule out the possibility that this effect is a gradient one, our second experiment resolved the ambiguity of antecedent with the use of certain adverbials. The semantics of the adverbs had a very large effect on the production of stress shift on this second experiment, whereas no measurable effect was found due to accessibility. Although we cannot rule out the fact that surface-level effects may contribute a small amount to the production of prominence in a sentence, the effect size of anaphoricity exceeds that of low-level activation by several orders of magnitude.

Therefore, the results of study 1 bear directly on current formulations of focus anaphoricity within the psycholinguistic literature. By showing that the anaphoric relationship is semantically determined, we negate the accessibility account in favour of a semantically-based account. Addi-

tionally, the anaphoric nature of focus helps to categorize it within the architecture of the grammar. We support the proposal in Rooth (1992), which states that focus requires a syntactic operator and is anaphoric in nature, therefore making it similar to pronouns and other anaphora like ellipsis. The acquisition of prosodic focus in English is therefore a good test case for the mapping between syntax and discourse, which has received much attention in recent years.

8.2   Prosodic Focus in Spanish

The conditions governing prosodic focus in English and Spanish are different: prosodic focus in Spanish is more restricted. In choosing between a syntax-semantics theory (Scope Hypothesis, (vander Klok et al. 2014)) and a Phonological theory (e.g. Féry 2013), we argue in favour of the Scope Hypothesis. The production data from the Spanish native speakers in study 3 showed that Spanish native speakers do shift stress within DPs, counter to what has been proposed about the phonology of Romance languages (Zubizarreta 1998). However, stress shift was limited to cases of corrective focus. Corrective focus differs from other types of focus in its syntax: corrective focus involves the contrasting of two speech acts, and therefore the focus operator takes broad scope. In addition to this, the Spanish prosodic focus operator may require a particular semantic interpretation, one that negates a previous speech act.

8.3   Acquisition of Prosodic Focus

This thesis addressed several current theories in L2 acquisition. Study 2 addressed the Interface Hypothesis (IH) in L2. An anaphoric theory of prosodic focus in English means that focus involves anaphoric dependencies just as in the processing of pronouns. There is no principled reason why it should not be considered an *external* interface, which means that the Interface Hypothesis would predict that Spanish speakers should not show native-like judgments for English prosodic focus.

However, the naturalness judgment data in this study showed that this was not the case: the learners did not differ significantly from native speakers in their judgments and there was a correlation between their judgments and their proficiency scores, which indicated that the individual differences in judgments were due to differing levels of proficiency. Learners' judgments of clefting showed evidence of positive transfer from the L1.

The Study 3 production experiments address the role of positive evidence in the acquisition of prosodic focus. The hypothesis extended in this chapter was that a directional asymmetry should emerge with respect to the L2 data. The acquisition of Spanish prosodic focus marking by English native speakers requires the integration of two pieces of positive evidence while in the opposition direction, Spanish native speakers need only one piece of positive evidence to deduce the target-like pattern. Until English native speakers can integrate Spanish data points where stress is shifted as it is in English (corrective contexts) and data points where stress is not shifted (non-corrective contexts), they posit the existence of two separate grammars: One in which stress shift always occurs in cases of focus (as in English) and one in which it never occurs (resembling Northern Sotho). The existence of these two grammars results in optionality in production.

The eye-tracking study examines L2 processing of cataphoric focus-marking. Native speakers of English are shown to use cataphoric focus-marking to generate online predictions about upcoming content while the learners show evidence of L1 transfer in processing. When the cataphoric focus-marking involved a shift in stress from the default prosodic head (Head Noun condition), the learners were unable to generate predictions. However, in other cases, they were able to predict upcoming referents based on prosody, which provides the basis of an argument against the hypothesis that learners are altogether unable to generate predictions online. In fact, the experiment did not provide any strong evidence that the learners were less efficient in processing outside cases of transfer. In addition, we found a correlation between a learner's rate of stress shift in their L2 and their ability to make use of prosodic cues online in the L2, which further supports the idea of transfer: L2 production and comprehension of focus prosody are highly correlated and it is not

the case that perception abilities precede production, nor is it the case that the learners are simply unable to generate predictions based on anticipatory prosody.

The interpretation of the eye-tracking results depend on a non-standard analysis of Spanish stress shift. Not only must it be assumed that Spanish stress shift is only licit in corrective contexts, it additionally must be assumed that this constraint only applies to cases of leftward shifts in stress. Rightward shifts in stress would not be subject to this rule. To better phrase this rule, it could be stated that Spanish cannot move the prosodic head within a prosodic phrase, except for purposes of corrective focus. However, with our current formalism using the prosodic focus operator, such a rule would be difficult to implement. In addition to this, an alternative hypothesis could be that learners simply have a difficult time processing sentences with leftward stress shift as compared to rightward stress shift, and that the effect has little to do with the properties of the L1 grammar. These questions remain open for further investigation.

8.4 Final Conclusion

Focus is an anaphoric phenomenon and focus antecedence is decided by speaker's intended meaning. Crosslinguistic differences in focus-marking are due to syntactic and semantic differences involving the unpronounced prosodic focus operator. Prosodic focus in a second language is subject to transfer from the L1 and ultimate attainment is not guaranteed; however, lack of ultimate attainment should not be attributed to qualitative differences between L2 and L1 cognition but instead due to the types of evidence available to learners. Learners make changes to the interlanguage prosodic grammar based on positive evidence that disconfirms hypotheses about the target grammar. Aspects of the L1 grammar interfere not only with L2 production, but also L2 processing. The L2 production and comprehension of prosodic focus do not develop separately but are based on a single source of grammatical knowledge. Aside cases of negative transfer, learners do not show evidence of non-native-like processing of prosodic focus and are able to predict upcoming content based on prosodic cues.

Bibliography

ABRAHAMSSON, NICLAS. 2012. Age of onset and nativelike L2 ultimate attainment of morphosyntactic and phonetic intuition. *Studies in Second Language Acquisition* 34.187–214. DOI:10.1017/S0272263112000022.

ABRAHAMSSON, NICLAS, and KENNETH HYLTENSTAM. 2009. Age of onset and nativelikeness in a second language: listener perception versus linguistic scutiny. *Language Learning* 59.249–306. DOI:10.1111/j.1467-9922.2009.00507.x.

AMARAL, LUIZ, and TOM ROEPER. 2014. Multiple grammars and second language representation. *Second Language Research* 30.3–36. DOI:10.1177/0267658313519017.

ARNOLD, JENNIFER E. 1998. *Reference form and discourse patterns*. Ph.D. thesis, Stanford University.

ARNOLD, JENNIFER E.; JASON M. KAHN, and GIULIA C. PANCANI. 2012. Audience design affects acoustic reduction via production facilitation. *Psychonomic Bulleting and Review* 19.505–512. DOI:10.3758/s13423-012-0233-y.

ARNOLD, JENNIFER E., and DUANE G. WATSON. 2015. Synthesising meaning and processing approaches to prosody: Performance matters. *Language, Cognition and Neuroscience* 30.88–102. DOI:10.1080/01690965.2013.840733.

AYLETT, MATTHEW PETER, and ALICE TURK. 2004. The smooth signal redundancy hypothesis: A functional explanation for relationships between redundancy, prosodic prominence, and duration in spontaneous speech. *Language and Speech* 47.31–56. DOI:10.1177/00238309040470010201.

BAAYEN, ROLF HARALD. 2008. *Analyzing linguistic data: A practical introduction to statistics using R.* Cambridge, UK: Cambridge University Press.

BAAYEN, ROLF HARALD; DOUGLAS J. DAVIDSON, and DOUGLAS BATES. 2008. Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language* 59.390–412. DOI:10.1016/j.jml.2007.12.005.

BADER, CHRISTOPHER. 2001. *Givenness, Focus, and Prosody*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

BAILYN, JOHN FREDERICK. 2003. Does Russian scrambling exist? Simin Karimi (ed.) *Word Order and Scrambling*, chap. 7, 156–176. Malden, MA, USA: Blackwell Publishing.

BAKER, CARL LEE, and JOHN J. MCCARTHY (eds.) 1981. *The logical problem of language acquisition*. Cambridge, MA, USA: MIT Press.

BALE, ALAN CLINTON. 2007. Quantifiers and verb phrases: An exploration of propositional complexity. *Natural Language and Linguistic Theory* 25.447–483. DOI:10.1007/s11049-007-9019-8.

BAR, MOSHE. 2009. The proactive brain: Memory for predictions. *Philosophical Transactions of the Royal Society* 364.1235–1243. DOI:10.1098/rstb.2008.0310.

BARR, DALE J. 2008. Analyzing 'visual world' eyetracking data using multilevel logistic regression. *Journal of Memory and Language* 59.457–474. DOI:10.1016/j.jml.2007.09.002.

BARR, DALE J.; ROGER LEVY; CRISTOPH SCHEEPERS, and HARRY J. TILY. 2012. Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language* 68.255–278. DOI:10.1016/j.jml.2012.11.001.

BATES, DOUGLAS; MARTIN MAECHLER; BENJAMIN M. BOLKER, and STEVEN WALKER. 2014. lme4: Linear mixed-effects models using Eigen and S4. R package version 1.1-7. http://CRAN.R-project.org/package=lme4.

BECK, SIGRID. 2006. Focus on 'again'. *Linguistics and Philosophy* 29.277–314. DOI:10.1007/s10988-005-5794-z.

BELL, ALAN; JASON M. BRENIER; MICHELLE L. GREGORY; CYNTHIA GIRAND, and DANIEL JURAFSKY. 2009. Predictability effects on durations of content and function words in conversational English. *Journal of Memory and Language* 60.92–111. DOI:10.1016/j.jml.2008.06.003.

BELLETTI, ADRIANA. 2000. 'Inversion' as focalization. Aafke Hulk and Jean-Yves Pollock (eds.) *Subject Inversion in Romance and the Theory of Universal Grammar*, chap. 3, 60–90. Oxford, UK: Oxford University Press.

BELLETTI, ADRIANA; ELISA BENNATI, and ANTONELLA SORACE. 2007. Theoretical and developmental issues in the syntax of subjects: Evidence from near-native Italian. *Natural Language and Linguistic Theory* 25.657–689. DOI:10.1007/s11049-007-9026-9.

BEST, CATHERINE T. 1995. A direct realist view of cross-language speech perception. Winifred Strange (ed.) *Speech Perception and Linguistic Experience: Issues in Cross-Language Research*, chap. 6, 171–232. Timonium, MD, USA: York Press.

BLEY-VROMAN, ROBERT. 1989. What is the logical problem of foreign language learning? Susan M. Gass and Jacquelyn Schachter (eds.) *Linguistic Perspectives on Second Language Acquisition*, 41–68. New York, NY, USA: Cambridge University Press.

BOCCI, GIULIANO. 2013. *The Syntax-Prosody Interface*. Amsterdam, NL: John Benjamins.

BOCCI, GIULIANO, and CINZIA AVESANI. 2008. Deaccent given or define focus? Where Italian doesn't sound like English. Paper presented at the 34th Incontro di Grammatica Generativa.

BOERSMA, PAUL. 1998. *Functional Phonology*. Ph.D. thesis, University of Amsterdam, Amsterdam, NL.

BOERSMA, PAUL, and DAVID WEENINK. 2015. Praat: doing phonetics by computer. [Computer Program]. Version 5.4.08, retrieved 24 March 2015 from http://www.praat.org/.

BOLINGER, DWIGHT L. 1954. English prosodic stress and Spanish sentence order. *Hispania* 37.152–156.

BOLINGER, DWIGHT L. 1965. *Forms of English: accent, morpheme, order*. Cambridge, MA, USA: Harvard University Press.

BOLINGER, DWIGHT L. 1972. Accent is predictable (if you're a mind-reader). *Language* 48.633–644. DOI:10.2307/412039.

BOULA DE MAREÜIL, PHILIPPE, and BIANCA VIERU-DIMULESCU. 2006. The contribution of prosody to the perception of foreign accent. *Phonetica* 63.247–267.

BRAUN, BETTINA, and LARA TAGLIAPIETRA. 2010. The role of contrastive intonation contours in the retrieval of contextual alternatives. *Language and Cognitive Processes* 25.1024–1043. DOI:10.1080/01690960903036836.

BREEN, MARA; EVELINA FEDORENKO; MICHAEL WAGNER, and EDWARD GIBSON. 2010. Acoustic correlates of information structure. *Language and Cognitive Processes* 25.1044–1098. DOI:10.1080/01690965.2010.504378.

BRUHN DE GARAVITO, JOYCE, and LYDIA WHITE. 2002. L2 acquisition of Spanish DPs: the status of grammatical features. Ana Teresa Pérez-Leroux and Juana Muños Liceras (eds.) *The acquisition of Spanish morphosyntax: the L1/L2 connection*, 153–178. Dordrecht, NL: Kluwer.

BÜRING, DANIEL. 1997. *The meaning of topic and focus: the 58th street bridge accent*. London, UK: Routledge.

BÜRING, DANIEL. 2010. Towards a typology of focus realization. Malte Zimmermann and Caroline Féry (eds.) *Information Structure: Theoretical, Typological and Experimental Perspectives*, 177–205. Oxford, UK: Oxford University Press.

