

EXPLORATIONS IN THE INFORMATIONAL COMPONENT

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To my grandmother, Techya Ziniuk (1911-2003)

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ABSTRACT

EXPLORATIONS IN THE INFORMATIONAL COMPONENT

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Most current work in linguistics acknowledges that the organization of linguistic information in a sentence is sensitive to the speaker's assumptions regarding his hearer's knowledge state. What is less clear, however, is how and where the organization of information—information structure (IS)—is carried out in the grammar, and precisely what role it plays in shaping the output of the grammar. In this study I argue that IS is an independent component of the grammar, whose primitives combine to form IS representations in accordance with a set of well-formedness conditions. These representations not only determine if a given output is licit or not, but also feed the semantic and phonological representations, thus regulating *inter alia* the predication relations in the sentence and the placement of prosodic prominence.

The main claims of this study are supported by an in-depth analysis of two phenomena, which I maintain are information structural in nature: focus intervention and weak crossover effects. In both cases, non-IS analyses are shown to fall short in capturing the available data, while an IS approach manages to weave a range of seemingly unrelated observations into a descriptively and explanatorily adequate account. The case study of focus intervention provides a window into the well-formedness conditions on IS

representations, while weak crossover helps us understand the internal composition of these representations and their relationship to other levels of representation in the grammar. The two phenomena also establish the import of implicit contextualization, i.e. the fact that speakers impose a context on sentences given in isolation, which guides the mapping to IS categories. In the course of the investigation of these phenomena, significant insight is gained into a variety of topics, ranging from the status of focus in the grammar to the interpretation of quantificational expressions in natural language.

The findings of the case studies justify a reassessment of current grammatical architectures. I propose an architecture in which much of the burden is shifted to the IS component, resulting in a simple, truly autonomous computational system, in line with the original model of the grammar in the generative tradition and with Minimalist assumptions.

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Chapter 1

Introduction

1.1 Setting the Stage

Whatever the primary function of natural language, if in fact such a function can be established, one thing we can agree on is that it is used to convey information. What we can also agree on is that speakers do not provide this information in a random manner; rather, they organize it in light of the information they think is available to the hearer, whether because it was provided in the discourse, relates to something physically present in the context, or is assumed to be part of the hearer's world knowledge.¹ Thus, consider a situation in which the speaker discovers that a colleague of his, Carla, is pregnant but has yet to tell the other employees. In gossiping about Carla, the speaker will remind the hearer about relevant background facts, such as that she has called in sick a number of times recently, before spilling the beans about her pregnancy. In other words, he connects the novel information to that which is already given. At the same time, he will not point out that Carla is the brunette from cubicle 3A and that pregnant women in the first trimester often suffer from nausea, insofar as this information is known to the hearer.

Linguistic information is organized not only at the discourse level, in terms of the propositional content which the speaker chooses to provide and the order in which he does so, but also at the level of the individual sentence. This dissertation is concerned with the latter type of organization, which, in keeping with the existing literature, we will call information structure (IS). The organization of information in a sentence consists in labeling what part of the sentence contributes to the hearer's knowledge and how this links up to existing knowledge. In more precise terms, we say that sentences are partitioned into IS categories—topic, focus, and tail—each of which is associated with a particular IS function. These categories can be marked through a range of linguistic means which vary across languages, including word order, specialized particles, and prosodic cues. Obviously, then, IS is part of the conventionalized system of language and a subject worthy of inquiry in the framework of generative grammar. In fact, one of the broad conclusions of this dissertation is that IS plays a role far more central in the grammar than that attributed to it by most research in the generative framework.

In order to investigate IS, the dissertation will center on two phenomena which are well-known in the linguistic literature, though not in the context of discussions of IS. These are the focus intervention effect illustrated in (1b) and the weak crossover effect in (2)-(3). The answer to the question in (1b) is unacceptable, while "??" in (2) and (3) indicates that the bound reading, in which the pronoun covaries with the quantifier or *wh*-

¹ Cf. Strawson's (1964) "Principle of Relevance", which states that interlocutors "intend in general to give or add information about what is a matter of standing or current interest or concern", and his "Principle of the Presumption of Knowledge", according to which statements "commonly depend for their effect upon knowledge assumed to be already in the audience's possession" (p. 97).

phrase, is difficult to get. Thus, speakers have a hard time understanding (2) as meaning 'for every boy x , x 's mother loves x ' and (3) as meaning 'for which person x , x 's children dislike x '.

- (1) a. What did only John drink?
b. *Only John drank only beer.²

(2) ??His mother loves every boy.

(3) ??Who_i do his children dislike t_i ?

One of the goals of the dissertation is to establish that there is a single cause underlying the degradedness of (1b), (2), and (3): the way in which these sentences are partitioned into IS categories. The fact that these ostensibly different phenomena converge on the same explanation serves to support this explanation and the general framework espoused here.

The finding that focus intervention and weak crossover effects reduce to an IS-based explanation has significant implications beyond the analysis of these specific phenomena. In particular, the phenomena allow insight into the guidelines that regulate the mapping to IS categories and the ways in which this mapping is constrained; in addition, they shed light on the place of IS in the grammar and its relationship to other parts of the grammar. The analysis of focus intervention specifically establishes the existence of well-formedness conditions that are unique to IS, which in turn constitutes good evidence for the independence of IS from other levels of representation. Weak crossover effects strengthen the case for an autonomous IS representation, and provide information on the connection between IS and the semantic and phonological levels of representation, LF and PF. Both case studies reveal the ubiquity of IS: all sentences are partitioned into IS categories, including those given in isolation for the purpose of collecting judgments.

To understand the repercussions of the study of focus intervention and weak crossover for the grammatical architecture, it is necessary to acquaint ourselves with the current conception of this architecture. After briefly discussing the architecture, I return to IS, describe how it is generally perceived in the contemporary literature, and outline some of its fundamental properties.

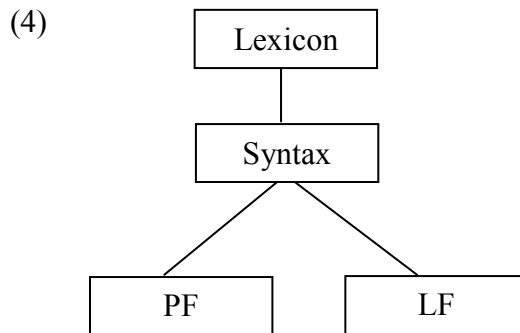
1.2 The Architecture of the Grammar

A basic question for any theory of grammar is how different types of linguistic representation interact. In addressing this question, much of the existing generative literature adopts the assumption originating in Chomsky (1965), whereby the information that linguistic representations encode can be one of three kinds: syntactic, semantic, or phonological. Thus, a different level of representation is responsible for each of these kinds of information.

The specific architecture which relates the syntactic, semantic, and phonological levels of representation within the Minimalist framework (Chomsky 1995), known as the

² Throughout this study, sentences not judged as fully acceptable are classified as carefully as possible on a scale ranging from '?', through '??' and '?*', to '*'; this should not be taken as an indication of whether or not the sentence is grammatical.

T-model or Y-model and incorporating a lexicon as well, is schematized in (4).³



In this architecture, the autonomous computational system, or syntax, manipulates a set of items drawn from the lexicon to form linguistic expressions. These are then sent off to PF ("Phonological Form" or "Phonetic Form") and LF ("Logical Form"), each of which interfaces with a different mental system. PF interfaces with the articulatory-perceptual (AP) system, coordinating those aspects of language involved in perception and production, whereas LF interfaces with the conceptual-intentional (CI) system, i.e. the system responsible for cognitive processes including memory and reasoning.

Importantly, there is no direct communication between PF and LF within this model; instead, the syntax mediates between the two. Thus, a linguistic property affecting both sound and meaning will typically be encoded in the syntax. Another noteworthy aspect of the model is the idea that LF is a syntactic level of representation, generated by the operations of the syntax, albeit without a reflex in the surface structure. Accordingly, it should be constrained in the same way that structures derived via overt movement are (Reinhart 1998).

1.3 Information Structure

Conspicuously absent from the architecture sketched in (4) is any representation of IS notions. This absence does not mean that notions like topic and focus are entirely missing from the generative literature: they are sometimes brought up, for instance, in the discussion of movement operations, and the status of focus in the grammar has specifically been a longstanding topic of debate. At the same time, the theoretical constructs that the labels topic and focus refer to are often assumed to be part of the syntax and/or semantics, and therefore do not warrant a level of representation of their own. Worth citing here is the position of Chomsky (1995:220), who states:

"Notice that I am sweeping under the rug questions of considerable significance, notably, questions about what in the earlier Extended Standard Theory (EST) framework were called "surface effects" on interpretation. These are manifold, involving topic-focus and theme-rheme structures, figure-ground properties, effects of adjacency and linearity, and many others. Prima facie, they seem to involve some additional level or levels internal to the phonological component, postmorphology but prephonetic, accessed at the interface along with PF and LF."

³ This model involves modifications to the architecture assumed within Government and Binding (Chomsky 1981), dispensing with the levels of D- and S-Structure. However, it retains the basic idea that the grammar consists of a syntactic, semantic, and phonological component.

Ignoring the questionable mixture of terms like adjacency and linearity with IS notions, what is notable is that Chomsky acknowledges a level for the latter, and positions it within the phonology, at a late stage in the derivation. Like most researchers working in the generative framework, he does not take up the issue of IS in any more depth; indeed, treatises devoted to IS in the generative framework are few and far between.⁴

Not only is it possible, I maintain, to provide a more explicit description of IS categories, but also to establish that these categories are involved in a variety of phenomena hitherto considered to be purely syntactic and/or semantic. What this shows is that grammatical competence is not limited to the three types of linguistic ability—syntactic, semantic, and phonological—emphasized time and again in the existing literature (e.g. Radford 1981). Rather, this competence also includes intuitions about IS categories and IS well-formedness. Furthermore, the phenomena to be discussed in this dissertation indicate that IS categories do have an independent representation, as claimed in Vallduví (1990) and Erteschik-Shir (1997), which interacts in different ways with the well-established syntactic, semantic, and phonological components. Accordingly, a revision of the architecture in (4) is in order.

Let us consider in a bit more detail what is intended by "information structure". We have defined this as the way in which information is organized at the sentence level: the different expressions in a sentence are assigned an IS category in accordance with their status vis-à-vis the information contributed by the sentence, where information is roughly what the speaker assumes that the hearer does not know. The term IS thus encompasses notions like topic-focus structure, theme-rheme, and topic-comment, mentioned by Chomsky above and elsewhere in the literature. IS is part of the meaning of a sentence no less than the more well-known component of logico-semantic meaning, in the sense that it must be interpreted by the hearer in order to achieve full understanding of the sentence (cf. Vallduví 1990). The assignment of IS categories is guided by grammatical convention and may be indicated in the morphosyntactic and/or prosodic structure of the sentence; non-conventionalized aspects of language use fall outside the definition of IS and hence outside the purview of the present investigation.

What it means for a linguistic expression to be mapped onto a particular IS category is best demonstrated through example: consider the sentence in (5b), where the mapping to IS is dictated by the preceding question.

- (5) a. What do beavers do?
b. Beavers build dams.

In this sentence, the verb phrase *build dams* is the part of the sentence which contributes information to the hearer, while the noun phrase *beavers* denotes the entity that this information is about. We say that *beavers* is the topic of the sentence and *build dams* is the focus. While the topic is not marked in this sentence, as is often the case in English, the focus is: *dams* must carry phonological prominence.

Variation pertaining to IS may be of the sort just mentioned, in that IS categories are marked differently, if at all, within a given language, and marking of the same category may also vary across languages. Alternatively, components of the grammar in which IS is indicated (the syntax, morphology, and phonology) can exhibit crosslinguistic variation

⁴ Detailed treatments of IS include Vallduví (1990), Lambrecht (1994), Erteschik-Shir (1997, 2007), and Zubizarreta (1998), which differ in their coverage and precise conceptualization of IS.

which is independent of IS but ultimately affects it. English, for example, does not possess the type of clause-final subject position found in languages like Catalan and Italian; as we will see in chapter 3, this yields a difference in the IS categories which the subject in these languages can be assigned.