BÜRING, DANIEL, and MANUEL KRIŽ. 2013. It's that, and that's it! Exhaustivity and homogeneity presuppositions in clefts (and definites). *Semantics and Pragmatics* 6. DOI:10.3765/sp.6.6.

BURZIO, LUIGI. 1986. *Italian syntax: a government-binding approach*. Boston, MA, USA: Dordrecht.

CALABRESE, ANDREA. 1987. Focus structure in Berber: A comparative analysis with Italian. Mohamed Guerssel and Kenneth L. Hale (eds.) *Studies in Berber Syntax*, 103–120. Cambridge, MA, USA: MIT Press.

CALHOUN, SASHA. 2010. How does informativeness affect prosodic prominence? *Language and Cognitive Processes* 25.1099–1140. DOI:10.1080/01690965.2010.491682.

CARBARY, KATHLEEN; MEREDITH BROWN; CHRISTINE A. GUNLOGSON; JOYCE M. MC-DONOUGH; ALEKSANDRA FALZIPOUR, and MICHAEL K. TANENHAUS. 2014. Anticipatory deaccenting in language comprehension. *Language, Cognition and Neuroscience* 30.197–211. DOI:10.1080/23273798.2014.885534.

CHIERCHIA, GENNARO; DANNY FOX, and BENJAMIN SPECTOR. 2012. Scalar implicature as a grammatical phenomenon. Claudia Maienborn, Klaus von Heusinger and Paul Portner (eds.)

Semantics: an International Handbook of Natural Language Meaning, 2297–2331. Berlin, Germany: Mouton de Gruyer.

CHOMSKY, NOAM. 1959. A review of B.F. Skinner's *Verbal behavior*. *Language* 35.26–58.

CHOMSKY, NOAM. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA, USA: MIT Press.

CHOMSKY, NOAM. 1969. *Deep structure, surface structure and semantic interpretation*. Bloomington, IN, USA: Indiana University Linguistics Club.

CHOMSKY, NOAM. 1993. A minimalist program for linguistic theory. Kenneth L. Hale and Samuel Jay Keyser (eds.) *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. Cambridge, MA, USA: MIT Press.

CHOMSKY, NOAM. 2005. Three factors in language design. *Linguistic Inquiry* 36.1–22. DOI:10.1162/0024389052993655.

CHOMSKY, NOAM, and MORRIS HALLE. 1968. *The Sound Pattern of English*. New York, NY, USA: Harper & Row.

CINQUE, GUGLIEMO. 1993. A null theory of phrase and compound stress. *Linguistic Inquiry* 24.239–297.

CLAHSEN, HARALD, and CLAUDIA FELSER. 2006. Grammatical processing in language learners. *Applied Psycholinguistics* 27.3–42. DOI:10.1017/S0142716406060024.

CLARK, ANDY. 2013. Whatever next? predictive brains, situated agents, and the future of cognitive science. *Behavioral and Brain Sciences* 36.181–253. DOI:10.1017/S0140525X12000477.

COOPER, ROGER. 1974. The control of eye fixation by the meaning of spoken language. *Cognitive Psychology* 6.84–107. DOI:10.1016/0010-0285(74)90005-X.

CRUTTENDEN, ALAN. 2006. The de-accenting of given information: A cognitive universal? Giuliano Bernini and Maria L. Schwartz (eds.) *Pragmatic Organization of Discourse in the Languages of Europe*. New York, NY, USA: Mouton de Gruyter.

CUTLER, ANNE; DELPHINE DAHAN, and WILMA VAN DONESELAAR. 1997. Prosody in the comprehension of spoken language: A literature review. *Language and Speech* 40.141–201. DOI:10.1177/002383099704000203.

DAHAN, DELPHINE; MICHAEL K. TANENHAUS, and CRAIG G. CHAMBERS. 2002. Accent and reference resolution in spoken-language comprehension. *Journal of Memory and Language* 47.292–314. DOI:10.1016/S0749-596X(02)00001-3.

DEKYDTSPOTTER, LAURENT; REX A. SPROUSE, and BRUCE ANDERSON. 1997. The interpretative interface in L2 acquisition: The process-result distinction in English-French interlanguage grammars. *Language Acquisition* 6.297–332.

DEKYDTSPOTTER, LAURENT; REX A. SPROUSE, and KIMBERLY SWANSON. 2001. Reflexes of mental architecture in second-language acquisition: the interpretation of combien extractions in English-French interlanguage. *Language Acquisition* 9.175–227. DOI:10.1207/S15327817LA0903$_1$.

DEZSÖ, LÁSZLÓ. 1977. Toward a typology of theme and rheme: SOV languages. Maria-Elisabeth Conte, Anna Ramat and Paolo Ramat (eds.) *Worststellung und Bedeutung*, 3–11. Tübingen, Germany: Niemeyer.

DOMÍNGUEZ, LAURA. 2013. *Understanding Interfaces: Second Language Acquisition and Native Language Attrition of Spanish Subject Realization and Word Order Variation*. Amsterdam, NL: John Benjamins.

ECKARDT, REGINE, and MANUELA FRÄNKEL. 2012. Particles, "Maximize Presupposition" and discourse management. *Lingua* 122.1801–1818. DOI:10.1016/j.lingua.2012.08.014.

FACE, TIMOTHY L. 2000. Prosodic manifestations of focus in Spanish. *Southwest Journal of Linguistics* 19.45–62.

FACE, TIMOTHY L. 2001. Focus and early peak alignment in Spanish intonation. *Probus* 13.223–246. DOI:10.1515/prbs.2001.004.

FACE, TIMOTHY L. 2002. Local intonational marking of Spanish contrastive focus. *Probus* 14.71–92. DOI:10.1515/prbs.2002.006.

FÉRY, CAROLINE. 2001. Focus and phrasing in French. Caroline Féry and Wolfgang Sternefeld (eds.) *Audiatur Vox Sapientiae. A Festschrift for Anim von Stechow*, 153–181. Berlin, Germany: Akademie Verlag.

FÉRY, CAROLINE. 2013. Focus as prosodic alignment. *Natural Language and Linguistic Theory* 31.683–734. DOI:10.1007/s11049-013-9195-7.

FLEGE, JAMES EMIL. 1995. Second language speech learning: Theory, findings and problems. Winifred Strange (ed.) *Speech Perception and Linguistic Experience: Issues in Cross-Language Research*, chap. 8, 233–277. Timonium, MD, USA: York Press.

FOWLER, CAROL A., and JONATHAN HOUSUM. 1987. Talkers' signaling of "new" and "old" words in speech and listeners' perception and use of the distinction. *Memory and Language* 26.489–504. DOI:10.1016/0749-596X(87)90136-7.

GABRIEL, CRISTOPH. 2010. On focus, prosody, and word order in Argentinean Spanish: A minimalist OT account. *Revista Virtual de Estudos da Linguagem* 8.

GILLON, BRENDAN S. 1987. The readings of plural noun phrases in English. *Linguistics and Philosophy* 10.199–219. DOI:10.1007/BF00584318.

GOAD, HEATHER, and LYDIA WHITE. 2004. Ultimate attainment of L2 inflection: Effects of L1 prosodic structure. Susan H. Foster-Cohen, Michael Sharwood-Smith, Antonella Sorace and Mitsuhiko Ota (eds.) *Eurosla Yearbook*, 119–145. Amsterdam, NL: John Benjamins. DOI:10.1075/eurosla.4.07goa.

GOAD, HEATHER, and LYDIA WHITE. 2006. Ultimate attainment in interlanguage grammars: A prosodic approach. *Second Language Research* 22.243–268. DOI:10.1191/0267658306sr268oa.

GORMAN, KYLE; JONATHAN HOWELL, and MICHAEL WAGNER. 2011. Prosodylab-aligner: A tool for forced alignment of laboratory speech. *Proceedings of Acoustics Week in Canada*. Quebec City, QC, Canada: Canadian Acoustical Association.

GOTO, HIROMU. 1971. Auditory perception by normal Japanese adults of the sounds "L" and "R". *Neuropsychologia* 9.317–323. DOI:10.1016/0028-3932(71)90027-3.

GRÜTER, THERES; CASEY LEW-WILLIAMS, and ANNE FERNALD. 2012. Grammatical gender in L2: A production or a real-time processing problem? *Second Language Research* 28.191–215. DOI:10.1177/0267658312437990.

GRÜTER, THERES, and HANNAH ROHDE. 2013. L2 processing is affected by RAGE: Evidence from reference resolution. Talk presented the 12th conference on Generative Approaches to Second Language Acquisition (GASLA).

GUSSENHOVEN, CARLOS. 2007. Types of focus in English. Chungmin Lee, Matthew Gordon and Daniel Büring (eds.) *Topic and Focus: Cross-Linguistic Perspectives on Meaning and Intonation*, 83–100. Dordrecht, NL: Springer.

HALE, KENNETH L., and SAMUEL JAY KEYSER. 1991. On argument structure. Center for Cognitive Science, MIT.

HALE, KENNETH L., and SAMUEL JAY KEYSER. 1993. On argument structure and the lexical representation of syntactic relations. Kenneth L. Hale and Samuel Jay Keyser (eds.) *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. Cambridge, MA, USA: MIT Press.

HALLE, MORRIS, and JEAN-ROGER VERGNAUD. 1987. *An Essay on Stress*. Cambridge, MA, USA: MIT Press.

HALLIDAY, MICHAEL. 1967. Notes on transitivity and theme in English: Part 2. *Journal of Linguistics* 3.199–244. DOI:10.1017/S0022226700016613.

HAMLAOUI, FATIMA; SASCHA CORIDUN, and CAROLINE FÉRY. 2012. Expression prosodique du focus et du donné au sein des groupes nominaux [N A] du français. Franck Neveu, Valelia Muni Toke, Peter Blumenthal, Thomas Klinger, Pierliugi Ligas, Sophie Prévost and Sandra Teston-Bonnard (eds.) *Actes du 3e Congrès Mondial de Linguistique Française*, 1505–1518. SHS Web of Conferences. DOI:10.1051/shsconf/20120100300.

HEIM, IRENE. 1991. Artikel und Definitheit. Dieter Wunderlich and Arnim von Stechow (eds.) *Semantik: ein internationales Handbuch der zeitgenössischen Forschung*. Berlin, Germany: de Gruyter.

HIRSCHBERG, JULIA, and JANET PIERREHUMBERT. 1986. The intonational structuring of discourse. *The 24th Annual Meeting of the Association for Computational Linguistics (ACL)*, 136–144.

HOOT, BRADLEY. 2012. *Presentational Focus in Heritage and Monolingual Spanish*. Ph.D. thesis, University of Illinois at Chicago, Chicago, IL, USA.

HOPP, HOLGER. 2010. Ultimate attainment in L2 infleciton: Performance similarities between non-native and native speakers. *Lingua* 120.901–931. DOI:10.1016/j.lingua.2009.06.004.

HORNSTEIN, NORBERT, and DAVID LIGHTFOOT. 1981. *Explanation in Linguistics: the Logical Problem of Language Acquisition*. London, UK: Longman.

HUALDE, JOSÉ IGNACIO; ANTXON OLARREA, and ERIN O'ROURKE (eds.) 2012. *The Handbook of Hispanic Linguistics*. Malden, MA, USA: Wiley-Blackwell.

HUETTIG, FALK; JOOST ROMMERS, and ANTJE S. MEYER. 2011. Using the visual world paradigm to study language processing: A review and critical evaluation. *Acta Psychologica* 137.151–171. DOI:10.1016/j.actpsy.2010.11.003.

ITO, KIWAKO, and SHARI R. SPEER. 2008. Anticipatory effects of intonation: Eye movements during instructed visual search. *Journal of Memory and Language* 58.541–573. DOI:10.1016/j.jml.2007.06.013.

JACKENDOFF, RAY S. 1972. Focus and presupposition. *Semantic Interpretation in Generative Grammar*, chap. vi, 227–278. Cambridge, MA, USA: MIT Press.

JACKENDOFF, RAY S. 1997. *The Architecture of the Language Faculty*. Cambridge, MA, USA: MIT Press.

JACKENDOFF, RAY S. 2002. *Foundations of Language: Brain, Meaning, Grammar, Evolution*. Oxford, UK: Oxford University Press. DOI:10.1093/acprof:oso/9780198270126.001.0001.

JAEGER, T. FLORIAN. 2010. Redundancy and reduction: speakers manage syntactic information density. *Cognitive Psychology* 61.23–62. DOI:10.1016/j.cogpsych.2010.02.002.

JILKA, MATTHIAS. 2000. *The contribution of intonation to the perception of foreign accent*. Ph.D. thesis, Universität Stuttgart, Stuttgart, Germany.

JUFFS, ALAN, and MICHAEL HARRINGTON. 1995. Parsing effects in second language sentence processing: Subject and object asymmetries in *wh*-extraction. *Studies in Second Language Acquisition* 17.483–516.

JUFFS, ALAN, and GUILLERMO A. RODRÍGUEZ. 2015. *Second Language Sentence Processing*. New York, NY, USA: Routledge.

JUN, SUN-AH, and JASON BISHOP. 2015. Priming implicit prosody: Prosodic boundaries and individual differences. *Language and Speech* Advanced Online Copy.

JUN, SUN-AH, and CÉCILE FOUGERON. 2000. A phonological model of French intonation. Antonis Botinis (ed.) *Intonation: Analysis, Modelling and Technology*. Amsterdam, NL: Springer.

KAAN, EDITH. 2014. Predictive sentence processing in L2 and L1. *Linguistic Approaches to Bilingualism* 4.257–282. DOI:10.1075/lab.4.2.05kaa.

KAHN, JASON M., and JENNIFER E. ARNOLD. 2015. Articulatory and lexical repetition effects on durational reduction: Speaker experience vs. common ground. *Language, Cognition and Neuroscience* 30.103–119. DOI:10.1080/01690965.2013.848989.

KAM, XUAN-NGA CAO, and JANET DEAN FODOR. 2012. Children's acquisition of syntax: Simple models are too simple. *Rich Languages from Poor Inputs*. Oxford, UK: Oxford University Press. DOI:10.1093/acprof:oso/9780199590339.001.0001.

KANNO, KAZUE. 1997. The acquisition of null and overt pronominals in japanese by english speakers. *Second Language Research* 13.265–287. DOI:10.1191/026765897673070746.

KIM, ALAN HYUN-OAK. 1988. Preverbal focussing and type XXIII languages. Michael Hammond, Edith A. Moravcsik and Jessica R. Wirth (eds.) *Studies in Syntactic Typology*, 147–169. Amsterdam, NL: John Benjamins. DOI:10.1075/tsl.17.12kim.

KISS, KATALIN É. 1998. Identificational focus versus information focus. *Language* 74.245–273. DOI:10.2307/417867.

KLASSEN, JEFFREY. 2013a. Second language acquisition of English focus prosody: Evidence from native Spanish speakers. *Poster presented at the 38th Annual Boston University Conference on Language Development (BUCLD 38)*, Boston, MA, USA.

KLASSEN, JEFFREY. 2013b. Second language acquisition of English focus prosody: Evidence from Spanish native speakers. *Poster presented at the 12th Generative Advances in Language Acquisition (GASLA12) Conference*, Gainesville, FL, USA.

KLASSEN, JEFFREY. 2013c. Second language acquisition of English focus prosody: Evidence from Spanish native speakers. Jennifer Cabrelli Amaro, Tiffany Judy and Diego Pascual y Cabo (eds.) *Proceedings of the 12th Generative Approaches to Second Language Acquisition Conference (GASLA 12)*. Somerville, MA, USA: Cascadilla Proceedings Project.

KLASSEN, JEFFREY, and ANNIE TREMBLAY. 2015a. Anticipatory focus and second language acquisition: Eye-tracking and production data. *Talk given at the 2nd Discourse Expectations: Theoretical, Experimental and Computational Perspectives (DETEC-2) Workshop*, Edmonton, AB, Canada.

KLASSEN, JEFFREY, and ANNIE TREMBLAY. 2015b. L2 prosodic focus: Processing, transfer, and grammatical architecture. *Poster presented at the 38th Annual CUNY Conference on Human Language Processing*, Los Angeles, CA, USA.

KLASSEN, JEFFREY, and MICHAEL WAGNER. 2015. Prosodic prominence shifts are anaphoric. Submitted.

KLEIN, WOLFGANG. 2001. Time and again. Caroline Féry and W Sternefeld (eds.) *Audiatur Vox Sapientiae. A Festschrift for Anim von Stechow*, 267–286. Akademie Verlag.

KRIFKA, MANFRED. 2009. Embedding speech acts. Manuscript, Humboldt Universität.

LADD, D. ROBERT. 2008. *Intonational Phonology*. Cambridge, UK: Cambridge University Press.

LAM, TUAN Q., and DUANE G. WATSON. 2010. Repetition is easy: Why repeated referents have reduced prominence. *Memory and Cognition* 38.1137–1146. DOI:10.3758/MC.38.8.1137.

LARSON, RICHARD K. 1988. On the double object construction. *Linguistic Inquiry* 19.335–391.

LENNEBERG, ERIC H. 1967. *Biological Foundations of Language*. New York, NY, USA: John Wiley and Sons, Inc.

LIBERMAN, MARK. 1975. *The Intonational System of English*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

LÓPEZ, LUIS. 2009. *A Derivational Syntax for Information Structure*. Oxford, UK: Oxford University Press. DOI:10.1093/acprof:oso/9780199557400.001.0001.

LOZANO, CRISTOBAL. 2006. Focus and split-intransitivity: the acquisition of word order alternations in non-native Spanish. *Second Language Research* 22.145–187. DOI:10.1191/0267658306sr264oa.

VAN MAASTRICHT, LIEKE; EMIEL KRAHMER, and MARC SWERTS. 2015. Prominence patterns in a second language: Intonational transfer from Dutch to Spanish and vice versa. Accepted for publication.

MATIN, ETHEL; K. C. SHAO, and KENNETH R. BOFF. 1993. Saccadic overhead: Information-processing time with and without saccades. *Perception and Psychophysics* 53.372–380. DOI:10.3758/BF03206780.

MCDONALD, JANET L. 2006. Beyond the critical period: Processing-based explanations for poor grammaticality judgment performance by late second language learners. *Journal of Memory and Language* 55.381–401. DOI:10.1016/j.jml.2006.06.006.

MENNEN, INEKE. 2015. Beyond segments: Towards a L2 intonation learning theory. Elisabeth Delais-Roussarie, Mathieu Avanzi and Sophie Herment (eds.) *Prosody and Language in*

Contact: L2 Acquisition, Attrition and Languages in Multilingual Situations, chap. 9, 171–188. Berlin, Germany: Springer-Verlag. DOI:10.1007/978-3-662-45168-7₉.

MONTALBETTI, MARIO M. 1984. *After Binding*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

NAMJOSHI, JUI, and ANNIE TREMBLAY. 2014. The processing of prosodic focus in French. Paper presented at the 27th annual CUNY Conference on Human Sentence Processing, Ohio State University.

NESPOR, MARINA, and IRENE VOGEL. 1986. *Prosodic Phonology*. Dordrecht, NL: Foris Publications.

O'ROURKE, ERIN. 2012. Intonation in Spanish. José Ignacio Hualde, Antxon Olarrea and Erin O'Rourke (eds.) *The Handbook of Hispanic Linguistics*, chap. 9, 173–191. Wiley-Blackwell.

ORTEGA-SANTOS, IVÁN. 2013. Corrective focus at the right edge in Spanish. *Lingua* 131.112–135. DOI:10.1016/j.lingua.2013.02.007.

PÉREZ-LEROUX, ANA TERESA, and WILLIAM R. GLASS. 1999. Null anaphora in Spanish second language acquisition: probabilistic versus generative approaches. *Second Language Research* 15.220–249.

PICKERING, MARTIN J., and SIMON GARROD. 2013. An integrated theory of language production and comprehension. *Behavioral and Brain Sciences* 36.329–392. DOI:10.1017/S0140525X12001495.

PIERREHUMBERT, JANET. 1980. *The Phonology and Phonetics of English Intonation*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

PIERREHUMBERT, JANET, and JULIA HIRSCHBERG. 1990. The meaning of intonational contours in the interpretation of discourse. Philip R. Cohen, Jerry L. Morgan and Martha E. Pollack (eds.) *Intentions in Communication*, 271–311. Cambridge, MA, USA: MIT Press.

PLATZACK, CHRISTER. 2001. The vulnerable C-domain. *Brain and Language* 77.364–377. DOI:10.1006/brln.2000.2408.

RAMCHAND, GILLIAN, and CHARLES REISS (eds.) 2007. *The Oxford Handbook of Linguistic Interfaces*. Oxford, UK: Oxford University Press.

REINHART, TANYA. 2006. *Interface strategies: optimal and costly computations*. Cambridge, MA, USA: MIT Press.

RICHARDS, NORVIN. 2010. *Uttering Trees*. Cambridge, MA, USA: MIT Press.

RICHARDS, NORVIN. 2014. Contiguity theory. LingBuzz: ling.auf.net/lingbuzz/002247.

RINGBOM, HÅKAN. 1992. On L1 transfer in L2 comprehension and L2 production. *Language Learning* 42.85–112.

RIZZI, LUIGI. 1997. The fine structure of the left periphery. Liliane M. V. Haegeman (ed.) *Elements of Grammar: Handbook of Generative Syntax*, 281–337. Dordrecht, NL: Kluwer. DOI:10.1007/978-94-011-5420-8.

ROEPER, TOM. 1999. Universal bilingualism. *Bilingualism: Language and Cognition* 2.169–186.

ROOTH, MATS EDWARD. 1985. *Association with Focus*. Ph.D. thesis, University of Massachusetts, Amherst, Amherst, MA, USA.

ROOTH, MATS EDWARD. 1992. A theory of focus interpretation. *Natural Language Semantics* 1.75–116. DOI:10.1007/BF02342617.

ROSS, JOHN ROBERT. 1967. *Constraints on variables in syntax*. Ph.D. thesis, MIT, Cambridge, MA, USA.

ROTHMAN, JASON. 2009. Pragmatic deficits with syntactic consequences?: L2 pronominal subjects and the syntax-pragmatics interface. *Journal of Pragmatics* 41.951–973. DOI:10.1016/j.pragma.2008.07.007.

SAMEK-LODOVICI, VIERI. 2005. Prosody-syntax interaction in the expression of focus. *Natural Language and Linguistic Theory* 23.687–755. DOI:10.1007/s11049-004-2874-7.

SAUERLAND, ULI. 2005. Don't interpret focus: why a presuppositional account of focus fails, and how a presuppositional account of givenness works. Emar Maier, Corien Bary and Janneke Huitink (eds.) *Proceedings of Sinn und Bedeutung 9*, 370–384. Nijmegen, NL: Nijmegen Centre of Semantics.

SAUERLAND, ULI. 2012. The computation of scalar implicatures: Pragmatic, lexical or grammatical? *Language and Linguistics Compass* 6.36–49. DOI:10.1002/lnc3.321.

SCHWARTZ, BONNIE D. 1986. The epistemological status of second language acquisition. *Second Language Research* 2.120–159. DOI:10.1177/026765838600200202.

SCHWARTZ, BONNIE D., and REX A. SPROUSE. 1996. L2 cognitive states and the Full Transfer/Full Access model. *Second Language Research* 12.40–72. DOI:10.1177/026765839601200103.

SCHWARZSCHILD, ROGER. 1999. GIVENNESS, AVOIDF and other constraints on the placement of accent. *Natural Language Semantics* 7.141–177. DOI:10.1023/A:1008370902407.

SELKIRK, ELISABETH O. 1978. On prosodic structure and its relation to syntactic structure. T. Fretheim (ed.) *Nordic Prosody II*. Trondheim, Norway: TAPIR.

SELKIRK, ELISABETH O. 1980a. Prosodic domains in phonology: Sanskrit revisited. Mark
   Aronoff and Mary-Louise Kean (eds.) *Juncture*. Saratoga, CA, USA: Anma Libri.

SELKIRK, ELISABETH O. 1980b. The role of prosodic categories in English word stress. *Linguistic Inquiry* 11.563–605.

SELKIRK, ELISABETH O. 1981. On the nature of phonological representation. Terry Myers,
   John Laver and John M. Anderson (eds.) *The Cognitive Representation of Speech*, 379–388.
   Amsterdam, NL: North-Holland Publishing Company.

SELKIRK, ELISABETH O. 1984. *Phonology and Syntax: the relation between sound and structure*.
   Cambridge, MA, USA: MIT Press.

SELKIRK, ELISABETH O. 1995. Sentence prosody: Intonation, stress, and phrasing. John A.
   Goldsmith (ed.) *The Handbook of Phonological Theory*, chap. 16, 550–569. Cambridge, MA,
   USA: Blackwell Publishing.

SELKIRK, ELISABETH O. 2007. Contrastive focus, givenness and phrase stress. Manuscript,
   University of Massachusetts at Amherst.

SLABAKOVA, ROUMYANA. 2000. L1 transfer revisited: the L2 acquisition of telicity marking in
   English by Spanish and Bulgarian native speakers. *Linguistics* 38.739–770.

SLABAKOVA, ROUMYANA. 2010. Scalar implicatures in second language acquisition. *Lingua*
   120.2444–2462. DOI:10.1016/j.lingua.2009.06.005.

SORACE, ANTONELLA. 2011. Pinning down the concept of "interface" in bilingualism. *Linguistic
   Approaches to Bilingualism* 1.1–33. DOI:10.1075/lab.1.1.01sor.

SORACE, ANTONELLA, and FRANCESCA FILIACI. 2006. Anaphora resolution in near-native
   speakers of Italian. *Second Language Research* 22.339–368. DOI:10.1191/0267658306sr271oa.

VON STECHOW, ARNIM. 1991. Focusing and backgrounding operators. Abraham Werner (ed.) *Discourse Particles: Descriptive and Theoretical Investigations on the Logical, Syntactic and Pragmatic Properties of Discourse in German*, chap. iv, 37–84. Amsterdam, NL: John Benjamins. DOI:10.1075/pbns.12.04ste.

SWERTS, MARC; EMIEL KRAHMER, and CINZIA AVESANI. 2002. Prosodic marking of information status in Dutch and Italian: a comparative analysis. *Journal of Phonetics* 30.629–654. DOI:10.1006/jpho.2002.0178.

TANENHAUS, MICHAEL K.; MICHAEL J. SPIVEY-KNOWLTON; KATHLEEN EBERHARD, and JULE C. SEDIVY. 1995. Integration of visual and linguistic information in spoken language comprehension. *Science* 268.1632–1634. DOI:10.1126/science.7777863.