Besides the informational meaning associated with the linguistic expressions in (5b) and the way in which it is signaled, another aspect of this sentence that stems from IS is its truth-conditional interpretation: the sentence means that beavers have the generic property of being dam builders. Crucially, notice that the same interpretation and position of prominence arises when (5b) is uttered without any preceding context. Although isolated sentences are not a typical feature of actual language use, they are the primary source of evidence in contemporary linguistic research. The lack of an overt context does not mean that no such context is associated with the sentence; rather, a context is created ad hoc by whoever is asked to judge the sentence, and it is this implicit context which guides the mapping to IS categories. Thus, there is no such thing as a sentence without IS (cf. Lambrecht 1994). IS, in turn, is reflected in the intonational phonology, and may affect sentence interpretation as well as judgments of acceptability.

The IS categories imposed on sentences given in isolation often follow a default pattern, in which the subject is the topic and the verb phrase, or the object alone, is the focus.⁵ The correlation between subjects and topic-hood is well-established (Li & Thompson 1976, Reinhart 1981, Lambrecht 1994, Erteschik-Shir 1997), and that between VPs or objects and focus-hood is identified in Lambrecht (1994). This default pattern was attributed above to (5b) when used out of the blue, and is further illustrated in the example in (6) from Lambrecht (1994).

(6) Nazis tear down antiwar posters. (Lambrecht 1994:133)

In the absence of contextual cues, English speakers place prominence on *antiwar* or *posters* in (6) and interpret the sentence as attributing a generic property to Nazis; namely, that they tear down antiwar posters. This, as Lambrecht notes, is because the subject *Nazis* is treated by default as the topic and the VP as the focus.⁶ However, given the actual context (6) was written in, scrawled across a half-torn down antiwar poster, the partition of the sentence into IS categories changes, so that *Nazis* is labeled the focus. Consequently, the interpretation and concomitant phonology also change: *Nazis* bears prominence and the sentence is taken to predicate of the people who tear down antiwar posters that they are Nazis. Notice that the same change is possible in (5b), where prominence on the subject *beavers* may yield the interpretation whereby dams have the generic property that they are built by beavers.

The existence of implicit contextualization and default IS tends to be ignored in the linguistic literature. This might be tolerable in certain cases, where controlling for the possible effects of context seems unnecessary. It is difficult to see, for instance, how crosslinguistic differences in the position of the verb in the clause (i.e. whether or not verb raising applies) would be influenced by contextual factors, and so we need not take

⁵ Zubizarreta (1998) claims that the default pattern is one in which the whole sentence is the focus. This is not, however, what most speakers impose on out-of-the-blue sentences.

⁶ The precise mechanism underlying the interpretation of the sentence is not central to the discussion here, but see Cohen and Erteschik-Shir (2002) for the idea that topic bare plurals are interpreted generically and focused bare plurals are interpreted existentially.

the latter into account in analyzing these differences. However, I believe that in many other cases the lack of attention to context and IS leads to the misinterpretation and misanalysis of data; in particular, the unacceptability associated with phenomena which are driven by IS considerations is mistaken for ungrammaticality, and these phenomena are erroneously analyzed as syntactic and/or semantic in nature. Since we often do not know in advance whether or not IS is relevant, ignoring it is unwise as a general practice.

Cases of significant misunderstanding of entire phenomena due to disregard for context and IS include the focus intervention and weak crossover effects which I will take up in subsequent chapters. One simpler, instructive example of misunderstanding is provided by the treatment of (5b) in Chomsky (1975), who considers this sentence in isolation and compares it to (7).

(7) Dams are built by beavers.

Chomsky notes that the interpretation of (5b) differs from (7), when both sentences are restricted to what he calls their most natural interpretation and normal intonation. That is, when prominence is on *dams* in (5b) and *beavers* in (7), the former predicates of beavers that they are dam-builders and the latter predicates of dams that they are beaver-built. This difference, Chomsky argues, is somehow related to the distinction in what functions as the grammatical subject in each sentence, *beavers* or *dams*.

The natural interpretation and normal intonation of (5b) and (7) that Chomsky refers to are a corollary of the default IS pattern described above. In other words, they represent a robust *correlation* between grammatical functions and IS categories, rather than a categorical *rule* in the syntactic structure, as Chomsky seems to suggest. Therefore, the interpretation can be altered via context, as observed in the case of (6), or by modifying only the location of prominence, as was mentioned with respect to (5b). In fact, the modified intonation in (5b) and its accompanying interpretation are precisely the unmarked pattern reported for (7).

Beyond the evidence for default IS mappings, whose existence will be corroborated in the course of the dissertation, two main conclusions should be drawn from this brief discussion. First, the IS notions of topic and focus play an important role in deriving the interpretive properties of a sentence, including its truth-conditional meaning. Second, existing analyses of various phenomena should be reconsidered in light of the possibility that they are affected by implicit contextualization and the default IS. Indeed, the import of the latter will become especially clear in chapter 4, when we tackle weak crossover.

In addition to following a default pattern, implicit contextualization may also vary between speakers, leading to corresponding differences in the mapping to IS categories. The possibility that differences in contextualization underlie reported instances of interspeaker variation which have no geographical or social basis was raised by Newmeyer (1983), but never pursued further, to the best of my knowledge. I conjecture that most, if not all, examples of idiosyncratic variation of this sort are attributable to contextualization, and hence to IS; the phenomena investigated in this dissertation provide a good case in point.

This description of IS suffices for current purposes. It should give the reader an idea of the type of meaning IS encodes and how it can be signaled in the surface form, and has introduced basic features of IS, which need to be considered even in studies not directly concerned with this aspect of the grammar. Let us proceed to review the contents of the dissertation, which will flesh out and provide support for the claims put forward here.

1.4 Outline Of Chapters

The dissertation is organized as follows. Chapter 2 presents an overview of information structure, as a theoretical backdrop to the empirical case studies which follow. A taxonomy of the basic categories of IS—topic, focus, and tail—is provided and illustrated through simple examples. I describe surface correlates of these categories and also devote some discussion to the ways in which the IS categories interact with the syntax, semantics, and phonology. An important conclusion from the discussion is that the relationship between syntactic or semantic functions and IS categories normally takes the form of a default, or tendency, and not a categorical rule. Thus, subjects are usually topics, a semantic focus, such as the associate of *only*, tends to be an IS focus, a non-d-linked *wh*-phrase also tends to function as an IS focus, and a d-linked *wh*-phrase is usually construed as a topic. The chapter ends by listing well-formedness constraints on IS, whose existence is a central piece of evidence for the autonomy of IS and which underlie the phenomenon analyzed in chapter 3.

Chapter 3 is dedicated to the phenomenon of focus intervention effects in the sense of Beck (1996), where the placement of a certain type of operator in a question, such as *only*, influences its acceptability or interpretation. Having introduced the basic patterns to be accounted for, I survey the range of existing analyses: syntactic, semantic, and information structural. Their strong points and shortcomings are highlighted, and more importantly, they are compared in terms of their predictions regarding when intervention effects will appear and when they will not. I then move on to the crucial data, which allows us to tease apart the competing analyses, and adjudicates in favor of an IS analysis. According to this analysis, intervention effects arise because interveners have no compatible IS category available to them in the sentence.

Evidence for the IS approach is of three types. First, we observe that certain contexts ameliorate or entirely eliminate intervention effects; as predicted by an IS approach, these contexts affect the IS of the question, but not its syntax or semantics. Second, the IS approach is able to explain differences in the status of intervention effects associated with different types of questions, by connecting these differences to pragmatic distinctions. Independent motivation for these alleged pragmatic distinctions is provided, as part of a novel typology of questions, roughly based on the idea that not all questions are associated with an existential presupposition. A third kind of evidence for the IS approach is the almost complete absence of intervention effects in one language, Amharic. Crucially, this observation follows from the same information structural and prosodic factors attested in specific contexts and structures in other languages, and not from something unique in the syntax or semantics of Amharic.

The last part of chapter 3 presents a set of data which has not been reported in the literature until now and is illustrated in example (1) above: the same operators that give rise to intervention effects in questions do so in declaratives as well. Unlike the well-known question examples, however, differences in acceptability between declaratives do not correlate with differences in word order. Rather, they are a function of the IS, as determined by the preceding context and reflected in the intonation of the sentence. Neither traditional syntactic and semantic analyses of intervention nor theories of focus realization are able to explain this pattern, while the IS approach to intervention devised for questions can be extended to capture the declarative data.

In chapter 4 I move on to a second phenomenon, which at first glance seems to have nothing in common with focus intervention: weak crossover effects, exemplified in (2)-(3). A weak crossover configuration, according to the existing literature, is one in which an operator (i.e. a quantifier or *wh*-phrase) has moved across a non-c-commanding pronoun; the reading whereby the pronoun is bound by the operator is then difficult to access. This effect has been a major topic of research for forty years, and has been used to argue for a particular conception of LF and as a diagnostic to distinguish A- vs. A'-movement. Nevertheless, as Reinhart (1998:54) notes, "none of the existing accounts for weak crossover gets close enough to capture the facts." I propose a novel account of weak crossover, which connects two independent claims: first, that variable binding hinges on scope, and second, that scope is sensitive to the notion of topichood. In the end, then, IS factors are responsible for both weak crossover and focus intervention effects.

In the discussion of weak crossover, I first recount the long list of existing explanations, noting that the predominant class of theories are at an inherent disadvantage because they assume that the operator does scope over the pronoun in examples of weak crossover. All other things being equal, a theory that does without such an assumption is preferable. A critical empirical problem with existing accounts is subsequently laid out: they fail to explain the absence of weak crossover effects in a wide range of examples, which involve the use of d-linked *wh*-phrases, focus particles, question/answer focus, and non-genuine *wh*-questions, as well as basic *wh*-questions in German. I argue that these examples form a well-behaved group, distinguishable from the original paradigm of weak crossover effects, once the mapping to IS categories is taken into account. Basically, in the acceptable sentences the operator is able to bind the pronoun because it is construed as the topic. While this construal is much more difficult in the baseline examples of weak crossover, where the operator is identified as a focus by default, it is not impossible; as noted above, default IS mappings may be overridden, resulting in a pattern of interspeaker variation. Non-IS theories of weak crossover effects are unable to explain why they exhibit such variation, which has been known to exist since the earliest work on the topic (see Postal 1972).

After justifying the IS-based generalization concerning weak crossover effects, I derive this generalization from a fact about scope: an operator must be a topic in order to scope higher than its surface structure position, that is, to take inverse scope. The sensitivity of inverse scope to IS considerations is reflected not only in the crosslinguistic distribution of scope rigidity, but also in the marked status of inverse scope readings and their susceptibility to interspeaker variation. Two central ideas of chapter 4, that weak crossover is purely a matter of scope and that inverse scope largely reduces to IS, have major ramifications for LF, which I also take up in the same chapter. The prevailing conception of LF in the literature, based on May (1977, 1985), cannot be maintained; in its place, I propose a representation in which topics are highest in the clause, while raising of quantifiers and *wh*-phrases is not a freely available syntactic operation as in May's framework. A positive feature of this representation is that it simultaneously encodes three semantic relations: scope, variable binding, and the predication relation. The topic serves as the subject of predication and therefore c-commands the remainder of the sentence, i.e. the predicate, meaning that it also scopes over the sentence and can bind any pronoun therein.

The discussion of LF naturally leads to chapter 5, which addresses the idea of IS as an independent level of representation and its relationship with other levels of representation. IS is conceived as an annotation procedure, taking its input from the syntax and tagging the structure with IS labels, which are then read by LF and PF. That IS feeds LF is indicated by the way in which IS factors shape scope and variable binding; IS also provides input to PF, dictating that focus be marked via sentential prominence. Lastly, although IS receives a hierarchical representation from the syntax, neither component sees the other: the syntax does not look ahead into the IS, and hence cannot be directly motivated by it, while IS assigns categories irrespective of syntactic constituency in the tree structure. Consideration of these relations in toto yields a novel grammatical architecture, in which the IS level of representation, rather than the syntax, mediates between phonology and semantics. Thus, much of the baroque machinery currently attributed to the syntax can be dispensed with, leaving a simple and truly autonomous syntactic component.

Finally, chapter 6 concludes by reviewing the theoretical, methodological, and descriptive contributions of the dissertation to the existing literature.

Chapter 2

Information Structure: A Synopsis

2.1 Introduction: Where is Information Structure in the Grammar?

A theory of the language faculty must provide an account of what is grammatically encoded in a sentence. This is rather obvious for the fundamental types of linguistic encoding—syntactic, semantic, and phonological—represented inter alia in word order, compositional meaning, and suprasegmental cues, respectively. However, the precise status and role of information structure (IS) is a more contentious issue. Thus, cues indicating how information is arranged in a sentence in accordance with grammatical convention are often set aside in the generative literature. For example, in the original conception of the Minimalist Program, as noted in chapter 1, these cues are lumped together with effects of adjacency and linearity, and essentially ignored (Chomsky 1995).

Beyond identifying markers of IS, defining their function, and describing the ways in which they interact with one another and with other components of the sentence, a comprehensive linguistic theory should also pinpoint the locus of IS in the grammar. Similar questions concerning the locus of morphology have been debated in the literature for quite some time, suggesting that working out the architecture of the grammar in this respect is no trivial matter. As in the case of morphology, two main possibilities have to be considered with regard to IS. One possibility is that notions I have labeled as information structural, such as topic and focus, belong to the well-established syntactic and/or semantic modules of the grammar, and perhaps that different aspects of topichood and focushood are distributed among these modules. Topic, for example, could be a semantic and syntactic object, given its truth-conditional import (see below) and relevance for word order patterns in a variety of languages. By adopting such a perspective, one effectively rejects the idea of an IS module.

An alternative option is that the division into categories like topic and focus is determined by a single component devoted exclusively to IS. Consequently, the reflexes of these categories at multiple levels of representation come about through mapping rules between labels assigned by the IS component and the syntax, semantics, etc. This allows some degree of crosslinguistic variation in the forms of IS categories, though the underlying functions ultimately reduce to a universal inventory. Whether or not constraints on the IS component are part of a broader set of rules, shared by other modules, is then an empirical question.

Rather than presupposing the correctness of one viewpoint or another and then tackling questions of the type just mentioned, one can use these questions as a starting point. That is, if we uncover constraints, formatting guidelines, etc., which are specific to IS categories, this is a good indication that there exists a module underlying them. Showing that these properties cannot be straightforwardly imputed to other modules, and that they individually explain certain observations while also combining to yield more

complex linguistic phenomena, would serve to further strengthen the position that an autonomous IS component exists.

This is the position I defend in this dissertation, specifically using the strategy described in the previous paragraph. Although IS is more difficult to single out than other components of the language faculty, because it piggybacks on these other components, it should, I argue, be considered on a par with the syntax, semantics, and phonology. IS consists of units unique to it, whose function and encoding in the surface representation are part of the grammar no less than the composition of sentence meaning from the meanings of individual words, or the relation between certain prosodic contours and the illocutionary force of the sentence. The IS units exhibit both crosslinguistic uniformity and variation in their realization, and must comply with well-formedness conditions whose violation leads to judgments of degradedness, much like other components of the language faculty. Thus, intuitions about IS units and IS well-formedness are part of grammatical competence.

This chapter is devoted to describing the units, functions, and surface cues of IS, as viewed in this study. My goal is not to review the existing literature on IS (see Vallduví 1990 and Gundel and Fretheim 2004 for relevant surveys), but rather to provide the details necessary to understand the case studies which are presented later. This includes, in section 2.2, a demarcation of the subject matter under investigation, definitions and illustrations of the IS categories, and discussion of how these categories are mapped onto the sentence. The combinatorial rules by which the categories are put together to yield an interpretation are also briefly explained. Given the approach espoused here, whereby IS is an independent level of representation, this section also addresses what exact format should be attributed to this level, namely, a linear partition or hierarchical structure. Some parts of the description and the theoretical options chosen are informed by the results of the case studies undertaken in later chapters. These choices are highlighted, as are the ways in which the framework adopted here follows, but also differs from, others models of IS. In light of its import for the first case study, regarding intervention effects, the notion of focus is taken up in more detail in section 2.3. I attempt to clarify a longstanding debate concerning the existence of distinct categories of focus, and establish that there is indeed a need to keep apart an IS notion of focus, which is central to this study, from an orthogonal, semantic object of the same name. This naturally leads to section 2.4, where the status of *wh*-phrases vis-à-vis focus is handled, and it is argued that, although typically the IS focus, these expressions can also be topics. Section 2.5 concludes by cataloging the constraints on IS which were mentioned in this chapter, and which crucially figure in the following chapter.

2.2 Information Structure: Primitives, Arrangements, and Interpretive Rules

Information structure refers to the way in which information is presented, or packaged, at the sentence level, in accordance with the assumptions of the speaker about his interlocutor's knowledge and attentional state (see Chafe 1976, Prince 1986, Vallduví 1990). Information is material that contributes to the knowledge store of the hearer, or, in information theoretic terms, the part of the propositional content that reduces uncertainty in the hearer's knowledge store. According to this study, the regulation of the exchange of information is carried out by an independent module of the grammar, which we may call

IS, with its own corresponding level of representation. The IS module communicates with the computational system via this level of representation, just as Logical Form (LF) is said to interface between the linguistic form and semantic interpretation.¹ In this manner, this dissertation disputes most current models of the grammar in the generative tradition, which do not admit any role for IS independently of the syntax, semantics, or phonology.

The fact that the exchange of data adheres to a set of guidelines is a property unique to natural language; the example in (8) illustrates this for a question-answer pair (small capitals indicate the word bearing the pitch accent).^{2,3} (8c) is infelicitous because it marks *the cookie* as the piece of information contributed by the answer, rather than *John*. The information that a cookie was stolen, rather than something else, is already known to the hearer at the point at which he asks the question; what he does not know, and is therefore asking about, is the identity of the individual who stole the cookie.

- (8) a. Who stole the cookie from the cookie jar?
 b. JOHN stole the cookie from the cookie jar.
 c. #John stole the COOKIE from the cookie jar.

The answers in (8) also demonstrate how IS is realized at the level of a given sentence in English: *John* and *the cookie* are prosodically marked, via a pitch accent, as the contribution to the hearer's knowledge store. These expressions are the focus of each of the answers, an IS notion I return to shortly. The partitioning of a sentence into IS categories like focus is labeled an informational or IS articulation, and it may be signaled via the syntactic structure, morphological marking, and/or prosodic cues, depending on the language and IS category.

The IS articulation provides a set of information packaging instructions, which tell the hearer how to retrieve the information carried by the sentence and enter it into his knowledge store (Vallduví 1990). Information packaging serves to update the hearer's knowledge store in an efficient way, which would not be possible if propositional content were simply entered as is. The knowledge store can be thought of as a catalog of file cards (cf. Heim 1983), or addresses. Each address denotes an entity involved in the discourse, and includes entries specifying attributes and relations pertaining to the entity. Addresses are manipulated in accordance with the referential status of the NPs which point to them. For example, indefinite NPs, which typically express novel discourse referents, signal to the hearer to create a new address, while definite NPs, denoting given referents, indicate that an existing address is to be activated.⁴ Once an address is active, information packaging instructions will determine how it is to be updated; details of how the IS categories found in a particular sentence and their arrangement correspond to different information packaging instructions are described below.

¹ Vallduví (1990) identifies the module as "informatics" and the level of representation as IS.

² This high pitch accent in English is known as the A accent (Jackendoff 1972) and is indicated as H* in the tradition of Pierrehumbert (1980). I also refer to the accent as the main stress or sentential prominence.

³ The question can also be an implicit "question under discussion", i.e. a discourse topic formulated as a question (see below for relevant examples and Roberts 1996 for elaboration of this notion).

⁴ Referential givenness-newness is correlated with topic-hood: a referentially given NP is more likely to be a topic than an NP designating a novel discourse referent. At the same time, there is nothing preventing a referentially given expression, such as *she* in (i), from functioning as the focus of a sentence.

- (i) a. Who called?
 b. Pat said SHE called.

(Gundel 1980:139)

In this study, the specific conception of the parts making up an informational articulation roughly follows Vallduví (1990, 1995). This is a tripartite articulation, composed of a focus, topic, and tail, the latter two jointly forming the ground. The focus constitutes the new, informative part of the sentence from the perspective of the hearer at the time of the utterance, adding to or modifying his knowledge store.⁵ Newness here is a relative term: the focus is new in relation to the ground, and its status is therefore independent of whether the discourse referent it denotes is new or given to the hearer (see fn. 4 for illustration). Focus is realized across many languages, if not universally, by an obligatory phonological cue, either prominence (i.e. pitch accents) or phonological phrasing.⁶ It is the sole component of the informational articulation which must be present and overt, due to its status as the motivation for the utterance; for example, it is the part of the response to a question which answers the question and cannot be elided.

The ground is the complement to the focus; in informational terms, it is the portion of the sentence which anchors the focus to the relevant entry in the hearer's knowledge store in an appropriate way, and its content must therefore be established in the knowledge store at the time of utterance.⁷ The ground is divided into a topic and tail; the former can be described from a pragmatic, mentalistic, and semantic perspective. In pragmatic terms, the topic is the phrase whose referent the sentence is about (Strawson 1964, Reinhart 1981, Gundel 1988, Lambrecht 1994): the sentence increases the hearer's knowledge about this referent or requests information about it.^{8,9}

The packaging function of the topic—i.e. its status in mentalistic terms—is to point to the address in the hearer's knowledge store where the information provided by the focus is to be entered. The topic also has semantic import: it serves as the subject of predication (É. Kiss 1995, Erteschik-Shir 1997), and hence constitutes the pivot for the assessment of the sentence's truth value. This is demonstrated in (9), from Strawson (1964): (9a) is judged by speakers as undefined or infelicitous, because the topic *the King of France* denotes an empty set. There is no entity against which the predicate can be assessed, and therefore the sentence cannot be assigned a truth value. Conversely, (9b) is judged false, because the topic *the exhibition* is referential and what is predicated of it is false.

(9) a. The King of France visited the exhibition.

b. The exhibition was visited by the King of France.

(Strawson 1964:95)

⁵ This corresponds to what Vallduví and Vilks (1998) term the rheme and É. Kiss (1998) calls the information focus; I later label it the IS focus, in order to distinguish it from a semantic notion of focus to be introduced below.

⁶ It is often claimed that a single pitch accent on an object NP marks the entire clause as focused, in accordance with a set of focus projection rules (see Selkirk 1995). However, experimental evidence disputes this claim (see Gussenhoven 1999, Breen et al. 2010, and chapter 5 for further discussion).

⁷ Much of the literature uses the term "presupposition" to refer to the complement of the focus (e.g. Jackendoff 1972, Chomsky 1976), deliberately or inadvertently conflating it with the notion of presupposition familiar from the discussion of clefts, definite descriptions, etc. in the pragmatic literature. As forcefully argued by Dryer (1996), this should be avoided, since what is given in IS terms—the portion of the sentence already established in the hearer's model—is not necessarily presupposed in the sense of a shared belief, nor is it entailed by the sentence.

⁸ On the difference between sentence topics and discourse topics, a proposition or entity a given text or discourse is about, see Reinhart (1981). The latter type of topic is not discussed in this study.

⁹ This definition identifies topics as linguistic expressions, though the term "topic" can also be used to denote the relevant entity or discourse referent.

In (9), the IS labels are affected by grammatical function: subjects are usually construed as topics (Li & Thompson 1976, Reinhart 1981, Lambrecht 1994, Erteschik-Shir 1997), while the *by*-phrase of a passive typically does not serve as a topic (Reinhart 1981, Brunetti 2009b).¹⁰ Variation in judgments of (9a), to the extent that it exists, stems from the fact that speakers do not have to choose the subject as the topic. It is also possible to manipulate IS categories via prosodic marking, as was mentioned in chapter 1. Placing a pitch accent on an NP marks it as the focus, meaning that a second NP in a simple transitive sentence is most likely the topic. Accordingly, elements other than the subject can be the topic, and hence determine the assignment of truth values. As expected, we find the same distinction in judgments; that is, because there is no King of France, a sentence in which it is the topic—(10a)—results in a truth-value gap, whereas (10b), in which *the King of France* is the focus and *the exhibition* is the topic, is false. In the latter case the hearer can ascertain that it is not true of the exhibition, which ostensibly exists, that the King of France visited it.

- (10) a. The King of France visited the EXHIBITION yesterday.
 b. The King of FRANCE visited the exhibition yesterday.

Though the data in (9)-(10) has long been known in the literature, it is not clear that its significance has been fully appreciated. There is no reason to assume that selection of the topic as the subject of predication in sentences like (9) and (10) is somehow exceptional, particularly if all sentences have a topic, or that the topic qua subject of predication is relevant for assessment only in analogous examples. What is also important is that the subject of predication can be some phrase other than the grammatical subject (cf. (10b)), meaning that assessment need not follow the surface order of constituents. In chapters 4 and 5 we will discover that this possibility of non-isomorphism between surface order and predication, which is regulated by IS considerations, has major repercussions for generalizations which are generally thought to be purely semantic in nature.