TERKEN, JACQUES M. B. 1984. The distribution of pitch accents in instructions as a function of discourse structure. *Language and Speech* 27.269–289.

TERKEN, JACQUES M. B., and JULIA HIRSCHBERG. 1994. Deaccentuation of words representing 'given' information: Effects of persistence of grammatical function and surface position. *Language and Speech* 37.125–145. DOI:10.1177/002383099403700202.

TOLEDO, GUILLERMO ANDRÉS. 1989. Señales prosódicas del foco. *Revista Argentina de Lingüística* 5.205–230.

TRUCKENBRODT, HUBERT. 1995. *Phonological Phrases: Their Relation to Syntax, Focus and Prominence*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

TSIMPLI, IANTHI, and ANTONELLA SORACE. 2006. Differentiating interfaces: L2 performance in syntax-semantics and syntax-discourse phenomena. David Bamman, Tatiana Magnitskaia and Colleen Zaller (eds.) *Proceedings of the 30th Annual Boston University Conference on Language Development (BUCLD)*, 653–664. Boston University, Somerville, MA, USA: Cascadilla Press.

VANDER KLOK, JOZINA; HEATHER GOAD, and MICHAEL WAGNER. 2014. Prosodic focus in English vs. French: A scope account. LingBuzz: ling.auf.net/lingbuzz/002274.

WAGNER, MICHAEL. 2005a. NPI-licensing and focus movement. Efthymia Georgala and Jonathan Howell (eds.) *Proceedings of SALT XV*. UCLA, Ithaca, NY, USA: Cornell Working Papers in Linguistics.

WAGNER, MICHAEL. 2005b. *Prosody and Recursion*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

WAGNER, MICHAEL. 2006. Givenness and locality. Masayuki Gibson and Jonathan Howell Howell (eds.) *Proceedings of SALT XVI*, 295–312. Ithaca, NY, USA: CLC Publications.

WAGNER, MICHAEL. 2012. Focus and recursion. UCL Workshop on Information Structure.

WAGNER, MICHAEL, and JEFFREY KLASSEN. 2015. Accessibility is no alternative to alternatives. *Language, Cognition and Neuroscience* 30.212–233. DOI:10.1080/23273798.2014.959532.

WANG, LIN; MARCEL BASTIAANSEN; YUFANG YANG, and PETER HAGOORT. 2011. The influence of information structure on the depth of semantic processing: how focus and pitch accent determine the size of the N400 effect. *Neuropsychologia* 49.813–820. DOI:10.1016/j.neuropsychologia.2010.12.035.

WARD, GREGORY, and JULIA HIRSCHBERG. 1985. Implicating uncertainty: The pragmatics of fall-rise intonation. *Language* 61.747–76. DOI:10.2307/414489.

WATSON, DUANE. 2010. The many roads to prominence: Understanding emphasis in conversation. *Psychology of Learning and Motivation* 52.163–183. DOI:10.1016/S0079-7421(10)52004-8.

WATSON, DUANE G.; MICHAEL K. TANENHAUS, and CHRISTINE A. GUNLOGSON. 2008. Interpreting pitch accents in online comprehension: H* vs. L+H*. *Cognitive Science* 32.1232–1244. DOI:10.1080/03640210802138755.

WENNERSTROM, ANN. 1994. Intonational meaning in English discourse: A study of non-native speakers. *Applied Linguistics* 15.399–420. DOI:10.1093/applin/15.4.399.

WHITE, LYDIA. 1987. Against comprehensible input: the input hypothesis and development of second-language competence. *Applied Linguistics* 8.95–110. DOI:10.1093/applin/8.2.95.

WHITE, LYDIA. 1989. *Universal Grammar and Second Language Acquisition*. Amsterdam, NL: John Benjamins.

WHITE, LYDIA. 2003. *Second Language Acquisition and Universal Grammar*. Cambridge, UK: Cambridge University Press.

WHITE, LYDIA. 2011a. The interface hypothesis: How far does it extend? *Linguistic Approaches to Bilingualism* 1.108–110. DOI:10.1075/lab.1.1.19whi.

WHITE, LYDIA. 2011b. Second language acquisition at the interfaces. *Lingua* 121.577–590. DOI:10.1016/j.lingua.2010.05.005.

WHITE, LYDIA. 2012. Universal grammar, crosslinguistic variation and second language acquisition. *Language Teaching* 45.309–328. DOI:10.1017/S0261444812000146.

WHITE, LYDIA, and FRED GENESEE. 1996. How native is near-native? The issue of ultimate attainment in adult second language acquisition. *Second Language Research* 12.233–265. DOI:10.1177/026765839601200301.

WHITE, LYDIA, and ALAN JUFFS. 1998. Constraints on wh-movement in two different contexts of non-native language acquisition: competence and processing. Suzanne Flynn, Gita Marto-

hardjono and Wayne A. O'Neil (eds.) *The Generative Study of Second Language Acquisition*. Mahwah, NJ, USA: Lawrence Erlbaum.

YANG, CHARLES. 2003. *Knowledge and Learning in Natural Language*. New York, NY, USA: Oxford University Press.

YUAN, BOPING. 1998. Interpretation of binding and orientation of the Chinese reflexive *ziji* by English and Japanese speakers. *Second Language Research* 14.324–340.

ZERBIAN, SABINE. 2006. *Expression of Information Structure in the Bantu Language Northern Sotho*. Ph.D. thesis, Humboldt-Universität zu Berlin, Berlin, Germany.

ZERBIAN, SABINE. 2015. Markedness considerations in L2 prosodic focus and givenness marking. Elisabeth Delais-Roussarie, Mathieu Avanzi and Sophie Herment (eds.) *Prosody and Language in Contact: L2 Acquisition, Attrition and Languages in Multilingual Situations*. Berlin, Germany: Springer-Verlag.

ZUBIZARRETA, MARIA LUISA. 1998. *Prosody, Focus and Word Order*. Cambridge, MA, USA: MIT Press.

ZUBIZARRETA, MARIA LUISA, and EMILY NAVA. 2011. Encoding discourse-based meaning: prosody vs. syntax. Implications for second language acquisition. *Lingua* 121.652–669. DOI:10.1016/j.lingua.2010.06.013.

ZUBIZARRETA, MARIA LUISA, and JEAN-ROGER VERGNAUD. 2005. Phrasal stress and syntax. Martin Everaert and Henk C. van Riemsdijk (eds.) *The Blackwell Companion to Syntax*, chap. 49. Malden, MA, USA: Blackwell Publishing.

Appendix A

Materials – Study 1

A.1 Experiment Items – Experiment 1

Table A.1: Experimental Items from Study 1, Experiment 1

Item	Condition	Set-up	Question
		A couple of business associates are discussing the problem of overeating that they see at their weekly meetings.	
		"Last week at the student meeting,	
	WhQuestion	. . . Mary ate a cupcake."	"Who ate one this week?"
	Contrast	. . . Mary ate a cupcake."	"What happened this week?"
1	**Coordinated**	. . . John and Mary ate a cupcake."	"What happened this week?"
	Repeated	. . . John ate a cupcake."	"What happened this week?"
	New	. . . the food provided was extremely unhealthy."	"What happened this week?"
	Elicited response: "John ate a cupcake."		
		A couple of parents are discussing their child, Peter, who is quite difficult and therefore has no regular babysitter.	
		"Yesterday,	
	WhQuestion	. . . Tammy babysat Peter."	"Who will babysit him tonight?"
	Contrast	. . . Tammy babysat Peter."	"What will happen tonight?"
2	**Coordinated**	. . . Jack and Tammy babysat Peter."	"What will happen tonight?"
	Repeated	. . . Jack babysat Peter."	"What will happen tonight?"
	New	. . . we stayed in and didn't need a babysitter."	"What will happen tonight?"
	Elicited response: "Jack will babysit Peter."		
		Friends playing a card game are discussing the happenings in the game, which has gone by very slowly and so it is easy to forget the details.	
		"Last round,	
	WhQuestion	. . . Terry dealt the cards."	"Who dealt them this round?"
	Contrast	. . . Terry dealt the cards."	"What happened this round?"
3	**Coordinated**	. . . John and Terry dealt the cards."	"What happened this round?"
	Repeated	. . . John dealt the cards."	"What happened this round?"
	New	. . . there were zero points scored."	"What happened this round?"
	Elicited response: "John dealt the cards."		

A group of hunters is talking about its annual hunting expeditions.

"During last year's expedition,

WhQuestion	. . . Kendra caught a bear."	"Who caught a bear this time?"
Contrast	. . . Kendra caught a bear."	"What happened this time?"
Coordinated	. . . Benny and Kendra caught a bear."	"What happened this time?"
Repeated	. . . Benny caught a bear."	"What happened this time?"
New	. . . the weather turned very cold."	"What happened this time?"

4

Elicited response: "Benny caught a bear."

Two gardeners are talking about how to deal with drought season.

"The first time there was a drought,

WhQuestion	. . . Leona watered the cactus."	"Who watered it this time?"
Contrast	. . . Leona watered the cactus."	"What happened this time?"
Coordinated	. . . Elliott and Leona watered the cactus."	"What happened this time?"
Repeated	. . . Elliott watered the cactus."	"What happened this time?"
New	. . . the plants simply died."	"What happened this time?"

5

Elicited response: "Elliott watered the cactus."

Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.

"In 2005,

WhQuestion	. . . Tony downloaded a virus."	"Who downloaded a virus in 2006?"
Contrast	. . . Tony downloaded a virus."	"What happened in 2006?"
Coordinated	. . . Amanda and Tony downloaded a virus."	"What happened in 2006?"
Repeated	. . . Amanda downloaded a virus."	"What happened in 2006?"
New	. . . the office got new security software."	"What happened in 2006?"

6

Elicited response: "Amanda downloaded a virus."

Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.

WhQuestion	"Jessica liked the first pic."	"Who liked the second one?"
Contrast	"Jessica liked the first pic."	"What about the second one?"
Coordinated	"Grant and Jessica liked the first pic."	"What about the second one?"
Repeated	"Grant liked the first pic."	"What about the second one?"
New	"Lots of people commented on the first pic."	"What about the second one?"

7

Elicited response: "Grant liked the second pic."

A family is planning a reunion potluck, which is held every season.

"For the fall potluck,

WhQuestion	. . . Grandma brought a dessert."	"Who will bring a dessert to the winter potluck?"
Contrast	. . . Grandma brought a dessert."	"What will happen at the winter potluck?"
Coordinated	. . . Aunt Lisa and Grandma brought a dessert."	"What will happen at the winter potluck?"
Repeated	. . . Aunt Lisa brought a dessert."	"What will happen at the winter potluck?"
New	. . . a whole turkey was eaten."	"What will happen at the winter potluck?"

8

Elicited response: "Aunt Lisa will bring a dessert."

A couple of friends are discussing the latest celebrity news on their favourite blog, which tends to deliver very spiteful reports on celebrities every hour.

"In the 8pm post,

WhQuestion	. . . Britney was dissed by Mario."	"Who was dissed by Mario in the 9pm post?"
Contrast	. . . Britney was dissed by Mario."	"What happened in the 9pm post?"
Coordinated	. . . Lindsay and Britney were dissed by Mario."	"What happened in the 9pm post?"
Repeated	. . . Lindsay was dissed by Mario."	"What happened in the 9pm post?"
New	. . . there was no new gossip."	"What happened in the 9pm post?"

9

Elicited response: "Lindsay was dissed by Mario."

The student union holds annual elections for various positions. Two student journalists discuss the political facts.

"In the last election,

10

	WhQuestion	…Gregory ran for president."	"Who ran for president in this election?"
	Contrast	…Gregory ran for president."	"What happened in this election?"
	Coordinated	…Matilda and Gregory ran for president."	"What happened in this election?"
	Repeated	…Matilda ran for president."	"What happened in this election?"
	New	…a referendum was held on budgetary issues."	"What happened in this election?"

Elicited response: "Matilda ran for president."

Some beekeepers are discussing the honey harvest from their colony of honeybees.

"Last year,

	WhQuestion	…Clive harvested the honey from the beehive."	"Who harvested it this year?"
	Contrast	…Clive harvested the honey from the beehive."	"What happened this year?"
11	**Coordinated**	…Johnny and Clive harvested the honey from the beehive."	"What happened this year?"
	Repeated	…Johnny harvested the honey from the beehive."	"What happened in this year?"
	New	…the bees did not produce very much honey."	"What happened this year?"

Elicited response: "Johnny harvested the honey."

A team of gardening experts is discussing the upkeep of the botanical gardens, which involves an intense cleaning every spring.

"In the past,

	WhQuestion	…Bertha did the spring cleaning."	"Who did it this year?"
	Contrast	…Bertha did the spring cleaning."	"What happened this year?"
12	**Coordinated**	…Jared and Bertha did the spring cleaning."	"What happened this year?"
	Repeated	…Jared did the spring cleaning."	"What happened in this year?"
	New	…the cleaning was not properly carried out."	"What happened this year?"

Elicited response: "Jared did the spring cleaning."

In a reality show about paranormal activity, contestants take tours of houses that are supposed to be haunted. The latest show is being discussed by some fans.