Like foci, topics are sometimes said to be phonetically marked; for example, by a fall-rise tone in English (L+H* in the system of Pierrehumbert 1980), labeled the B accent in Jackendoff (1972). The phonetic realization of this accent may depend on the type of topic (e.g. whether it is new or not); these details are not important here (see Vallduví and Engdahl 1996). In this study, the term "topic" replaces Vallduví's notion of "link" as the complement of the tail in the ground, because it includes a wider range of objects. In its original conception, Vallduví's link only refers to a new topic, i.e. a topic that indicates a change of address, also known in the literature as a shift/shifted/shifting or switch topic. In addition, Vallduví's link necessarily appears at the beginning of the sentence, a distinguishing property which might derive from its address-changing function.¹¹ Topic, as it is used in Reinhart (1981), Erteschik-Shir (1997, 2007), and here, is not restricted to new topics nor to sentence-initial position, but rather subsumes any expression that falls under the definitions given above.

The distinction Vallduví makes between different kinds of topics may be needed to

¹⁰ In languages with a postnuclear subject position, in addition to the prenuclear one, the correlation with topichood holds only for the latter. See below for further details.

¹¹ See Erteschik-Shir (2007) and Frascarelli and Hinterhölzl (2007) for further discussion of different types of topics.

account for properties of certain languages and/or phenomena. Furthermore, as Vallduví correctly remarks, the sentence-initial constraint provides an unambiguous and easily applicable diagnostic for the identification of links.¹² However, Vallduví himself abandons the latter diagnostic in later work, demonstrating in Vallduví and Engdahl (1996) that it is empirically inaccurate to claim that links necessarily occupy a sentence-initial position. In any case, the partition into topic types is not useful in this study, while the data itself will normally be simple enough to bear out intuitions regarding "what the sentence is about". Given a limited set of possible IS categories, question-answer pairs involving short transitive sentences—the typical data used here—provide an unambiguous informational articulation. Furthermore, there is nonetheless a tendency for topics to be sentence-initial (Li & Thompson 1976); in languages like English, this may be a byproduct of the strong association between topics and subjects, which in turn often come first. We should thus have sufficient means to pick out the topic.

Notwithstanding what I have just said, there is one distinction between topic types which is crucial to this dissertation, namely, that between aboutness or thematic topics and contrastive topics. The former is the subject of the above description and is central to much of the discussion in subsequent chapters. Contrastive topics constitute a separate linguistic category which has some relation to the general notion of topichood (see Büring 1997, 2003 and Vallduví and Vilks 1998), but the details of this relation go beyond the scope of this study. Only one aboutness topic is allowed in a clause sentence (Reinhart 1981); thus, though a sentence in Japanese may have more than one element marked with the so-called topic particle *-wa*, the second *-wa* phrase will be interpreted contrastively (Kuno 1973). Given the claim that the assessment of a sentence as true or false is topic-centered, the restriction to one such topic makes sense.

Returning exclusively to aboutness topics, I assume that they not only point to a construct in the hearer's mental database, but also necessarily correspond to an entity in the extralinguistic world. This rather widespread assumption in the literature (see, for example, Reinhart 1981) is based on empirical findings and theoretical considerations. From a theoretical perspective, the notion of aboutness invoked with respect to topics requires a referent in the actual world (cf. Strawson 1964).¹³ In empirical terms, there are numerous languages in which topic marking is incompatible with expressions which are non-referential, i.e. not entity-denoting. In Hungarian, for example, some quantificational NPs cannot appear in the syntactic topic position (Szabolcsi 1997), while in Japanese, Korean, and Tsez, similar expressions cannot take morphological topic marking (Polinsky & Potsdam 2001, Tomioka 2007b). Assuming that the marking is indeed purely an indication of topichood, topics are necessarily entities.

McNally (1998), however, questions the proposed relation between topics and entities, noting that the correlation between some supposed cues of topichood and referentiality is not perfect; in particular, the B accent in English can allegedly be found on non-referential determiners and negative quantifiers. I disagree with McNally's conclusion for three reasons. First, given the potential ambiguity of suprasegmental cues, it is not obvious that the phonetic marking in question is the same as that associated with

¹² See Vallduví (1990) and Erteschik-Shir (2007) for a range of topic tests that have been suggested in the literature.

¹³ For Vallduví (1990) the aboutness of topics is an epiphenomenon: information under a given address is felt as being about the denotation of that address.

(certain) topics. Even if it is the so-called B accent, this accent may mark contrast—possibly an autonomous IS notion (cf. Vallduví and Vilkuna 1998)—rather than topichood. A second difficulty for McNally's conclusion is that in languages where topic marking is syntactic or morphological, it *is* restricted to entity-denoting expressions.¹⁴ McNally does not provide an explanation for this observation in light of her claim that topics are not entities. Lastly, the relation between topics and entities is supported by the intervention effect data to be analyzed in the next chapter. This data shows that forcing certain expressions to be topics, by virtue of the context and regardless of the presence of overt topic marking, yields unacceptable sentences. This crosslinguistic generalization can be accounted for only by invoking the requirement that topics be entities, and acknowledging that the expressions in question fail to denote such entities.

Rounding out the focus and topic in the IS articulation is the tail, which provides further details on how data is to be entered into the knowledge store. That is, when present, the tail is included under the address indicated by the topic, as part of a larger record which must be completed or altered by the focus. This contrasts with an articulation lacking a tail, in which case the focus is simply added to the address designated by the topic. An important constraint on tails is that they must not bear intonational prominence.

The definitions of the three IS primitives employed in this study are much easier to comprehend via actual examples, particularly question-answer pairs, since questions transparently reflect the questioner's knowledge state. As a result, they impose a particular informational articulation on the answer, requiring the constituent in the answer that corresponds to the *wh*-expression in the question to be the focus (cf. the Focus Diagnostic of Rochemont 1998). To facilitate understanding, basic examples will be in English, where IS is marked primarily via prosody; additional languages will be introduced only insofar as they differ from English in interesting and relevant ways. I begin with the articulations described in Vallduví (1990), and then move on to structures which are sanctioned only if the sentence-initial criterion for topics is dropped. The first example, in (11), demonstrates a topic-focus articulation.^{15,16}

- (11) a. What about John? What did HE do?
 b. [TOP John] [FOC insulted MARY].

In terms of information packaging instructions, the articulation of (11b) instructs the hearer to go to the address *John* in his knowledge store and then add under *John* the information that he insulted Mary.

As noted by Lambrecht (1994), the articulation in (11b), which he dubs a predicate focus structure, is the default informational articulation: speakers assign it to sentences given without context or other cues indicating the intended informational articulation. Recall, for example, the sentence in (12), from chapter 1, in which speakers automatically interpret *Nazis* as a topic and the VP as the focus, yielding the interpretation that this is a

¹⁴ Possible counterexamples arguably require further examination of the semantic properties of the expressions; see Endriss (2009) and chapter 4 on distinctions between different types of quantificational expressions and their ability to function as topics.

¹⁵ In the sentences below, [TOP] delimits the topic, [FOC] the focus, and small caps indicate the word bearing the pitch accent within the focus.

¹⁶ IS articulations are portrayed in this chapter as linear partitions for the sake of simplicity and in order to highlight the division into IS categories. The precise format of IS is addressed in chapter 5.

comment about what Nazis do. The relevance of the default status of this articulation will become evident in later case studies.

(12) [TOP Nazis] [FOC tear down ANTIWAR posters]. (=6)

The placement of prominence in (12), in accordance with the position of focus in the default articulation, is the same as that derived by the nuclear stress rule of English. This rule roughly picks out the rightmost element—*antiwar* or *posters*—as the bearer of nuclear stress (see Cinque 1993).¹⁷ The connection between the default IS articulation and the nuclear stress rule is elaborated on in chapter 5.

A second type of informational articulation consists of a single focus and no overt topic in the sentence, as demonstrated in the answer in (13) and the existential sentence in (14).

(13) a. What happened?
b. [TOP ...] [FOC John insulted MARY].

(14) Waiter! [TOP ...] [FOC There's a FLY in my cream of broccoli soup]! (Vallduví 1990:64)

There are two possible perspectives on such an articulation. On the one hand, Vallduví (1990) treats it as a topicless, all-focus structure ("sentence focus" in Lambrecht 1994), given the assumption that topics (links, in his terms) must be overtly realized. According to him, if there is no element in the sentence functioning as an address pointer, then either there is no particular address under which the information should be entered, or the speaker assumes that the hearer has already gone to the relevant address, given by the previous discourse. In fact, if the latter is the case—an address was provided earlier—it simply cannot be a link in Vallduví's system, given the definitions he uses.

On the other hand, using the abovementioned file metaphor of the hearer's knowledge store, Erteschik-Shir (1997, 2007) maintains that a card signifying the time and place of the discourse situation is always located on top of the file. This "stage topic", in Erteschik-Shir's terms, serves as a location for the entry of information, but need not be represented by a linguistic expression in the sentence. Thus, for Erteschik-Shir there are no topicless sentences per se. I follow this line of reasoning, since the function of the topic as the element against which the truth of the sentence is evaluated makes its presence necessary. Thus, I consider the topic in (13) and (14) to be an implicit spatio-temporal argument, indicated by '...'.¹⁸ In semantic terms, the truth of (13b) is evaluated by asking whether the proposition is true of the stage topic, namely, a particular time in the past and a location, if relevant. The information packaging instructions for these articulations are the same as those for sentences with overt topics (cf. (11b)). These examples differ, however, in that the propositional content in its entirety is a contribution to the knowledge store of the hearer.

Another kind of sentence which is considered all-focus by Vallduví, given his specific conception of links, is provided in (15). According to Vallduví, the pronoun *he* is part of the focus; the relevant address in the knowledge store is inherited from previous

¹⁷ Why *posters* might be skipped as the bearer of prominence is not important here.

¹⁸ In Vallduví and Engdahl (1996) these kinds of sentences are said to include a general situation file card, corresponding to the time and space information mentioned in the discourse or inferred from the context. Thus, the difference between this approach and Erteschik-Shir's may not be as great as it seems at first glance.

discourse and hence does not need to be explicitly repeated in the same NP form. Vallduví is forced into this position regarding pronouns due to the assumption noted above, whereby link expressions are only found when there is a change in the address for data entry, which is not the case in (15). Under the definitions adopted here, however, *he* can be, and is, a topic.

(15) The president has a weakness.

[_{TOP} He] [_{FOC} hates CHOCOLATE].

(Vallduví & Engdahl 1996:469)

Bringing tails into the discussion, we first find examples which Vallduví analyzes as focus-tail articulations, lacking a link; as in the example above, I consider the pronoun to be a topic in such cases. Thus, (16) is a topic-focus-tail articulation.

(16) You shouldn't have brought chocolates for the president.

[_{TOP} He] [_{FOC} HATES] chocolate.

(Vallduví & Engdahl 1996:469)

This articulation provides the following instruction to the hearer: "Go to the address *the president* and substitute *hates* for *V* in the record '*the president V chocolate*'".¹⁹ In other words, the tail indicates that the focus completes or alters an existing entry. Similar sentences with a non-pronominal topic, which are therefore categorized by both Vallduví and myself as a topic/link-focus-tail articulation, are given in (17) and (18). Note that the latter involves a slightly more complex ditransitive structure, which Vallduví does not discuss in IS terms.

(17) a. What about John? What did HE do to Mary?

b. [_{TOP} John] [_{FOC} INSULTED] Mary.

(18) a. What about Mary? What did SHE do for the guests?

b. [_{TOP} Mary] [_{FOC} gave the NAMETAGS] to the guests.

Also consisting of all three IS categories are topic-tail-focus articulations, as in (19)-(20), which differ from the previous sentences in that the VP is partitioned into focus and tail.

(19) a. What about John? Who did HE insult?

b. [_{TOP} John] insulted [_{FOC} MARY].

(20) a. What about Mary? Who did SHE give the nametags to?

b. [_{TOP} Mary] gave the nametags to [_{FOC} the GUESTS].

In addition to the articulations described above, it is helpful to give examples of the three types of articulations in which the topic is not sentence-initial: focus-topic, focus-tail-topic, and focus-topic-tail. Recall that being initial was a definitional criterion for links in Vallduví (1990), so that such articulations were not described in his original model. A focus-topic structure is illustrated in (21), a focus-tail-topic in (22)-(23), and a focus-topic-tail in (24).²⁰

(21) a. What about Mary? What happened to HER?

b. [_{FOC} John INSULTED] [_{TOP} Mary].

¹⁹ I am ignoring the way in which the pronoun gets to the address for the NP *the president*.

²⁰ In the focus-topic-tail sentence, the verb, which is part of the tail, separates the focus from the topic. This is the result of the surface word order of English, and has no theoretical import; in a language with freer word order, it is possible to make the IS categories contiguous in the string.

- (22) a. What about Mary? Who insulted HER?
 b. [_{FOC} JOHN] insulted [_{TOP} Mary].
- (23) a. What about the guests? Who gave THEM the nametags?
 b. [_{FOC} MARY] gave the nametags to [_{TOP} the guests].
- (24) a. What about the nametags? Who gave THEM to the guests?
 b. [_{FOC} MARY] gave [_{TOP} the nametags] to the guests.

From a brief review of the English examples provided until now, one could conclude that there is no consistent relation between overt syntactic positions and IS categories: a given IS category is not realized in a fixed syntactic position, while the same position allows more than one IS category.²¹ A topic, for example, can be in the syntactic subject position—SpecIP for the sake of discussion—or a VP-internal object, and a phrase in SpecIP may function as a topic or focus. Similarly, both the direct and indirect object can serve as the topic in a dative construction (cf. (23b) and (24b)), as well as in a double object construction:

- (25) a. What about the guests? Who gave THEM the nametags?
 b. [_{FOC} MARY] gave [_{TOP} the guests] the nametags.
- (26) a. What about the nametags? Who gave THEM to the guests?
 b. [_{FOC} MARY] gave the guests [_{TOP} the nametags].

This conclusion is at odds with the range of cases reported in the literature in which syntactic positions are claimed to be dedicated to specific IS roles, as well as the less common claim that an IS role must be realized in a specific position. While the disparity may be partly due to crosslinguistic differences, such that languages like Catalan and Hungarian putatively mark IS notions in the syntax more rigidly than English, even English seems to have some degree of IS labeling reflected in its syntax (e.g. left-dislocation). The issue of how to deal with this labeling and accommodate it within a framework which espouses an independent IS representation is addressed in chapter 5.

Before ending the description of possible informational articulations, it is important to point out once more that the use of an explicit discourse context to bring out particular articulations does not mean that such a context is always available or needed. The informational articulation of a sentence may be determined by non-linguistic contextual cues, or by default, particularly when the sentence is given without any relevant contextual information. The latter case often arises in elicitation of native speaker judgments, as illustrated in (12) above, while the former is exemplified in (27)-(30) below, inspired by Vallduví (1990). (27) provides a relevant, non-linguistic context, in which (28) is felicitous but (29) and (30) are not, as indicated by '#'.

- (27) Context: Speaker is organizing a birthday party for his boss together with his coworkers. Two workers are in the office kitchen, preparing food for the event. Speaker walks in and sees that they are busy cutting broccoli.
- (28) Oh no, [_{TOP} the boss] [_{FOC} HATES] broccoli!
- (29) #Oh no, [_{FOC} the BOSS] hates [_{TOP} broccoli]!

²¹ To my knowledge, there is no evidence that the surface structure of these English examples hides different syntactic positions for different IS categories.

(30) #Oh no, [_{TOP} the boss] hates [_{FOC} BROCCOLI]!

The only felicitous articulation is one in which the verb is the focus, instructing the hearer to go to the address *the boss* and substitute *hates* for *V* in the record '*the boss V broccoli*'. Articulations in which the verb is in the ground are unacceptable because the relation between the boss and broccoli is not information known to the hearer through the context at the time of utterance. One can also consider this context an implicit discourse topic, or question under discussion, i.e. *What is the relation between the boss and broccoli?*. Table 1 summarizes the various possible IS articulations demonstrated above.

	Articulation	Examples
1.	topic-focus (overt topic)	(11), (15)
2.	topic-focus (implicit topic)	(13), (14)
3.	topic-focus-tail	(16), (17), (18), (28)
4.	topic-tail-focus	(19), (20)
5.	focus-topic	(21)
6.	focus-tail-topic	(22), (23), (26)
7.	focus-topic-tail	(24), (25)

Table 1: Possible Informational Articulations

Although illustrated in English, and thus distinguished by the placement of prosodic prominence, the articulations in table 1 are not language-specific nor are they necessarily signaled only via the phonology. Japanese, for instance, has the morpheme *-wa* devoted to marking topics. In a language like Catalan, the IS categories are indicated via their position in the syntactic tree: foci remain in situ in the lowest IP, or core clause, new topics (links) undergo left-dislocation, while tails are right-dislocated (Vallduví 1990). This is exemplified in the topic-focus-tail sentence in (31), akin to the English (16)-(18) and (28). This sentence also demonstrates that IS cues are not mutually exclusive in a given language: in Catalan, the focus is marked in the phonology, falling under the clause-final pitch peak, while topics and tails are removed from the scope of prosodic prominence.

(31) [_{TOP} L'amo_j] [_{FOC} l'_i ODIA t_it_j], el bròquil_i.
the.boss OBJ hate.3S the broccoli
'The boss HATES broccoli.' (Vallduví 1990:64)

The range of possible IS articulations is restricted in interesting and important ways. First, as mentioned above, the focus is the only element overtly occurring in all articulations; the claim that it is an obligatory component of the IS articulation is shared by most, if not all, studies of IS (Vallduví 1990, Lambrecht 1994, Erteschik-Shir 1997, 2007, Zubizarreta 1998, a.o.). There is a simple logic behind this: were it not for the focus, there would be no justification for the utterance to begin with. The status of topics seems more controversial at first, since researchers like Vallduví (1990) allow for IS representations without a topic, or link in his terminology. However, this stems from theory-specific assumptions regarding the definition of topics and the status of stage topics, rather than a strong empirical basis. Given their role as identifying the address for data entry and as the subject in a predication relation, I assume that topics are a mandatory part of every IS articulation, although they may remain unrealized in the sentence.

Lastly, a glaring omission from the arrangements in table 1 is a tail-initial articulation. This, I argue, is not a coincidence: subjects in a position preceding the nuclear stress cannot normally be tails. English, with its rigid word order, essentially has only one subject position, which is sentence-initial, forcing an NP placed in this position to be interpreted as a topic or focus.²² Subject tails are allowed, however, in languages which possess a postnuclear subject position; indeed, this is the only position they may occupy. This is illustrated in the Catalan (32) and Italian (33) examples below. The rather awkward translations possible for these sentences, using right-dislocation, reflect the absence of an exact parallel in English, as Vallduví (1990:135) notes: "... this sentence seems to be the best approximate to the informational understanding of the sentence as encoded in the Catalan equivalent."

(32) [TOP De pa_i] [FOC no en_i MENJA t_i t_j], mon germà_j.
of bread no OBJ eat.3S my brother
'Bread he doesn't eat, my brother.' (Vallduví 1990:135)

(33) [TOP Le verdure] [FOC proprio non le VUOLE], il capo.
the vegetables really not them_{CL} he.wants the boss
'He really doesn't want vegetables, the boss.' (Brunetti 2009a:759)

The resistance of prenuclear subjects to tailhood is demonstrated again in chapter 3, in the context of focus intervention effects. We will see that languages like Catalan can manipulate the IS status of the subject by placing it in the postnuclear position, and thus evade intervention effects, while English must often resort to other syntactic means, such as demoting the subject to a *by*-phrase.

Now that the basics of the system have been laid out, it is useful to address a number of leftover overarching questions regarding IS representations. First, the idea that IS consists of precisely three primitives, rather than additional subdivisions or a simpler binary partition (e.g. topic-comment, as in Reinhart 1981, or focus-presupposition as in Jackendoff 1972), is justified by the empirical studies to follow: it is both the minimal and maximal number of categories needed to account for the data. This motivation joins the empirical reasoning for a tripartite representation provided by Vallduví (1990). Other putative IS categories are either derivative of these primitives, such as contrastive topics, or in fact semantic notions; one such notion—semantic, or operator, focus—is addressed at length in the following section.

The three primitives combine in various ways to form what I have labeled an IS articulation, also known as an "information unit" following Halliday (1967), which was implicitly assumed above to be a clause. Though this assumption is often warranted, an IS articulation does not automatically correspond to the syntactic notion of a clause; rather, two clauses can form a single IS articulation. The precise way in which the chunking into IS articulations is determined and the factors which play a part in it, including the informational properties of the participating clauses, are poorly understood issues; a few relevant examples will be identified and discussed in chapter 3.

Another feature of the articulations provided above which has not been explicitly addressed is their format: although these were represented as linear partitions, it might be

²² I ignore marginal non-subject initial constructions, such as locative inversion, since their specialized IS-related functions make them inappropriate for further IS manipulations.

more appropriate to think of them as hierarchical structures. To explore this possibility, consider three aspects of structure which are relevant to the representation of linguistic objects. First, there is the notion of constituency, i.e. groupings of words based on syntactic behavior and corresponding to intuitions about semantic closeness. These groupings serve as the motivation for a hierarchical model of phrase structure over linear concatenation. On the one hand, this organization of linguistic objects is carried over into levels of representation other than the core syntax, including the IS. Thus, the complex noun phrase *the boy with the blue shirt* is treated as a single unit—a topic—in (34b):

- (34) a. What about the boy with the blue shirt? What did HE do?
 b. [_{TOP} The boy with the blue shirt] [_{FOC} insulted MARY].

On the other hand, just as discrepancies between syntactic constituents and corresponding structures in the semantics and phonology are possible, this seems to also be true of IS. In (35), for example, the focus spans the subject and verb, a non-constituent in the syntax. I return shortly to the question of how this putative unit behaves in the IS representation.

- (35) a. What about Mary? What happened to HER? (=21)
 b. [_{FOC} John INSULTED] [_{TOP} Mary].

Independently of the mapping between syntactic constituents and IS categories, another potential structural aspect of the IS representation is recursivity. If an IS articulation, or some part thereof, could be embedded within another articulation, this would indicate the existence of a hierarchical structure within the IS representation. However, as Tomioka (2008) points out, the existence of recursivity in IS is questionable. One potential piece of evidence for it, morphological topic marking in Japanese embedded clauses, is restricted in ways which may not be reducible to informational properties. A second phenomenon which could *prima facie* suggest a recursive IS structure is the occurrence of operators that are claimed to associate with focus, such as *only*, in the domain of another operator of the same type. (36) is an example of this phenomenon—known in the literature as second occurrence focus—where *vegetables* in the second sentence is associated with *only* and is simultaneously in the ground of *even* (italics here and below mark the associates of operators like *only* and *even*).

- (36) a. Everyone already knew that Mary *only* eats *VEGETABLES*.
 b. If *even* PAUL knew that Mary *only* eats *vegetables*, then he should have suggested a different restaurant. (Partee 1999:215)

Such examples are proof of one focus-ground partition embedded within another under the assumption that the associate of *only* has a one-to-one relation with IS focus. This assumption, however, is not justified: a thorough examination of the relationship between operators like *only* and IS focus, taking second occurrence foci as well as a range of additional data into account, shows that the two do not perfectly align with one another. The following section is dedicated to this issue.

Having found that IS representations do include some form of word groupings, which may or may not be isomorphic to syntactic constituents, a third aspect of structure worth considering is the relation between these groupings. This relation is modeled as a hierarchical structure, with properties unique to the IS level of representation, by Vallduví (1990) and Erteschik-Shir (1997). Vallduví's motivation for such a representation is the Principles and Parameters model within which he works. In this

model, an overt hierarchical relation in one language is thought to be covertly replicated in other languages. Thus, just as *wh*-movement in English is supposed to be expressed at LF in *wh*-in-situ languages like Chinese (Huang 1982), the overt placement of topics and foci in Catalan is claimed to be represented at the post-Spell-Out level of IS in English. Since this line of reasoning is theory-internal, and has been contested in the case of *wh*-constructions (Reinhart 1998), it would be helpful to find independent support for a hierarchical model of IS.

There is in fact need to acknowledge a type of hierarchical relation between topics and foci, due to their characteristics defined above. As an address for storing data and the subject of predication, the topic must precede the focus which provides the data and is (part of) the predication (see É. Kiss 1995). Using the file metaphor, interlocutors must have access to the file card before the information which is to be entered under the card. While Vallduví follows this rationale to back up his claim that links must be overtly sentence-initial, it is more reasonable to assume that the hierarchical relation needs only materialize at a covert interpretive level for which it is relevant. Furthermore, scope considerations—particularly the observation that topics take widest scope (Ioup 1975, Kuno 1982, Reinhart 1981, Erteschik-Shir 1997, 2007)—favor viewing IS relations as hierarchical. What remains to be addressed is whether these relations are realized at IS, which would then correspond to, and possibly replace, existing LF representations of scope. Alternatively, it could be that LF is influenced by IS considerations, but remains the input to the semantic interpretation. This matter is discussed in chapters 4 and 5.²³

Returning to the specific IS notions adopted in this study, the following section is devoted exclusively to focus, given its significance for the phenomena which form the core of this study. I contend that it is necessary to differentiate between two objects which are known as focus in the literature, namely, an IS category of focus and a correlated, yet independent, semantic category of focus.