"In the first house,

	WhQuestion	…Petra saw a ghost."	"Who saw a ghost in the second house?"
	Contrast	…Petra saw a ghost."	"What happened in the second house?"
13	**Coordinated**	…Milton and Petra saw a ghost."	"What happened in the second house?"
	Repeated	…Milton saw a ghost."	"What happened in the second house?"
	New	…the reality stars decided the haunting was a hoax."	"What happened in the second house?"

Elicited response: "Milton saw a ghost."

A group of friends goes out to the lake for the summer. They are discussing the boat that they have borrowed from the neighbours.

"Yesterday,

	WhQuestion	…Tyler manned the boat."	"Who manned it today?"
	Contrast	…Tyler manned the boat."	"What happened today?"
14	**Coordinated**	…Justine and Tyler manned the boat."	"What happened today?"
	Repeated	…Justine manned the boat."	"What happened today?"
	New	…the water was too choppy for boating."	"What happened today?"

Elicited response: "Justine manned the boat."

In the kitchen of a local restaurant, one particular cook is disastrous and always drops things into the food accidentally. The other cooks always have to clean up after him.

"At lunch,

	WhQuestion	…Patrick found an earring in the soup."	"Who found one at dinner?"
	Contrast	…Patrick found an earring in the soup."	"What happened at dinner?"
15	**Coordinated**	…Trent and Patrick found an earring in the soup."	"What happened at dinner?"
	Repeated	…Trent found an earring in the soup."	"What happened at dinner?"
	New	…nobody noticed any mistakes."	"What happened at dinner?"

Elicited response: "Trent found an earring."

The managers of a restaurant are discussing the servers and their duties during the morning and afternoon shifts.

"In the morning,

	WhQuestion	…Darlene waited table seven."	"Who waited it during the afternoon shift?"
16	**Contrast**	…Darlene waited table seven."	"What happened during the afternoon shift?"
	Coordinated	…Riley and Darlene waited table seven."	"What happened during the afternoon shift?"

	Repeated	. . . Riley waited table seven."	"What happened during the afternoon shift?"
	New	. . . the restaurant was quiet and only one customer came."	"What happened during the afternoon shift?"

Elicited response: "Riley waited table seven."

Some siblings are arguing about their household chores, which no one wants to do.

"On Monday,

17	**WhQuestion**	. . . Millie dried the dishes."	"Who dried them last night?"
	Contrast	. . . Millie dried the dishes."	"What happened last night?"
	Coordinated	. . . Janet and Millie dried the dishes."	"What happened last night?"
	Repeated	. . . Janet dried the dishes."	"What happened last night?"
	New	. . . the dishwasher broke."	"What happened last night?"

Elicited response: "Janet dried the dishes."

At a monthly book club get-together, the coffee and food is paid for by all the members. The coffee is quite expensive

and some members are discussing how certain members might be drinking more than their share.

"Last month at the get-together,

18	**WhQuestion**	. . . Brandy drank a cup of coffee."	"Who drank a cup of coffee this month?"
	Contrast	. . . Brandy drank a cup of coffee."	"What happened this month?"
	Coordinated	. . . Roy and Brandy drank a cup of coffee."	"What happened this month?"
	Repeated	. . . Roy drank a cup of coffee."	"What happened this month?"
	New	. . . the coffee cost way too much."	"What happened this month?"

Elicited response: "Roy drank a cup of coffee."

Some friends who travel often together are talking about car rentals, which can be stressful to plan.

"For the last holiday,

19	**WhQuestion**	. . . Ramona rented a car."	"Who rented a car for this holiday?"
	Contrast	. . . Ramona rented a car."	"What happened this holiday?"
	Coordinated	. . . Henry and Ramona rented a car."	"What happened this holiday?"
	Repeated	. . . Henry rented a car."	"What happened this holiday?"
	New	. . . the car rental was handled by the travel company."	"What happened this holiday?"

Elicited response: "Henry rented a car."

Some hikers are on the trail and discussing the duties related to setting up a campsite every evening.

"Yesterday,

20	**WhQuestion**	. . . Dolly pitched the tent."	"Who pitched it today?"
	Contrast	. . . Dolly pitched the tent."	"What happened today?"
	Coordinated	. . . Jolene and Dolly pitched the tent."	"What happened today?"
	Repeated	. . . Jolene pitched the tent."	"What happened today?"
	New	. . . the fire was hard to start because it was raining."	"What happened today?"

Elicited response: "Jolene pitched the tent."

A.2   Experiment Items – Experiment 2

Table A.2: Experimental Items from Study 1, Experiment 2

Item	Condition	Set-up & Question	Response

A couple of business associates are discussing the problem of overeating that they see at their weekly meetings.

"Last week at the student meeting,

Contrast	. . . Mary ate a cupcake. What happened this week?"	" . . .
Again	. . . John and Mary ate a cupcake. What happened this week?"	"Again, . . .
ThisTime	. . . John and Mary ate a cupcake. What happened this week?"	"This time, . . .
Repeated	. . . John ate a cupcake. What happened this week?"	" . . .
New	. . . the food provided was extremely unhealthy. What happened this week?"	" . . .

Response (cont.): . . . John ate a cupcake."

A couple of parents are discussing their child, Peter, who is quite difficult and therefore has no regular babysitter.

"Yesterday,

Contrast	. . . Tammy babysat Peter. What will happen tonight?"	" . . .
Again	. . . Jack and Tammy babysat Peter. What will happen tonight?"	"Again, . . .
ThisTime	. . . Jack and Tammy babysat Peter. What will happen tonight?"	"This time, . . .
Repeated	. . . Jack babysat Peter. What will happen tonight?"	" . . .
New	. . . we stayed in and didn't need a babysitter. What will happen tonight?"	" . . .

Response (cont.): . . . Jack will babysit Peter."

Friends playing a card game are discussing the happenings in the game, which has gone by very slowly and so it is easy to forget the details.

"Last round,

Contrast	. . . Terry dealt the cards. What happened this round?"	" . . .
Again	. . . John and Terry dealt the cards. What happened this round?"	"Again, . . .
ThisTime	. . . John and Terry dealt the cards. What happened this round?"	"This time, . . .
Repeated	. . . John dealt the cards. What happened this round?"	" . . .
New	. . . there were zero points scored. What happened this round?"	" . . .

Response (cont.): . . . John dealt the cards."

A group of hunters is talking about its annual hunting expeditions.

"During last year's expedition,

Contrast	. . . Kendra caught a bear. What happened this time?"	" . . .
Again	. . . Benny and Kendra caught a bear. What happened this time?"	"Again, . . .
ThisTime	. . . Benny and Kendra caught a bear. What happened this time?"	"This time, . . .
Repeated	. . . Benny caught a bear. What happened this time?"	" . . .
New	. . . the weather turned very cold. What happened this time?"	" . . .

Response (cont.): . . . Benny caught a bear."

Two gardeners are talking about how to deal with drought season.

"The first time there was a drought,

Contrast	. . . Leona watered the cactus. What happened this time?"	" . . .
Again	. . . Elliott and Leona watered the cactus. What happened this time?"	"Again, . . .
ThisTime	. . . Elliott and Leona watered the cactus. What happened this time?"	"This time, . . .
Repeated	. . . Elliott watered the cactus. What happened this time?"	" . . .
New	. . . the plants simply died. What happened this time?"	" . . .

Response (cont.): . . . Elliott watered the cactus."

Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.

"In 2005,

Contrast	. . . Tony downloaded a virus. What happened in 2006?"	" . . .
Again	. . . Amanda and Tony downloaded a virus. What happened in 2006?"	"Again, . . .
ThisTime	. . . Amanda and Tony downloaded a virus. What happened in 2006?"	"This time, . . .
Repeated	. . . Amanda downloaded a virus. What happened in 2006?"	" . . .
New	. . . the office got new security software. What happened in 2006?"	" . . .

Response (cont.): . . . Amanda downloaded a virus."

Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.

7

Contrast	"Jessica liked the first pic. What about the second one?"	"...
Again	"Grant and Jessica liked the first pic. What about the second one?"	"Again, ...
ThisTime	"Grant and Jessica liked the first pic. What about the second one?"	"This time, ...
Repeated	"Grant liked the first pic. What about the second one?"	"...
New	"Lots of people commented on the first pic. What about the second one?"	"...

Response (cont.): ... Grant liked the second pic."

A family is planning a reunion potluck, which is held every season.

"For the fall potluck,

	Contrast	... Grandma brought a dessert. What will happen at the winter potluck?"	"...
	Again	... Aunt Lisa and Grandma brought a dessert. What will happen at the winter potluck?"	"Again, ...
8	**ThisTime**	... Aunt Lisa and Grandma brought a dessert. What will happen at the winter potluck?"	"This time, ...
	Repeated	... Aunt Lisa brought a dessert. What will happen at the winter potluck?"	"...
	New	... a whole turkey was eaten. What will happen at the winter potluck?"	"...

Response (cont.): ... Aunt Lisa will bring a dessert."

A couple of friends are discussing the latest celebrity news on their favourite blog, which tends to deliver very spiteful reports on celebrities every hour.

"In the 8pm post,

	Contrast	... Britney was dissed by Mario. What happened in the 9pm post?"	"...
	Again	... Lindsay and Britney was dissed by Mario. What happened in the 9pm post?"	"Again, ...
9	**ThisTime**	... Lindsay and Britney were dissed by Mario. What happened in the 9pm post?"	"This time, ...
	Repeated	... Lindsay was dissed by Mario. What happened in the 9pm post?"	"...
	New	... there was no new gossip. What happened in the 9pm post?"	"...

Response (cont.): ... Lindsay was dissed by Mario."

The student union holds annual elections for various positions. Two student journalists discuss the political facts.

"In the last election,

	Contrast	... Gregory ran for president. What happened in this election?"	"...
	Again	... Matilda and Gregory ran for president. What happened in this election?"	"Again, ...
10	**ThisTime**	... Matilda and Gregory ran for president. What happened in this election?"	"This time, ...
	Repeated	... Matilda ran for president. What happened in this election?"	"...
	New	... a referendum was held on budgetary issues. What happened in this election?"	"...

Response (cont.): ... Matilda ran for president."

Some beekeepers are discussing the honey harvest from their colony of honeybees.

"Last year,

	Contrast	... Clive harvested the honey from the beehive. What happened this year?"	"...
	Again	... Johnny and Clive harvested the honey from the beehive. What happened this year?"	"Again, ...
11	**ThisTime**	... Johnny and Clive harvested the honey from the beehive. What happened this year?"	"This time, ...
	Repeated	... Johnny harvested the honey from the beehive. What happened in this year?"	"...
	New	... the bees did not produce very much honey. What happened this year?"	"...

Response (cont.): ... Johnny harvested the honey."

A team of gardening experts is discussing the upkeep of the botanical gardens, which involves an intense cleaning every spring.

"In the past,

	Contrast	... Bertha did the spring cleaning. What happened this year?"	"...
	Again	... Jared and Bertha did the spring cleaning. What happened this year?"	"Again, ...
12	**ThisTime**	... Jared and Bertha did the spring cleaning. What happened this year?"	"This time, ...
	Repeated	... Jared did the spring cleaning. What happened in this year?"	"...
	New	... the cleaning was not properly carried out. What happened this year?"	"...

Response (cont.): ... Jared did the spring cleaning."

In a reality show about paranormal activity, contestants take tours of houses that are supposed to be haunted. The latest show is being discussed by some fans.

"In the first house,

	Contrast	... Petra saw a ghost. What happened in the second house?"	"...
13	**Again**	... Milton and Petra saw a ghost. What happened in the second house?"	"Again, ...
	ThisTime	... Milton and Petra saw a ghost. What happened in the second house?"	"This time, ...

Repeated	. . . Milton saw a ghost. What happened in the second house?"	"...
New	. . . the reality stars decided the haunting was a hoax. What happened in the second house?"	"...

Response (cont.): . . . Milton saw a ghost."

A group of friends goes out to the lake for the summer. They are discussing the boat that they have borrowed from the neighbours.

"Yesterday,

14	**Contrast**	. . . Tyler manned the boat. What happened today?"	"...
	Again	. . . Justine and Tyler manned the boat. What happened today?"	"Again, . . .
	ThisTime	. . . Justine and Tyler manned the boat. What happened today?"	"This time, . . .
	Repeated	. . . Justine manned the boat. What happened today?"	"...
	New	. . . the water was too choppy for boating. What happened today?"	"...

Response (cont.): . . . Justine manned the boat."

In the kitchen of a local restaurant, one particular cook is disastrous and always drops things into the food accidentally. The other cooks always have to clean up after him.

"At lunch,

15	**Contrast**	. . . Patrick found an earring in the soup. What happened at dinner?"	"...
	Again	. . . Trent and Patrick found an earring in the soup. What happened at dinner?"	"Again, . . .
	ThisTime	. . . Trent and Patrick found an earring in the soup. What happened at dinner?"	"This time, . . .
	Repeated	. . . Trent found an earring in the soup. What happened at dinner?"	"...
	New	. . . nobody noticed any mistakes. What happened at dinner?"	"...

Response (cont.): . . . Trent found an earring."

The managers of a restaurant are discussing the servers and their duties during the morning and afternoon shifts.