2.3 Semantic Focus vs. Information Structural Focus

As part of this synopsis of information structure, it is necessary to return to the notion of focus and take up an ongoing debate in the literature on this matter. The debate essentially concerns the ontological status of focus in language: is there one uniform category we can identify as focus, or is it necessary to separate IS focus, discussed until now, from a semantic category of focus, which I describe below? This issue is obviously important for any research on IS, and is particularly relevant for the first major case study here—intervention effects—where focus plays a crucial role. As will become clear later, in order for the account of intervention effects proposed in this study to go through, it is necessary to distinguish the two categories of focus. Accordingly, this section is intended to independently motivate such a distinction, and to show that although the overlap between semantic focus and IS focus is manifested in distributional patterns and speaker judgments, it is a default setting rather than a lexicalized relation.

The label "focus", which we have encountered in the case of question-answer pairs in

²³ A hierarchical model of IS is eschewed in Zubizarreta (1998) in favor of a linear representation, because foci do not need to be syntactic constituents but are nonetheless argued to undergo movement (cf. focus movement at LF in Chomsky 1976 and much subsequent work). If IS categories do not have to be identical to syntactic constituents, and no movement of IS foci takes place, as claimed in Vallduví (1990) and here, Zubizarreta's objections to a hierarchical representation become irrelevant. See chapter 5.

the previous section, also comes up in the context of so-called focus-sensitive operators, such as *only*, *even*, and *also*. This class of semantic operators, which will be henceforth referred to as *only*-type operators, is characterized as requiring a set of alternatives to quantify over (the "P-set" in Rooth 1985). The set of alternatives is provided by another element in the sentence, labeled the associate, or nucleus, of the operator; expressions which generate alternatives, including the associates of *only*-type operators, contrastive topics, and *wh*-phrases, are called semantic foci.^{24,25} *Only*, for example, exhausts over the alternatives to its associate, deriving the assertion that some proposition holds only of the associate and not its alternatives. The example in (37) illustrates: it presupposes that John introduced Bill to Sue, and asserts that John introduced Bill and no one else (from among the set of alternatives) to Sue.²⁶

(37) John only introduced *BILL* to Sue.

Beginning in the 1980s, researchers have deliberated whether the quantificational domain of *only*-type operators is obligatorily determined by the IS focus-ground partition, or if these operators can be restricted via elements other than the IS focus. According to one side of the debate, going back to Jackendoff (1972), and later taken up in Rooth (1985) and Krifka (1992), the former hypothesis is the correct one. These theories of focus, labeled "weak" in Rooth (1992), postulate that semantic operators like *only* need to associate with an IS focus because it alone provides the set of alternatives they require. This should be true of all occurrences of *only*-type operators, as noted by Krifka (1997:4):

(38) If an operator is analyzed as focus-sensitive (i.e. associated with a focus) in one type of use, it must be analyzed as focus-sensitive (associated with a focus) in all types of use.

This type of theory is semantic in the sense that it views association with focus as a grammaticized property of certain lexical items. It comes with two additional hypotheses, the first of which was discussed in the original literature on the topic, while the second has come to the fore recently, given purportedly relevant empirical findings which will be addressed shortly. The first hypothesis is that simplex sentences with more than one *only*-type semantic operator contain multiple embedded focus-ground partitions; although this conflicts with the traditional view of the IS articulation, because it is largely a conceptual matter, I do not discuss it further. The second, empirically testable hypothesis states that all associates of *only*-type operators necessarily bear some prosodic prominence, in accordance with the established observation that IS foci are prosodically marked. Thus, both in general conceptual terms and from an empirical perspective, a semantic approach

²⁴ The literature on the semantics of focus is vast: Rooth (1985, 1992, 1996a) and von Stechow (1990) propose the competing Alternative Semantics and Structured Meanings approaches, respectively; Krifka (2006) and Beaver and Clark (2008) provide recent overviews.

²⁵ The term "semantic focus" corresponds to "kontrast" in Vallduví and Vilks (1998), where IS focus is labeled "rheme". Although the notion of semantic focus also overlaps, fully or partially, with the term "bound focus", as opposed to "free focus", these terms are unhelpful and will generally be avoided here. Their use wrongly implies that the only difference between the two categories, which belong to different parts of the grammar, is the presence vs. absence of a binding operator.

²⁶ This is one of many possible treatments of the meaning components of *only*; see Beaver and Clark (2008) for recent discussion.

to focus association does not make a distinction between semantic foci and IS foci. This result is undesirable for our purposes, as we will see below.

An opposing view is put forward by pragmatic, or strong, approaches to focus, which include Vallduví (1990), Rooth (1992), Dryer (1994), Roberts (1996), Schwarzschild (1997), and Kadmon (2001). According to these approaches, *only*-type operators do not necessarily make use of the independently motivated IS articulation. Rather, IS focus is only one possible mechanism for introducing the restriction on the quantificational domain of these operators; contextual restrictions may arise through other means.²⁷ *Only*-type operators should therefore be able to associate with non-prominent material. A prime alleged case of a non-prominent associate is the well-known phenomenon of second occurrence focus (SOF), mentioned in the previous section and illustrated in examples (39)-(40).

- (39) a. Eva only gave xerox copies to the *GRADUATE STUDENTS*.
 b. (No,) PETER only gave xerox copies to the *graduate students*. (Partee 1991:179)
- (40) a. Everyone already knew that Mary only eats *VEGETABLES*. (=36)
 b. If even PAUL knew that Mary only eats *vegetables*, then he should have suggested a different restaurant.

In (39a), *graduate students* is a first occurrence focus and the IS focus, while in (39b) *Peter* is the IS focus and *graduate students* is called an SOF. While the latter does not have the same level of prosodic prominence in the second sentence, it remains the associate of *only*, i.e. a semantic focus. Pragmatic approaches to focus consider this a point in their favor.

Although it is true, as Beaver et al. (2007) remark, that the issue of prominence in SOF expressions has been a key point of contention in the debate between semantic and pragmatic theories, it is not the sole prediction distinguishing them. Support for pragmatic theories is not limited to phonetic data, nor to SOF. Moreover, the original line of reasoning put forward by pragmatic theories does not concern phonetic marking per se, but rather only as a possible correlate of IS focus. I review the evidence presented by pragmatic theories, and then come back to recent phonetic findings from Beaver et al. and others regarding SOF expressions. While it seems simpler to tackle the issue from a purely phonetic perspective and argue about quantitative data, following Beaver et al., this is not as straightforward as one might think. The claim of Beaver et al. that their phonetic findings invalidate a major argument for pragmatic theories is questionable, so that the issue has not been resolved in favor of a grammaticized relation between *only*-type operators and prosodic prominence. If anything, the full range of available data and theoretical considerations support the pragmatic camp, and contest semantic approaches to focus, as well as the most recent, hybrid framework for focus association proposed by Beaver and Clark (2008).

As noted above, advocates of a pragmatic approach have partly relied on their intuitions regarding prosodic prominence. Examples said to lack prosodic prominence include SOF expressions, where the associate of *only* is in the tail portion of the sentence (39)-(40), as well as subfocal associates, where the associate is within a larger IS focus.

²⁷ Vallduví (1990), for instance, argues that any linguistic phrase uttered in the appropriate context can generate a relevant set of alternatives. This set is also used by conversational and scalar implicatures, which are not dependent on IS focus.

Thus, in (41), taken from a coded speech corpus and presented in Vallduví and Engdahl (1996:85), the associate of *only* is *a month*, and yet the pitch accent falls on *Christmas*. The placement of the accent on the rightmost constituent (disregarding *now*, for reasons that are not important here) follows from the fact that this is an all-focus sentence.

- (41) a. Why are you so excited?
 b. [FOC There's only *a month* till CHRISTMAS now]. (Nevalainen 1987:148)

(41) is an example of discrepancy between the IS focus and the associate of *only* when both are in the scope of *only* and no backgrounding is involved, unlike SOF. Speakers are nonetheless able to derive the appropriate quantificational domain for *only* and hence the intended interpretation, essentially ignoring the pitch accent for this purpose.

Findings based on intuitions regarding prosodic prominence in examples like (39)-(41) might not hold up under careful phonetic analysis, and in any case, as I argue below, suprasegmental data is a dubious form of evidence for the theoretical issue under discussion here. It is therefore crucial to consider examples that do not hinge on prosody alone. Indeed, there exists independent structural evidence that the associate of *only*-type operators need not be the IS focus; this is observable in languages like Catalan, where IS is more or less directly mapped onto word order.

One type of structural evidence involves an associate which is a subsegment of the IS focus, akin to what we found in (41). In (42b), *dream* is the associate of *only* and is marked by an accent, despite the fact that the entire VP is the IS focus.

- (42) How will we relieve our libido?
 a. Well, I will [FOC go to bed with my MAN],
 b. but you'll [FOC only *DREAM* about YOURS]. (Vallduví & Zacharski 1994:15)

The corresponding Catalan example is provided in (43): the VP is realized in the position reserved for IS foci, i.e. rightmost within the core IP (43b), while the verb alone cannot be placed in this position (43c). Thus, the syntactic structure shows that the IS focus is not limited to the associate of *només* 'only'.²⁸

- (43) Com ens ho farem, per satisfer el nostre desig sexual?
 'What will we do to quench our sexual craving?'
 a. Bé, jo [FOC me n'aniré al llit amb el meu HOME],
 'Well, I will go to bed with my man,'
 b. i tu [FOC només somniaràs amb el TEU].
 'and you will only dream about yours.'

²⁸ Catalan *només* 'only' patterns like its English counterpart in its ability to associate "at a distance", thus allowing (at least) the two readings in (ia) and (ib), depending on placement of the main stress. While similar particles in other languages may be purely markers of exclusivity, and would therefore be irrelevant to the debate surrounding association with focus, this cannot be said of the Catalan particle at issue.

- (i) a. El Joan només beu CERVESA a les festes.
 John only drinks beer at the parties
 'John only drinks BEER at parties.'
 b. El Joan només beu cervesa a les FESTES.
 John only drinks beer at the parties
 'John only drinks beer at PARTIES.'

(Laia Mayol, p.c.)

c. #*i* tu només *hi* [_{FOC} SOMNIARÀS,] amb el teu_i. (Vallduví & Zacharski 1994:15)

A second type of structural data shows that topics can function as associates of *only*-type operators. Consider (44): the IS focus is the VP, but the associate of *only* is the topic *John*; the latter is marked by an L+H* accent appropriate for topics.

- (44) John and Mary know the Amazon quite well,
but only *John's* [_{FOC} been to the CITIES in Brazil]. (Vallduví & Zacharski 1994:16)

Once again, the Catalan equivalent in (45) unambiguously indicates that *John / el Joan* is the topic, allowing it to surface in the preverbal position reserved for topics. (46) establishes that the preverbal position in Catalan is indeed associated with a topic interpretation: *el Joan*, which is the element answering the question and hence the IS focus, cannot appear there.

- (45) El Joan i la Maria coneixen l'Amazones bastant bé,
però només el Joan ha estat a les ciutats del BRASIL.
'John and Mary know the Amazon quite well,
but only John's been to the cities in Brazil.'

- (46) Who has been to the cities in Brazil?

a. Només *hi* ha estat el JOAN, a les ciutats del Brasil_i.

b. #Només el Joan *hi* ha ESTAT, a les ciutats del Brasil_i.

'Only JOHN'S been to the cities in Brazil.' (Vallduví & Zacharski 1994:17)

Further structural evidence for the dissociation between the nucleus of *only* and IS focus is provided by Japanese and Amharic, where contrastive topics can be formed by combining the equivalent of *only* with a morphosyntactically marked topic. In Japanese this combination consists of *dake* 'only' and an element marked by the topic particle *-wa*, as in (47b); unlike the sentence in (47a), with the nominative marker *-ga*, (47b) implies that additional relevant properties hold of other members of the set *John* belongs to, besides going home.²⁹

- (47) a. John-dake-ga ie-ni kaetta.
John-only-NOM home-to returned
'Only John went home.'

b. John-dake-wa ie-ni kaetta.
John-only-TOP home-to returned
'Only John went home.'