"In the morning,

16	**Contrast**	. . . Darlene waited table seven. What happened during the afternoon shift?"	"...
	Again	. . . Riley and Darlene waited table seven. What happened during the afternoon shift?"	"Again, . . .
	ThisTime	. . . Riley and Darlene waited table seven. What happened during the afternoon shift?"	"This time, . . .
	Repeated	. . . Riley waited table seven. What happened during the afternoon shift?"	"...
	New	. . . the restaurant was quiet and only one customer came. What happened during the afternoon shift?"	"...

Response (cont.): . . . Riley waited table seven."

Some siblings are arguing about their household chores, which no one wants to do.

"On Monday,

17	**Contrast**	. . . Millie dried the dishes. What happened last night?"	"...
	Again	. . . Janet and Millie dried the dishes. What happened last night?"	"Again, . . .
	ThisTime	. . . Janet and Millie dried the dishes. What happened last night?"	"This time, . . .
	Repeated	. . . Janet dried the dishes. What happened last night?"	"...
	New	. . . the dishwasher broke. What happened last night?"	"...

Response (cont.): . . . Janet dried the dishes."

At a monthly book club get-together, the coffee and food is paid for by all the members. The coffee is quite expensive and some members are discussing how certain members might be drinking more than their share.

"Last month at the get-together,

18	**Contrast**	. . . Brandy drank a cup of coffee. What happened this month?"	"...
	Again	. . . Roy and Brandy drank a cup of coffee. What happened this month?"	"Again, . . .
	ThisTime	. . . Roy and Brandy drank a cup of coffee. What happened this month?"	"This time, . . .
	Repeated	. . . Roy drank a cup of coffee. What happened this month?"	"...
	New	. . . the coffee cost way too much. What happened this month?"	"...

Response (cont.): . . . Roy drank a cup of coffee."

Some friends who travel often together are talking about car rentals, which can be stressful to plan.

"For the last holiday,

19	**Contrast**	. . . Ramona rented a car. What happened this holiday?"	"...
	Again	. . . Henry and Ramona rented a car. What happened this holiday?"	"Again, . . .
	ThisTime	. . . Henry and Ramona rented a car. What happened this holiday?"	"This time, . . .
	Repeated	. . . Henry rented a car. What happened this holiday?"	"...

New	. . . the car rental was handled by the travel company. What happened this holiday?”	“. . .
Response (cont.): . . . Henry rented a car.”		

	Some hikers are on the trail and discussing the duties related to setting up a campsite every evening.		
	“Yesterday,		
	Contrast	. . . Dolly pitched the tent. What happened today?”	“. . .
	Again	. . . Jolene and Dolly pitched the tent. What happened today?”	“Again, . . .
20	**ThisTime**	. . . Jolene and Dolly pitched the tent. What happened today?”	“This time, . . .
	Repeated	. . . Jolene pitched the tent. What happened today?”	“. . .
	New	. . . the fire was hard to start because it was raining. What happened today?”	“. . .
	Response (cont.): . . . Jolene pitched the tent.”		

A.3   Experiment Items – Experiment 3

Table A.3: Experimental Items from Study 1, Experiment 3

Item	Condition	Set-up & Question
		A couple of business associates are discussing the problem of overeating that they see at their weekly meetings.
		“Last week at the student meeting,
1	**Contrast**	. . . Mary ate a cupcake. What happened this week?”
	Collective	. . . John and Mary ate a cupcake together. What happened this week?”
	Distributive	. . . John and Mary each ate a cupcake. What happened this week?”
	New	. . . the food provided was extremely unhealthy. What happened this week?”
	Elicited response: “John ate a cupcake.”	
		A couple of parents are discussing their child, Peter, who is quite difficult and therefore has no regular babysitter.
		“Yesterday,
2	**Contrast**	. . . Tammy babysat Peter. What will happen tonight?”
	Collective	. . . Jack and Tammy babysat Peter together. What will happen tonight?”
	Distributive	. . . Jack and Tammy each babysat Peter. What will happen tonight?”
	New	. . . we stayed in and didn’t need a babysitter. What will happen tonight?”
	Elicited response: “Jack will babysit Peter.”	
		Friends playing a card game are discussing the happenings in the game, which has gone by very slowly and so it is easy to forget the details.
		“Last round,
3	**Contrast**	. . . Terry dealt the cards. What happened this round?”
	Collective	. . . John and Terry dealt the cards together. What happened this round?”
	Distributive	. . . John and Terry each dealt the cards. What happened this round?”
	New	. . . there were zero points scored. What happened this round?”
	Elicited response: “John dealt the cards.”	
		A group of hunters is talking about its annual hunting expeditions.
		“During last year’s expedition,
4	**Contrast**	. . . Kendra caught a bear. What happened this time?”
	Collective	. . . Benny and Kendra caught a bear together. What happened this time?”

	Distributive	. . . Benny and Kendra each caught a bear. What happened this time?"
	New	. . . the weather turned very cold. What happened this time?"

Elicited response: "Benny caught a bear."

	Two gardeners are talking about how to deal with drought season.	
		"The first time there was a drought,
	Contrast	. . . Leona watered the cactus. What happened this time?"
	Collective	. . . Elliott and Leona watered the cactus together. What happened this time?"
5	**Distributive**	. . . Elliott and Leona each watered the cactus. What happened this time?"
	New	. . . the plants simply died. What happened this time?"

Elicited response: "Elliott watered the cactus."

	Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.	
		"In 2005,
	Contrast	. . . Tony downloaded a virus. What happened in 2006?"
	Collective	. . . Amanda and Tony downloaded a virus together. What happened in 2006?"
6	**Distributive**	. . . Amanda and Tony each downloaded a virus. What happened in 2006?"
	New	. . . the office got new security software. What happened in 2006?"

Elicited response: "Amanda downloaded a virus."

	Members of a rowing team have posted pics of their group on Facebook and now are discussing the online album.	
	Contrast	"Jessica liked the first pic. What about the second one?"
	Collective	"Grant and Jessica liked the first pic together. What about the second one?"
7	**Distributive**	"Grant and Jessica each liked the first pic. What about the second one?"
	New	"Lots of people commented on the first pic. What about the second one?"

Elicited response: "Grant liked the second pic."

	A family is planning a reunion potluck, which is held every season.	
		"For the fall potluck,
	Contrast	. . . Grandma brought a dessert. What will happen at the winter potluck?"
	Collective	. . . Aunt Lisa and Grandma brought a dessert together. What will happen at the winter potluck?"
8	**Distributive**	. . . Aunt Lisa and Grandma each brought a dessert. What will happen at the winter potluck?"
	New	. . . a whole turkey was eaten. What will happen at the winter potluck?"

Elicited response: "Aunt Lisa will bring a dessert."

	A couple of friends are discussing the latest celebrity news on their favourite blog, which tends to deliver very spiteful reports on celebrities every hour.	
		"In the 8pm post,
	Contrast	. . . Britney was dissed by Mario. What happened in the 9pm post?"
	Collective	. . . Lindsay and Britney was dissed by Mario together. What happened in the 9pm post?"
9	**Distributive**	. . . Lindsay and Britney were each dissed by Mario. What happened in the 9pm post?"
	New	. . . there was no new gossip. What happened in the 9pm post?"

Elicited response: "Lindsay was dissed by Mario."

	The student union holds annual elections for various positions. Two student journalists discuss the political facts.	
		"In the last election,
	Contrast	. . . Gregory ran for president. What happened in this election?"
	Collective	. . . Matilda and Gregory ran for president together. What happened in this election?"
10	**Distributive**	. . . Matilda and Gregory each ran for president. What happened in this election?"
	New	. . . a referendum was held on budgetary issues. What happened in this election?"

Elicited response: "Matilda ran for president."

	Some beekeepers are discussing the honey harvest from their colony of honeybees.	
		"Last year,
	Contrast	. . . Clive harvested the honey from the beehive. What happened this year?"
	Collective	. . . Johnny and Clive harvested the honey from the beehive together. What happened this year?"
11	**Distributive**	. . . Johnny and Clive each harvested the honey from the beehive. What happened this year?"

	New	. . . the bees did not produce very much honey. What happened this year?"

Elicited response: "Johnny harvested the honey."

A team of gardening experts is discussing the upkeep of the botanical gardens, which involves an intense cleaning every spring.

		"In the past,
	Contrast	. . . Bertha did the spring cleaning. What happened this year?"
	Collective	. . . Jared and Bertha did the spring cleaning together. What happened this year?"
12	**Distributive**	. . . Jared and Bertha each did the spring cleaning. What happened this year?"
	New	. . . the cleaning was not properly carried out. What happened this year?"

Elicited response: "Jared did the spring cleaning."

In a reality show about paranormal activity, contestants take tours of houses that are supposed to be haunted. The latest show is being discussed by some fans.

		"In the first house,
	Contrast	. . . Petra saw a ghost. What happened in the second house?"
	Collective	. . . Milton and Petra saw a ghost together. What happened in the second house?"
13	**Distributive**	. . . Milton and Petra each saw a ghost. What happened in the second house?"
	New	. . . the reality stars decided the haunting was a hoax. What happened in the second house?"

Elicited response: "Milton saw a ghost."

A group of friends goes out to the lake for the summer. They are discussing the boat that they have borrowed from the neighbours.

		"Yesterday,
	Contrast	. . . Tyler manned the boat. What happened today?"
	Collective	. . . Justine and Tyler manned the boat together. What happened today?"
14	**Distributive**	. . . Justine and Tyler each manned the boat. What happened today?"
	New	. . . the water was too choppy for boating. What happened today?"

Elicited response: "Justine manned the boat."

In the kitchen of a local restaurant, one particular cook is disastrous and always drops things into the food accidentally. The other cooks always have to clean up after him.

		"At lunch,
	Contrast	. . . Patrick found an earring in the soup. What happened at dinner?"
	Collective	. . . Trent and Patrick found an earring in the soup together. What happened at dinner?"
15	**Distributive**	. . . Trent and Patrick each found an earring in the soup. What happened at dinner?"
	New	. . . nobody noticed any mistakes. What happened at dinner?"

Elicited response: "Trent found an earring."

The managers of a restaurant are discussing the servers and their duties during the morning and afternoon shifts.

		"In the morning,
	Contrast	. . . Darlene waited table seven. What happened during the afternoon shift?"
	Collective	. . . Riley and Darlene waited table seven together. What happened during the afternoon shift?"
16	**Distributive**	. . . Riley and Darlene each waited table seven. What happened during the afternoon shift?"
	New	. . . the restaurant was quiet and only one customer came. What happened during the afternoon shift?"

Elicited response: "Riley waited table seven."

Some siblings are arguing about their household chores, which no one wants to do.

		"On Monday,
	Contrast	. . . Millie dried the dishes. What happened last night?"
	Collective	. . . Janet and Millie dried the dishes together. What happened last night?"
17	**Distributive**	. . . Janet and Millie each dried the dishes. What happened last night?"
	New	. . . the dishwasher broke. What happened last night?"

Elicited response: "Janet dried the dishes."

At a monthly book club get-together, the coffee and food is paid for by all the members. The coffee is quite expensive and some members are discussing how certain members might be drinking more than their share.

		"Last month at the get-together,
	Contrast	. . . Brandy drank a cup of coffee. What happened this month?"
	Collective	. . . Roy and Brandy drank a cup of coffee together. What happened this month?"
18	**Distributive**	. . . Roy and Brandy each drank a cup of coffee. What happened this month?"

	New	. . . the coffee cost way too much. What happened this month?"
	Elicited response: "Roy drank a cup of coffee."	

		Some friends who travel often together are talking about car rentals, which can be stressful to plan.
		"For the last holiday,
	Contrast	. . . Ramona rented a car. What happened this holiday?"
	Collective	. . . Henry and Ramona rented a car together. What happened this holiday?"
19	**Distributive**	. . . Henry and Ramona each rented a car. What happened this holiday?"
	New	. . . the car rental was handled by the travel company. What happened this holiday?"
	Elicited response: "Henry rented a car."	

		Some hikers are on the trail and discussing the duties related to setting up a campsite every evening.
		"Yesterday,
	Contrast	. . . Dolly pitched the tent. What happened today?"
	Collective	. . . Jolene and Dolly pitched the tent together. What happened today?"
20	**Distributive**	. . . Jolene and Dolly each pitched the tent. What happened today?"
	New	. . . the fire was hard to start because it was raining. What happened today?"
	Elicited response: "Jolene pitched the tent."	

Appendix B

Materials – Study 2

B.1   English Cloze Test Used in Studies 2 & 3 (following page)

CLOZE TEST

In the text below, some words have been replaced with blanks numbered from 1 to 30. First, read through the text to get the general meaning. Next, for each blank, decide which word best fits both the grammar and the meaning, using the choices on the answer sheet. Indicate your choice for each blank by circling (a), (b), (c) or (d) on the answer sheet. If you are not sure what the missing word is, guess.

_____

NON-VERBAL COMMUNICATION

When people communicate face-to-face, they convey information in several ways apart from the words they use. Thus, how often they make eye contact or how long they sustain that contact can indicate their degree of intimacy, interest in or understanding of what they are communicating verbally. Their _____(1), the way they sit or stand, _____(2) reveal attention, interest, disagreement or _____(3). The distance they sit or stand _____(4) one another and the angle at _____(5) they do so can suggest friendship, _____(6) or respect. These and other forms of _____(7) behaviour are so pervasive that we _____(8) notice them. Their importance becomes apparent, _____(9), when for some reason they are _____(10) or unclear.

One occasion when most people notice the importance of non-verbal communication is _____(11) they are talking on the telephone. _____(12) is an unwritten rule of telephone _____(13) that the listener must apply frequent _____(14) regular confirmation that (s)he is listening _____(15) saying *aah*, *mmm*, *yes*, *I see*, and _____(16) on. Failure to do this often enough_____(17) result in the speaker interrupting to _____(18) if the other person is "still there". _____(19) is not necessary in face-to-face conversation _____(20) attention and interest are conveyed silently _____(21) eye contact and posture.

Another occasion where the importance of _____(22) communication becomes clear is when one _____(23) travelling in a foreign country whose _____(24) is very different from one's own. _____(25) one shake hands, bow, touch, wink, _____(26) etc., or are some of these _____(27) considered rude? How long can eye contact _____(28) maintained without indicating something more than _____(29) interest? How close can one stand _____(30) appearing disrespectful or too intimate, how far away before being thought cold or unfriendly? Features like these can sometimes be more important in a second language than grammatical accuracy or a good accent.

CLOZE TEST

Name_____ **No.** _____ **Date:**_____

1. a) action
    b) effect
    c) shape
    d) posture

2. a) will
    b) can
    c) still
    d) up

3. a) boredom
    b) feeling
    c) other
    d) meaning

4. a) apart
    b) away
    c) from
    d) near

5. a) that
    b) when
    c) which
    d) with

6. a) adversity
    b) hostility
    c) apparent
    d) angry

7. a) visible
    b) apparent
    c) normal
    d) non-verbal

8. a) always
    b) merely
    c) scarcely
    d) usually

9. a) moreover
    b) however
    c) therefore
    d) obviously

10. a) absent
    b) clear
    c) obvious
    d) present

11. a) because
    b) where
    c) while
    d) why

12. a) It
    b) This
    c) That
    d) What

13. a) expression
    b) conversations
    c) speaking
    d) talking

14. a) also
    b) and
    c) not
    d) very

15. a) by
    b) or
    c) like
    d) to

16. a) off
    b) too
    c) so
    d) right

17. a) does
    b) has
    c) may
    d) to

18. a) ask
    b) hear
    c) know
    d) say

19. a) But
    b) It
    c) So
    d) This

20. a) attract
    b) but
    c) get
    d) where

21. a) by
    b) in
    c) use
    d) the

22. a) cultural
    b) non-verbal
    c) verbal
    d) the

23. a) has
    b) is
    c) person
    d) while

24. a) people
    b) customs
    c) habits
    d) culture

25. a) Does
    b) Each
    c) How
    d) When

26. a) greet
    b) look
    c) nod
    d) talk

27. a) activities
    b) behaviour
    c) manners
    d) gestures

28. a) been
    b) be
    c) has
    d) is

29. a) being
    b) non
    c) their
    d) polite

30. a) from
    b) on
    c) up
    d) without

B.2   Word List Used in Study 2 (following page)

Please look at this list and tell the experimenter if there are any words or names you don't recognize or can't pronounce

Verbs	Common nouns
call	actor
carry	apple
cry	ball
damage	basket
drink	beach
drive	bus
eat	cake
find	car
fly	cat
follow	child
hear	coffee
help	cow
hit	dog
look	door
lose	girl
meet	house
open	keys
pick	lady
play	nurse
push	old man
run	patient
see	plane
sell	plough
speak	tomato
stop	toy
swim	traffic
wait	tree
walk	truck

Proper nouns

Amanda
Bill
Brian
Chris
David
George
Jane
John
Laura
Lisa
Mary
Michael
Richard
Robert
Sarah
Scott
Susan
Tammy
Tom
Tracy

B.3 Experiment Items – Study 2

Table B.1: Experimental Items from Study 2

Item 1

	Stress shift	Clefting
Subject focus: Who saw Michael?		
Correct Focus:	SARAH saw Michael.	It was SARAH who saw Michael.
Incorrect Focus:	#Sarah saw MICHAEL.	#It was SARAH who saw Michael.
Object focus: Who did Sarah see?		
Correct Focus:	Sarah saw MICHAEL.	It was MICHAEL who Sarah saw.
Incorrect Focus:	#SARAH saw Michael.	#It was SARAH who saw Michael.

Item 2

	Stress shift	Clefting
Subject focus: Who met David?		
Correct Focus:	LISA met David.	It was LISA who met David.
Incorrect Focus:	#Lisa met DAVID.	#It was DAVID who Lisa met.
Object focus: Who did Lisa meet?		
Correct Focus:	Lisa met DAVID.	It was DAVID who Lisa met.
Incorrect Focus:	#LISA met David.	#It was LISA who met David.

Item 3

	Stress shift	Clefting
Subject focus: Who threw the ball?		
Correct Focus:	AMY threw the ball.	It was AMY who threw the ball.
Incorrect Focus:	#Amy threw THE BALL.	#It was THE BALL that Amy threw.
Object focus: What did Amy throw?		
Correct Focus:	Amy threw THE BALL.	It was THE BALL that Amy threw.
Incorrect Focus:	#AMY threw the ball.	#It was AMY who threw the ball.

Item 4

	Stress shift	Clefting
Subject focus: Who opened the door?		
Correct Focus:	JOHN opened the door.	It was JOHN who opened the door.
Incorrect Focus:	#John opened THE DOOR.	#It was THE DOOR that John opened.
Object focus: What did John open?		
Correct Focus:	John opened THE DOOR.	It was THE DOOR that John opened.
Incorrect Focus:	#JOHN opened the door.	#It was JOHN who opened the door.

Item 5

	Stress shift	Clefting
Subject focus: Who followed Robert?		
Correct Focus:	TAMMY followed Robert.	It was TAMMY who followed Robert.
Incorrect Focus:	#Tammy followed ROBERT.	#It was ROBERT who Tammy followed.
Object focus: Who did Tammy follow?		
Correct Focus:	Tammy followed ROBERT.	It was ROBERT who Tammy followed.
Incorrect Focus:	#TAMMY followed Robert.	#It was TAMMY who followed Robert.

Item 6

	Stress shift	Clefting
Subject focus: Who ate the cake?		
Correct Focus:	CHRIS ate the cake.	It was CHRIS who ate the cake.
Incorrect Focus:	#Chris ate THE CAKE.	#It was THE CAKE the Chris ate.
Object focus: What did Chris eat?		
Correct Focus:	Chris ate THE CAKE.	It was THE CAKE that Chris ate.
Incorrect Focus:	#CHRIS ate the cake.	#It was CHRIS who ate the cake.

Item 7

Subject focus: Who sold the house?	**Stress shift**	**Clefting**
Correct Focus:	TRACY sold the house.	It was TRACY who sold the house.
Incorrect Focus:	#Tracy sold THE HOUSE.	#It was THE HOUSE that Tracy sold.
Object focus: What did Tracy sell?	**Stress shift**	**Clefting**
Correct Focus:	Tracy sold THE HOUSE.	It was THE HOUSE that Tracy sold.
Incorrect Focus:	#TRACY sold the house.	#It was TRACY who sold the house.

Item 8		
Subject focus: Who lost the keys?	**Stress shift**	**Clefting**
Correct Focus:	BILL lost the keys.	It was BILL who lost the keys.
Incorrect Focus:	#Bill lost THE KEYS.	#It was THE KEYS that Bill lost.
Object focus: What did Bill lose?	**Stress shift**	**Clefting**
Correct Focus:	Bill lost THE KEYS.	It was THE KEYS that Bill lost.
Incorrect Focus:	#BILL lost the keys.	#It was BILL who lost the keys.

Item 9		
Subject focus: Who helped the old man?	**Stress shift**	**Clefting**
Correct Focus:	BRIAN helped the old man.	It was BRIAN who helped the old man.
Incorrect Focus:	#Brian helped THE OLD MAN.	#It was THE OLD MAN who Brian helped.
Object focus: Who did Brian help?	**Stress shift**	**Clefting**
Correct Focus:	Brian helped THE OLD MAN.	It was THE OLD MAN who Brian helped.
Incorrect Focus:	#BRIAN helped the old man.	#It was BRIAN who helped the old man.

Item 10		
Subject focus: Who heard Tom?	**Stress shift**	**Clefting**
Correct Focus:	LAURA heard Tom.	It was LAURA who heard Tom.
Incorrect Focus:	#Laura heard TOM.	#It was LAURA who heard Tom.
Object focus: Who did Laura hear?	**Stress shift**	**Clefting**
Correct Focus:	Laura heard TOM.	It was TOM who Laura heard.
Incorrect Focus:	#LAURA heard Tom.	#It was LAURA who heard Tom.

Item 11		
Subject focus: Who called Richard?	**Stress shift**	**Clefting**
Correct Focus:	SUSAN called Richard.	It was SUSAN who called Richard.
Incorrect Focus:	#Susan called RICHARD.	#It was RICHARD who Susan called.
Object focus: Who did Susan call?	**Stress shift**	**Clefting**
Correct Focus:	Susan called RICHARD.	It was RICHARD who Susan called.
Incorrect Focus:	#SUSAN called Richard.	#It was SUSAN who called Richard.

Item 12		
Subject focus: Who found the dog?	**Stress shift**	**Clefting**
Correct Focus:	SCOTT found the dog.	It was SCOTT who found the dog.
Incorrect Focus:	#Scott found THE DOG.	#It was THE DOG the Scott found.
Object focus: What did Scott find?	**Stress shift**	**Clefting**
Correct Focus:	Scott found THE DOG.	It was THE DOG the Scott found.
Incorrect Focus:	#SCOTT found the dog.	#It was SCOTT who found the dog.

Appendix C

Materials – Study 3

C.1 Language Background Questionnaire (following page)

Language Background Questionnaire

Participant Number *

Ask the experimenter for this number

[   ]

What is your age? *

[   ]

In what country were you born? *

[   ]

What is your first language? *

This is the very first language to which you were exposed.

◯ English

◯ Spanish

◯ Other: [   ]

[Continue »]

7% completed

Language Background Questionnaire

FIRST LANGUAGE

In what situation(s) did you learn your first language?

☐ With parents/guardians/immediate family members
☐ With family members not living with you (e.g. uncles and aunts, grandparents)
☐ Friendship or relationship with native speaker
☐ Classroom instruction
☐ Visiting/living in a foreign country
☐ Other: [_____]

How often were you EXPOSED to your first language between the ages of 0-2 years?

○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never
○ I don't know

How often did you USE your first language between the ages of 2-5 years?
Note: most infants begin talking before the age of 2 years.

○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

How often did you USE your first language between the ages of 5-12 years?

○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

How often did you USE your first language between the ages of 12-17 years?

○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

How often do you USE your first language presently?
○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

In your first language, how well can you...

communicate orally?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

understand what is going on around you?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

read?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

write?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

« Back   Continue »

30% completed

Language Background Questionnaire

SECOND LANGUAGE

Do you speak a second language? *

○ Yes

○ No

« Back   Continue »

38% completed

Language Background Questionnaire

* Required

SECOND LANGUAGE

What is your second language? *

○ English

○ Spanish

○ Other: [_____]

At what age did you begin learning your second language? *

If from birth, put "0".

[_____]

In what situation(s) did you learn your second language?

☐ With parents/guardians/immediate family members

☐ With family members not living with you (e.g. uncles and aunts, grandparents)

☐ Friendship or relationship with native speaker

☐ Classroom instruction

☐ Visiting/living in a foreign country

☐ Other: [_____]

How often were you EXPOSED to your second language between the ages of 0-2 years?

○ Daily

○ More than 5 times a week

○ Once to five times a week

○ Less than once a week

○ Never

○ I don't know

How often did you USE your second language between the ages of 2-5 years?

○ Daily

○ More than 5 times a week

○ Once to five times a week

○ Less than once a week

○ Never

How often did you USE your second language between the ages of 5-12 years?

○ Daily

○ More than 5 times a week

○ Once to five times a week

○ Less than once a week

○ Never

How often did you USE your second language between the ages of 12-17 years?

○ Daily

○ More than 5 times a week

○ Once to five times a week

○ Less than once a week

○ Never

How often do you USE your second language presently?

○ Daily

○ More than 5 times a week

○ Once to five times a week

○ Less than once a week

○ Never

In your second language, how well can you...

communicate orally?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

understand what is going on around you?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

read?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

write?

1 2 3 4 5

Barely at all ○ ○ ○ ○ ○ Perfectly well

« Back   Continue »

46% completed

Language Background Questionnaire

THIRD LANGUAGE

Do you speak a third language? *

○ Yes

○ No

« Back   Continue »

53% completed

Language Background Questionnaire

THIRD LANGUAGE

What is your third language? *

At what age did you learn your third language? *

In what situation(s) did you learn your third language?

☐ With parents/guardians/immediate family members

☐ With family members not living with you (e.g. uncles and aunts, grandparents)

☐ Friendship or relationship with native speaker

☐ Classroom instruction

☐ Visiting/living in a foreign country

☐ Other:

How often were you EXPOSED to your third language between the ages of 0-2 years?

◯ Daily

◯ More than 5 times a week

◯ Once to five times a week

◯ Less than once a week

◯ Never

◯ I don't know

How often did you USE your third language between the ages of 2-5 years?