(Kuno 1972, in Vallduví & Vilks 1998:88)

A similar example can be constructed in Amharic, although in this language morphological topic marking is not necessary; the topic can simply occupy a clause-peripheral position associated with a topic interpretation. In the sentence in (48), the operator *bəčča* 'only' takes the topic as its argument, rather than the preadjacent proposition (i.e. *What did Haile read*), as English *only* does. The resulting interpretation is that among a relevant set of alternatives, the question *What did he read?* refers exclusively to Haile.

²⁹ See Hara (2006, 2007) for additional details on Japanese *dake-wa*.

- (48) haile(-ss) bəčča mən anəbbäb-ä?
 Haile-TOP only what read.PER-3MS
 'Only speaking of Haile, what did he read?'

To the best of my knowledge, these types of examples have never been addressed by proponents of the semantic approach to focus association. Unlike the more contentious cases based on prosodic prominence, the topic status of the associate of *only* is not up for debate in these cases; moreover, claiming that the equivalents of *only* are somehow different here from other uses of *only* is not a credible option. The forms are fully compositional, and *only* has the same semantics—involving exhaustification over alternatives—it always has.

In addition to the structural data indicating that there is no necessary connection between *only*-type operators and IS focus, there is a further argument which can be made against semantic theories. It is possible to produce examples where a mismatch between the associate of *only* and the IS focus, bearing a pitch accent, yields interpretive difficulties. That is, *only* fails to associate with its intended nucleus, precluding the interpretation appropriate for the context. These kinds of examples were first provided by Schwarzschild (1997, 2004), who noted that the expected complete sentence answers to a question like (49a) are infelicitous. On the one hand, (49b) leads to association of *crepes* with *only*, and thus to the unintended interpretation that Renee will eat nothing but crepes in Paris, but may very well devour crepes in other places. On the other hand, avoiding accentuation of *crepes*, as in (49c), violates question-answer congruence; the resulting inappropriate background proposition is that Renee eats crepes somewhere.

- (49) a. What food will Renee only eat in PARIS?
 b. #She'll only eat CREPES in Paris.
 c. #She'll only eat crepes in PARIS. (Schwarzschild 2004:142)

In order to reply to the question in (49) with a complete sentence, it is necessary to remove the IS focus from the scope of *only*, as in the two answers in (50).

- (50) a. What food will Renee only eat in PARIS?
 b. She'll eat CREPES only in Paris.
 c. What Renee will only eat in PARIS are CREPES.

Schwarzschild takes this example to show that association with *only* and the division into focus and ground are independent mechanisms, conflicting with the predictions of semantic approaches to focus, which treat them as one and the same.³⁰ The example has since become a source of controversy in the literature: Beaver (2010) and Rooth (2010) assert that an answer like (49b) is essentially acceptable. However, this claim is doubtful. For one thing, it is unclear what Beaver bases his assertion on; the fact that speakers produced the examples in spoken form or judged them as acceptable, as he maintains, tells us nothing. What we need to know is whether speakers arrive at the interpretation

³⁰ Since pragmatic theories allow the IS focus to set the domain of quantification, they are in principle able to accommodate this type of focus mismatch. The question of why prosody overrides contextual considerations in this case is beyond the scope of this study; see below for some speculation regarding processing factors, and Schwarzschild (1997) for an account of such cases in denial contexts.

that matches the question. Moreover, the one naturally occurring example Beaver provides is not a question-answer pair and is thus irrelevant.³¹

As for Rooth (op. cit.), his claim that any difficulty with (49b) results from a low-level phonetic problem—the absence of phonetic evidence for focus on *Paris*, the intended associate of *only*—lacks sufficient evidence. It is not obvious that the modifications Rooth proposes to render (49b) felicitous, allowing the SOF *Paris* to be perceived as prominent, are indeed helpful. Specifically, Rooth maintains that adding material after the intended associate of *only* (51), the IS focus (52), or both (53), improves the status of the answers; I do not find any difference between these sentences and the original versions provided by Schwarzschild (2004).³²

- (51) a. What food will Renee only eat in PARIS next year?
b. She'll only eat CREPES in Paris next year.
- (52) a. What food will Paul only eat in PARIS?
b. He'll only eat UDON noodles in Paris.
- (53) a. What food will Renee only eat in PARIS next year?
b. She'll only eat UDON noodles in Paris next year.

In any case, the possibility that speakers' difficulty is due to the lack of prominence on the SOF *Paris* contradicts the semantic approach to focus which Rooth advocates; only the pragmatic approach predicts that speakers may treat SOF expressions as non-IS foci.

Whatever the results of the debate regarding Schwarzschild's question-answer pair, which arguably calls for more careful testing of speaker judgments, it is possible to devise analogous examples which are simpler, and for which judgments appear to be clearer. One such example is given in (54): because the question is based on world knowledge, answers can be elicited and evaluated by speakers in a way which is not possible with (49). Speakers uniformly judge the crucial answer in (54b) as infelicitous.

- (54) a. What bird can you only find in NEW ZEALAND?
b. #You can only find the KIWI in New Zealand.
c. #You can only find the kiwi in NEW ZEALAND.
d. You can find the KIWI only in New Zealand.

In this example and the one provided by Schwarzschild, the relation between *only* and its associate crosses the IS focus. The existence of a crossing dependency seems to be the key factor differentiating them from the acceptable sentence in (55), repeated from (41).

- (55) [_{FOC} There's only *a month* till CHRISTMAS now]. (=41)

The latter includes a nested dependency, in which the associate is adjacent to *only*; deriving the intended association is not a problem in this case. Question-answer pairs involving a nested dependency, analogous to the Schwarzschild-type examples discussed above, also seem to be simpler to interpret than their crossing dependency counterparts. Thus, in (56), the answer demanded by question-answer congruence, (56b), can be interpreted as intended, on a par with (56d): Tokyo is a place in which there are only

³¹ See <http://www.thekitchn.com/thekitchn/what-do-you-only-eat-in-restaurants-103998>.

³² As we will see in chapter 3, supposedly analogous examples Rooth provides to support the idea of a phonological constraint operating in these cases actually reflect something unrelated. There is, therefore, no independent evidence for Rooth's claim that the infelicity of (49b) stems from such a constraint.

skyscrapers. This reading may require a pause after *skyscrapers*, but in any case is not unavailable the way it is in (49) and (54).

- (56) a. Where are there only SKYSCRAPERS?
 b. There are only skyscrapers in TOKYO.
 c. #There are only SKYSCRAPERS in Tokyo.
 d. In TOKYO there are only skyscrapers.

The two types of dependencies are schematically represented in (57): (57a) is a nested dependency, where the non-stressed associate sits closer to the operator than the element bearing main stress, whereas in the crossing dependency in (57b) there is a stressed element between the operator and its intended associate.

- (57) a. *only* ... *xp* ... XP
 └──────────┘
 b. *only* ... XP ... *xp*
 └──────────┘

Nested dependencies as in (57a) may be simpler due to processing considerations: once the mechanism responsible for association has reached the adjacent associate it can shut down, avoiding a conflict with the stressed IS focus later down the stream. At any rate, an in depth examination of why nested dependencies behave differently from crossing dependencies is not essential to this study. What is important for our purposes is the interpretive difficulty created by crossing dependencies. This difficulty constitutes an additional form of evidence, beyond the prosodic and structural data discussed earlier, for the distinction between association with semantic operators and the focus-ground partition. Moreover, the breakdown of association with *only* is surprising for recent work on second occurrence focus to be discussed below. According to Beaver et al. (2007), SOF expressions do bear some phonetic indication of their focus status, contrary to the retrospective judgments previously reported in the literature. If so, what prevents them from serving as the nuclei for *only* in the question-answer pairs described above? This suggests that the phonetic marking allegedly found on SOF, whatever its source, is not relevant for the purpose of association, and hence does not bear on the current debate.

Among the phonological, structural, and interpretive observations reviewed above, recent work attempting to adjudicate between semantic and pragmatic approaches to focus association has centered on phonological arguments. Specifically, following preliminary findings reported in Rooth (1996b), Beaver et al. (2007) take up the question of prosodic prominence on SOF expressions, by testing whether speakers produce and perceive them differently from non-foci. Recall that under a pragmatic theory of focus, there is no requirement that the associate of an *only*-type operator be prosodically prominent, since it need not be the IS focus. Accordingly, the prediction is that SOF expressions should pattern like non-foci in terms of their phonetics. Beaver et al. report that this is not the case: SOF is marked by greater duration and intensity than non-foci, and speakers are able to distinguish the former from the latter in a perception task. Although SOF expressions lack the pitch movements associated with first occurrence foci, Beaver et al. suggest that this may follow from their placement in the postnuclear domain in the materials they tested. In this domain, deaccenting generally applies and neutralizes pitch distinctions. Indeed, in a study of German, Féry and Ishihara (2009)

claim that *prenuclear* SOF does exhibit the pitch marking characteristic of first occurrence foci.³³ Beaver et al. take their phonetic evidence to refute a central argument used by pragmatic theories against semantic theories of focus; it supposedly shows that even in a prime example of association with what appears to be non-prominent material, some phonetic marking of prominence is in fact observed.

Beyond the fact that the existence or lack of prosodic prominence on SOF is not the sole prediction distinguishing semantic vs. pragmatic theories of focus, as emphasized above, there are three main problems with the conclusions of Beaver et al. First, the results themselves, although statistically significant, are weak. As pointed out by Howell (2008), the duration and intensity values found fall short of some published just noticeable differences for speech, and Howell's attempts to replicate the results with somewhat modified methods yielded mixed results in both perception and production. Recall also that speakers seem unable to identify SOF expressions in crossing dependencies; comparable examples in which SOFs are treated on a par with non-foci, rather than IS foci, are discussed in the context of intervention effects in the next chapter.

A second problem concerns the way in which the results of Beaver et al. have been interpreted. The inference from phonetic data to theoretical arguments is, I argue, not justified in this case; alternative explanations, which Beaver et al. fail to rule out, are just as plausible. In general, suprasegmental information does not have a one-to-one relation with linguistic categories, making any inference of this type questionable. Accent marking, for example, is not an unambiguous marker of IS focus, since topics can also bear a certain type of accent (Lambrecht 1994, Vallduví & Zacharski 1994, Büring 1997). Furthermore, in the case of SOF in particular, low-level effects of phonetic copying or motor planning, as suggested by Howell (2008), must be considered: SOF expressions are repetitions of prosodically prominent material by definition, while the non-focus expressions to which they are compared are not. In order to convincingly show that the reported phonetic cues are necessarily related to the presence of an *only*-type operator, one must test sentences in which a focused expression is repeated without the reoccurrence of such an operator. Consider (58), a modified version of one of the experimental stimuli used by Beaver et al.

- (58) a. The doctor even gave *PETE* a pill today.
 b. No, the nurse gave Pete a pill today.

Since the word *Pete* is not associated with an operator in the second sentence, nor is it in the position of nuclear stress, any phonetic marking of prominence on it must be attributed to a mechanical effect of speech production. That is, if there is a cue distinguishing it from the adjacent *pill*, and from the same word *Pete* in a corresponding sentence pair without an *only*-type operator, this refutes Beaver et al.'s claim that their results reflect grammatical marking of the associates of *only*-type operators. It seems to me that there is such a cue.³⁴ Beaver et al. do not test examples like (58), leaving their results open to multiple interpretations.

³³ However, see Bishop (2008) for a follow-up study on pre-nuclear SOF in English, which is reported to lack pitch prominence.

³⁴ Nomi Erteschik-Shir (p.c.) points out that the same effect of repeating elements can be observed in question-answer pairs: a weakened version of the stress contour of the question appears in the answer. Thus, in the answer in (ib) *Pete* is more prominent than *pill*.

Lastly, using the phonetics of SOF is not an ideal way to operationalize the predictions of semantic and pragmatic theories of focus. Although this case study is empirically testable and yields quantitative results, it is rather uninformative: SOF expressions are typically disambiguated by the preceding context, i.e. their first occurrence. That is, unless the hearer walked in during the middle of a conversation and failed to hear the sentence in which the operator was first used (and has no other information regarding its associate), he does not need any phonetic marking to discern the intended associate. Indeed, work on SOF has recognized that the domain of quantification can be fixed by the expression containing the first occurrence focus (Rooth 1992).