◯ Daily

◯ More than 5 times a week

◯ Once to five times a week

◯ Less than once a week

◯ Never

How often did you USE your third language between the ages of 5-12 years?

○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

How often did you USE your third language between the ages of 12-17 years?
○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

How often do you USE your third language presently?
○ Daily
○ More than 5 times a week
○ Once to five times a week
○ Less than once a week
○ Never

In your third language, how well can you...

communicate orally?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

understand what is going on around you?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

read?

	1	2	3	4	5	
Barely at all	○	○	○	○	○	Perfectly well

write?

1   2   3   4   5

Barely at all ○ ○ ○ ○ ○ Perfectly well

« Back   **Continue »**

61% completed

Language Background Questionnaire

ADDITIONAL LANGUAGES

Do you speak any more languages? *

○ Yes

○ No

« Back   Continue »

69% completed

Language Background Questionnaire

ADDITIONAL LANGUAGES

Describe your additional languages (proficiency, age you started learning, where you learned it...)

« Back   Continue »

76% completed

Language Background Questionnaire

SPANISH DIALECT

Which dialect of Spanish do you speak or are you currently learning?

○ Mexican

○ European

○ Caribbean

○ South American

○ Don't know

○ Not applicable

○ Other: [_____]

| « Back | Continue » |
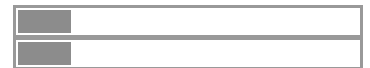
15% completed

Language Background Questionnaire

ENGLISH DIALECT

What dialect of English do you speak or are you currently learning?

○ North American variety (Canada/US)

○ British variety

○ Australian variety

○ Don't know

○ Not applicable

○ Other: [_____]

« Back	Continue »

23% completed

Language Background Questionnaire

LIVING IN CANADA

At what age did you arrive in Canada? *

If born in Canada, put "0".

[   ]

Have you spent more than 10 years in Canada? *

◯ Yes

◯ No

How much time have you spent living in Canada outside of Quebec?

[   ]

What is your dominant cultural identity?

Check more than one if you strongly identify with more than one culture.

☐ Canadian

☐ American

☐ American-Hispanic

☐ Cuban

☐ Argentine

☐ Puerto Rican

☐ Mexican

☐ Spanish (European)

☐ Other: [   ]

[« Back] [Continue »]

84% completed

Language Background Questionnaire

MUSICAL BACKGROUND
Describe your musical background:

Can you read music?

◯ Yes

◯ No

Can you play an instrument?

◯ Yes

◯ No

Can you sing?

◯ Yes

◯ No

Do you have a training in musical theory?

◯ Yes

◯ No

« Back	Continue »

92% completed

Language Background Questionnaire

VISION, HEARING, LANGUAGE IMPAIRMENT
You may opt out of any of these questions.

I have normal vision (with or without glasses/contact lenses):

○ Yes

○ No

○ Don't want to say

I have normal hearing (with or without hearing aid):

○ Yes

○ No

○ Don't want to say

I have a form of language impairment:

○ Yes

○ No

○ Don't want to say

« Back	**Submit**

Never submit passwords through Google Forms.

100%: You made it.

C.2 Spanish Proficiency Test Used in Study 3 (following page)

Multiple Choice Test

Each of the following sentences contains a blank indicating that a word or phrase has been omitted. Select the choice that best completes the sentence.

1. Al oír del accidente de su buen amigo, Paco se puso _____.

a. alegre   b. fatigado   c. hambriento   d. desconsolado

2. No puedo comprarlo porque me_____.

a. falta   b. dan   c. presta   d. regalan

3. Tuvo que guardar cama por estar _____.

a. enfermo   b. vestido   c. ocupado   d. parado

4. Aquí está tu café, Juanito. No te quemes, que está muy _____.

a. dulce   b. amargo   c. agrio   d. caliente

5. Al romper los anteojos, Juan se asustó porque no podía _____ sin ellos.

a. discurrir   b. oír   c. ver   d. entender

6. ¡Pobrecita! Está resfriada y no puede _____.

a. salir de casa   b. recibir cartas   c. respirar con pena   d. leer las noticias

7. Era una noche oscura sin _____.

a. estrellas   b. camas   c. lágrimas   d. nubes

8. Cuando don Carlos salió de su casa, saludó a un amigo suyo: -Buenos días,____.

a. ¿Qué va?   b. ¿Cómo es?   c. ¿Quién es?   d. ¿Qué tal?

9. ¡Qué ruido había con los gritos de los niños y el _____ de los perros!

a. olor   b. sueño   c. hambre   d. ladrar

10. Para saber la hora, don Juan miró el _____.

a. calendario   b. bolsillo   c. estante   d. despertador

11. Yo, que comprendo poco de mecánica, sé que el auto no puede funcionar sin _.

a. permiso   b. comer   c. aceite   d. bocina

12. Nos dijo mamá que era hora de comer y por eso _____.

a. fuimos a nadar   b. tomamos asiento   c. comenzamos a fumar
d. nos acostamos pronto

13. ¡Cuidado con ese cuchillo o vas a _____ el dedo!

a. cortarte   b. torcerte   c. comerte   d. quemarte

14. Tuvo tanto miedo de caerse que se negó a _____ con nosotros.

a. almorzar   b. charlar   c. cantar   d. patinar

15. Abrió la ventana y miró: en efecto, grandes lenguas de _____ salían llameando de las casas.

a. zorros   b. serpientes   c. cuero   d. fuego

16. Compró ejemplares de todos los diarios pero en vano. No halló _____.

a. los diez centavos   b. el periódico perdido   c. la noticia que deseaba
d. los ejemplos

17. Por varias semanas acudieron colegas del difunto profesor a _____ el dolor de la viuda.

a. aliviar   b. dulcificar   c. embromar   d. estorbar

18. Sus amigos pudieron haberlo salvado pero lo dejaron _____.

a. ganar   b. parecer   c. perecer   d. acabar

19. Al salir de la misa me sentía tan caritativo que no pude menos que _____ a   un pobre mendigo que había allí sentado.

a. pegarle   b. darle una limosna   c. echar una mirada   d. maldecir

20. Al lado de la Plaza de Armas había dos limosneros pidiendo _____.

a. pedazos   b. paz   c. monedas   d. escopetas

21. Siempre maltratado por los niños, el perro no podía acostumbrarse a _____ de sus nuevos amos.

a. las caricias   b. los engaños   c. las locuras   d. los golpes

22. ¿Dónde estará mi cartera? La dejé aquí mismo hace poco y parece que el necio de mi hermano ha vuelto a _____.

a. dejármela   b. deshacérmela   c. escondérmela   d. acabármela

23. Permaneció un gran rato abstraído, los ojos clavados en el fogón y el pensamiento ___ _____.

a. en el bolsillo   b. en el fuego   c. lleno de alboroto   d. Dios sabe dónde

24. En vez de dirigir el tráfico estabas charlando, así que tú mismo _____ del choque.

a. sabes la gravedad   b. eres testigo   c. tuviste la culpa
d. conociste a las víctimas

25. Posee esta tierra un clima tan propio para la agricultura como para _____.

a. la construcción de trampas   b. el fomento de motines   c. el costo de vida
d. la cría de reses

26. Aficionado leal de obras teatrales, Juan se entristeció al saber _____ del gran actor.

a. del fallecimiento   b. del éxito   c. de la buena suerte   d. de la alabanza

27. Se reunieron a menudo para efectuar un tratado pero no pudieron _____.

a. desavenirse   b. echarlo a un lado   c. rechazarlo   d. llevarlo a cabo

28. Se negaron a embarcarse porque tenían miedo de _____.

a. los peces   b. los naufragios   c. los faros   d. las playas

29. La mujer no aprobó el cambio de domicilio pues no le gustaba _____.

a. el callejeo   b. el puente   c. esa estación   d. aquel barrio

30. Era el único que tenía algo que comer pero se negó a _____.

a. hojearlo   b. ponérselo   c. conservarlo   d. repartirlo

Cloze Test

In the following text, some of the words have been replaced by blanks numbered 1 through 20. First, read the complete text in order to understand it. Then reread it and choose the correct word to fill each blank from the answer sheet. Mark your answers by circling your choice on the answer sheet, not by filling in the blanks in the text.

El sueño de Joan Miró

Hoy se inaugura en Palma de Mallorca la Fundación y Joan Miró, en el mismo lugar en donde el artista vivió sus últimos treinta y cinco años. El sueño de Joan Miró se ha _____ (1). Los fondos donados a la ciudad por el pintor y su esposa en 1981 permitieron que el sueño se _____(2); más tarde, en 1986, el Ayuntamiento de Palma de Mallorca decidió _____(3) al arquitecto Rafael Moneo un edificio que _____(4) a la vez como sede de la entidad y como museo moderno. El proyecto ha tenido que _____(5) múltiples obstáculos de carácter administrativo. Miró, coincidiendo _____(6) los deseos de toda su familia, quiso que su obra no quedara expuesta en ampulosos panteones de arte o en _____(7) de coleccionistas acaudalados; por ello, en 1981, creó la fundación mallorquina. Y cuando estaba _____(8) punto de morir, donó terrenos y edificios, así como las obras de arte que en ellos _____(9).

El edificio que ha construido Rafael Moneo se enmarca en _____(10) se denomina "Territorio Miró", espacio en el que se han _____(11) de situar los distintos edificios que constituyen la herencia del pintor.

El acceso a los mismos quedará _____ (12) para evitar el deterioro de las obras. Por otra parte, se _____(13), en los talleres de grabado y litografía, cursos _____(14) las distintas técnicas de estampación. Estos talleres también se cederán periódicamente a distintos artistas contemporáneos, _____(15) se busca que el "Territorio Miró" _____(16) un centro vivo de creación y difusión del arte a todos los _____ (17).

La entrada costará 500 pesetas y las previsiones dadas a conocer ayer aspiran _____(18) que el centro acoja a unos 150.000 visitantes al año. Los responsables esperan que la institución funcione a _____(19) rendimiento a principios de la _____ (20) semana, si bien el catálogo completo de las obras de la Fundación Pilar y Joan Miró no estará listo hasta dentro de dos años.

Cloze Test Answer Sheet

1. a. cumplido   b. completado   c. terminado

2. a. inició   b. iniciara   c. iniciaba

3. a. encargar   b. pedir   c. mandar

4. a. hubiera servido   b. haya servido   c. sirviera

5. a. superar   b. enfrentarse   c. acabar

6. a. por   b. en   c. con

7. a. voluntad   b. poder   c. favor

8. a. al   b. en   c. a

9. a. habría   b. había   c. hubo

10. a. que   b. el que   c. lo que

11. a. pretendido   b. tratado   c. intentado

12. a. disminuido   b. escaso   c. restringido

13. a. darán   b. enseñarán   c. dirán

14. a. sobre   b. en   c. para

15. a. ya   b. así   c. para

16. a. será   b. sea   c. es

17. a. casos   b. aspectos   c. niveles

18. a. a   b. de   c. para

19. a. total   b. pleno   c. entero

20. a. siguiente   b. próxima   c. pasada

Answer Key: Multiple Choice Test

1. d	11. c	21. a
2. a	12. b	22. c
3. a	13. a	23. d
4. d	14. d	24. c
5. c	15. d	25. d
6. a	16. c	26. a
7. a	17. a	27. d
8. d	18. c	28. b
9. d	19. b	29. d
10. d	20. c	30. d

Answer Key: Cloze Test

1. a	8. c	15. b
2. b	9. b	16. b
3. a	10. c	17. c
4. c	11. b	18. a
5. a	12. c	19. b
6. c	13. b	20. b
7. b	14. a	

Total points possible: 50

Advanced	40 to 50
Intermediate	30 to 39
Low	0 to 29

C.3 Experiment Items – English

Table C.1: List of Head Nouns Used in English Production
Experiment and Eye-tracking Experiment in Study 3

angel	apple	arrow	artist
baby	beaver	bottle	bucket
building	burger	candle	carrot
castle	chicken	cobra	coffee
cookie	camel	cricket	cupcake
dancer	doctor	dolphin	dragon
eagle	feather	fiddle	glasses
hammer	helmet	iron	ladder
ladle	lemon	lily	lion
lobster	mirror	monkey	needle
otter	parrot	peacock	pencil
pepper	pillow	pizza	planet
pumpkin	rabbit	rocket	salad
sandal	scissors	shower	singer
skater	soldier	spider	squirrel
student	table	target	teacher
tiger	toaster	treasure	trumpet
turtle	window	wizard	zebra

C.4   Experiment Items – Spanish

Table C.2: List of Head Nouns Used in Spanish Production
Experiment in Study 3

el ángel	el árbol	el arpa	el auto
el balde	el barco	el blanco	el burro
el cactus	el casco	el cerdo	el diente
el elfo	el gato	el grifo	el grillo
el hada	el huevo	el jarro	el lápiz
el libro	el mago	el mono	el ninja
el niño	el oso	el pato	el pavo
el perro	el pollo	el pulpo	el queso
el suéter	el tigre	el toro	el traje
el vino	el zorro	la bici	la bolsa
la cama	la capa	la carta	la casa
la cebra	la cesta	la cobra	la concha
la ducha	la flecha	la foca	la fresa
la hoja	la luna	la mesa	la mosca
la pera	la pizza	la plancha	la pluma
la puerta	la rana	la regla	la rosa
la seta	la sierra	la silla	la tarta
la taza	la tele	la vaca	la vela