The case for semantic theories of focus would be more convincing if it were based on instances in which context does not play a role in resolving the association of *only*-type operators. Phonetic marking would then have to be the sole cue responsible for association. However, the only kind of example where context seems to be disregarded—the infelicitous answers in (49) and (54)—does not in fact constitute support for semantic theories. As noted above, given their claim that SOF is phonetically marked, semantic theories do not predict that *only* will fail to associate in these answers, making them infelicitous. Furthermore, in other examples, which also involve a mismatch between the accented element and the associate but do not contain an SOF, it is easy to show that context underlies the interpretation. Consider the well-known sentence in (59), where *only* associates with *rice* despite the presence of a pitch accent on *eat*; the sentence means that people who grow rice usually don't eat anything other than rice.

(59) People who grow rice usually only EAT *rice*. (Rooth 1992:33)

Rooth (1996b) suggests that *rice* in (59) is associated with a focus feature, which may be imperceptible, while Beaver et al. (2007) raise the possibility that it is lengthened on a par with SOF. However, it is unclear what the motivation for any such marking would be, since comparison of the sentence to similar examples establishes that contextual information is what allows association with *only*. Specifically, in (60)-(61), which are identical in their configuration to (59), *only* does associate with the accented verb.³⁵

(60) People who hate cough syrup usually only SWALLOW *cough syrup*.

(61) People who hate houses usually only RENT *houses*.

I claim that the difference between (59) and (60)-(61) results from interpretive considerations. In (59), associating *only* with *eat* would derive a contradiction: if people grow rice it cannot be the case that the only thing they do with it is eat it. In fact, speakers report this contradiction when providing their interpretation of the sentence. In (60)-(61), however, no such contradiction arises if the verb is the nucleus of *only*; on the contrary, associating *only* with the object NPs—*cough syrup* or *houses*—would lead to an anomalous interpretation. Why, for example, would people who hate cough syrup choose to exclusively use cough syrup rather than other forms of medication?

There is another reason to think that context is crucial in determining the interpretation of these examples, and thus in other cases of association with focus as well. (59) involves a crossing dependency, which means that its status should be on a par with

(i) a. I know that the doctor gave Mary a pill today. Who gave PETE a pill today?
 b. The nurse gave Pete a pill today.

³⁵ The object NPs cannot be accented in (59)-(61) because they are given, forcing the accent to move left.

the sentences in (49) and (54), but it is not; recall that the latter are infelicitous, although speakers may report otherwise insofar as they do not recognize that the answer does not match the question. Since the only thing distinguishing the two types of examples is the linguistic context in which they are embedded, this must be the factor underlying their different status. Specifically, the potential contradiction which prevents associating *only* with the accented word in (59) does not arise in (49) and (54). In the latter cases, this association yields a sentence which does not answer the question but is perfectly coherent in and of itself. Consequently, the informant asked to judge the examples may either fail to notice the question-answer mismatch, and will judge the answer as acceptable, or he might notice it and react accordingly. The fact that the examples in (49) and (54) extend over a question and answer, rather than a single sentence, and that the combination of the question and answer does not derive a contradiction, whatever interpretation is arrived at, makes them different from (59). This hypothesis is supported by the observation that altering a question-answer pair like (54), so that it parallels (59), yields a sentence which speakers find acceptable and clearly different from the original: compare (54), repeated in (62), with (63a) and (63b), where the intended association between *only* and the non-accented *New Zealand* goes through.

- (62) a. What bird can you only find in NEW ZEALAND? (=54)
 b. #You can only find the KIWI in New Zealand.
 c. #You can only find the kiwi in NEW ZEALAND.
 d. You can find the KIWI only in New Zealand.
- (63) a. New Zealand may not have lots of unique tourist attractions, but you can only find the KIWI in New Zealand.
 b. New Zealand has a large population of unique birds; for example, you can only find the KIWI in New Zealand.

All in all, recent studies purporting to finally settle the debate regarding second occurrence foci, and focus association in general, have failed to do so. The attempt to formulate the theoretical question in quantitative phonetic terms in Rooth (1996b), Beaver et al. (2007), and Féry and Ishihara (2009) has not led to clearer, less controversial conclusions. Moreover, these attempts seem to have neglected the original parameters of the debate, which basically concerned the interface between IS and semantics. They often sidestep the fundamental theoretical issues involving IS which this debate raises, failing to articulate their assumptions regarding IS or the implications for it in light of their findings. The irrelevance of the phonetic findings regarding SOF means that semantic theories of focus association have to go back to the drawing board in search of arguments for their approach and against a pragmatic approach. This includes not only the theories of Rooth (1985) and Krifka (1992), but also the recent, heterogeneous approach to focus association proposed in Beaver and Clark (2008).

In Beaver and Clark's work, association with focus is specifically modeled as association with the answer to the question under discussion. The alleged class of focus-sensitive expressions is divided into subsets, and *only*-type operators are subsumed under the class of expressions which provide a comment on the question under discussion as part of their conventionalized meaning. Accordingly, *only*-type operators are expected to always have a prominent constituent in their scope, namely, the element answering the question under discussion. The approach of Beaver and Clark fails to deal with the entire

range of arguments for a non-lexicalized association between *only*-type operators and prosodic prominence, and is thus no different from the traditional semantic theories from our perspective. These arguments, as well as an entire new set of findings to be presented in the next chapter, raise the types of questions which phonetic studies, whatever their level of sophistication and regardless of how robust their results are, cannot address.

Beaver and Clark provide a couple of additional arguments, which are not based on phonetics, to corroborate the existence of a necessary connection between the associate of an *only*-type operator and prosodic prominence. Addressing these observations in detail would take us too far afield; however, it is worth noting that one key observation made by Beaver and Clark—that an *only*-type operator cannot associate with a constituent not in its scope (cf. Tancredi 1990)—is not detrimental to a pragmatic theory, notwithstanding their claims to the contrary. Beaver and Clark employ a range of constructions involving extraction and ellipsis to demonstrate that this generalization is true of *only*-type operators, but not of other expressions which show some type of focus-sensitivity. They conclude that the former adhere to certain structural requirements, and that a pragmatic approach does not predict this to be possible. This claim, however, is founded on faulty reasoning: the way in which *only*-type operators are constrained by syntactic considerations is independent of the means by which they find their associate. In other words, conventionalization of the syntactic domain from which the associate of an *only*-type operator must be selected does not entail that the choice of the associate within this domain is also conventionalized, as semantic theories maintain.³⁶ Rather, the domain constraint is a lexical feature of specific items, not reducible to other properties, and not tied in to IS focus. This is comparable to the fact that the NP to which Japanese *only*-type operators like *dake* 'only' or *mo* 'also, even' adjoin is also necessarily their associate, whatever its IS status. Thus, it is impossible to associate *dake* with a *wa*-marked topic in order to derive a contrastive topic interpretation if *dake* is not attached to this topic: unlike (47b) above, in (64) *John* cannot be interpreted as a contrastive topic.

- (64) John-wa koko-de hon-dake-o yon-da.
 John-TOP here book-only-ACC read-PAST
 'John read only books here.' (Satoshi Nambu, p.c.)

Similar examples in which the intended associate is a topic, rather than a focus, can be constructed in other languages, including languages in which operators have available a larger syntactic domain than just their host. These examples indicate that the domain constraint is unrelated to the alleged obligatoriness of association with focus.

Given the discussion above, and the conclusion that *only*-type operators do not always use the IS focus as their nucleus, the question is why there is nonetheless a great degree of overlap between the two; moreover, speakers tend to assign the interpretation in which they are aligned to sentences out of context. Here I follow Vallduví (1990) and Dryer (1994) in arguing that this follows from considerations of use in discourse, and does not indicate a grammaticized relation between *only*-type operators and IS focus.³⁷ In cases where the *only*-type operator associates with the IS focus, the ground consists of

³⁶ The restriction of possible associates to a certain syntactic domain is something that pragmatic theories have to take into account; nothing I have said so far rules this possibility out.

³⁷ See Tomioka (2007a) for a similar account appealing to the presuppositional properties of *only*-type operators.

everything but the operator and its associate. Thus, in (65), the hearer is assumed to know that John introduced someone to Sue at the time of utterance; he is instructed to go to the entry for the topic *John* and substitute the new information *only Bill* for *x* in the existing record '*John introduced x to Sue*'.

(65) John only introduced *BILL* to Sue.

Conversely, if a sentence in which the associate does not serve as the IS focus is used, such as (66), the hearer must have an existing record of the form '*John only introduced Bill to x*', which contains the exhaustive *only*.

(66) John only introduced *Bill* to SUE.

As Vallduví (1990) and Dryer (1994) note, the ground in (66) is more complex than that in (65), in the sense that exhaustiveness is part of the background in the former and yet remains relevant for anchoring the information conveyed by the sentence. Accordingly, the discourse contexts in which this complex ground would arise are rare, and it is more difficult to imagine a situation in which a sentence like (66) would be used. When asked to judge such a sentence, speakers find it unacceptable because they are unable to come up with the contextual conditions that would make it felicitous. It thus reflects what Vallduví labels "actual-world infelicity", which, although typically overlooked in the linguistic literature, will turn up again as a source of unacceptability in subsequent chapters.³⁸ As expected of a case of actual-world infelicity, it is nevertheless possible to make the sentence acceptable; namely, by fulfilling the preconditions for use of such a sentence via a relevant context, as in (67).

- (67) a. I know that John introduced Bill and Barb to Ralph. Is there anyone that John only introduced *BILL* to?
b. Yes, John only introduced *Bill* to SUE.

Extending this kind of explanation to the other major *only*-type operators—*even* and *also*—is rather straightforward. Moreover, we predict a difference between the latter operators and *only*, stemming from the fact that unlike *only*, *even* and *also* have only a discourse function and no truth-conditional import. Thus, while the presence of *only* in the ground might be needed to derive truth-conditional effects, no such justification exists for *even* and *also*; they should be marginal, if not entirely unacceptable, in such contexts. This prediction is borne out: while *only* is acceptable in the subordinate clause of a cleft (68), whose content is presupposed and hence backgrounded (see Prince 1978), *even* is not (69). The same point is illustrated in the question-answer pairs in (70) vs. (71).

(68) It was *BILL* that John only introduced to Sue.

(69) ??It was *BILL* that John even introduced to Sue. (Dryer 1994:9)

- (70) a. Who drank only beer?
b. JOHN drank only *beer*.

- (71) a. Who ate even snake?
b. ??JOHN ate even *snake*.

³⁸ See Kroch (1989) for an analysis of negative islands and long movement of non-referential *wh*-phrases as cases of actual-word infelicity.

The discourse function of *even* is to comment on an overly weak expectation regarding the answer to the current question under discussion (Beaver & Clark 2008). Since it relates to unexpectedness in the discourse, *even* is unlikely to be used once this unexpectedness is part of the hearer's model and no longer novel information. In this light, consider (69) again, where *even* and its associate, *Sue*, are in the ground: if the unexpectedness of John introducing Bill to Sue, compared to other people, has already been established, stating the fact that it was unexpected—the only reason to use *even*—is entirely superfluous. It is thus virtually impossible to imagine circumstances under which a speaker would do so, and hence the status of sentences like (69) cannot be improved.

As for *also*, whose discourse function is to convey that its argument parallels a previous answer to the question under discussion (Beaver & Clark 2008), Dryer (1994) gives the example in (72). Association of *also* with *Sue* here seems to be impossible; the context in (73) allows for the only interpretation possible, in which *also* takes *Bill* as its nucleus.

(72) ??It was BILL that John also introduced to Sue. (Dryer 1994:10)

(73) You've mentioned a lot of people that John introduced to Sue. Are you sure you've mentioned everyone? Isn't there one other person that John also introduced to Sue that you haven't mentioned? Do you know who it is? (Dryer 1994:10)

The discovery of a difference between *only* vs. *even* and *also* in terms of the extent to which they and their associates can be in the ground supports the general account defended here. That is, only an analysis which considers their function in discourse and allows for context-related considerations (i.e. actual world (in)felicity) to play a part in determining acceptability judgments can capture the range of data reviewed in this section. Because they lexicalize the behavior of all three operators—*only*, *even*, and *also*—Beaver and Clark (2008) do not provide such an analysis.

In this section I have examined the debate between semantic and pragmatic approaches to focus association, given its relevance for the distinction between the notions of semantic focus and IS focus (or lack thereof). I have established that there exists a considerable body of data supporting the pragmatic approach which has yet to be addressed by proponents of the semantic camp. Furthermore, the data point which the latter have pinned their hopes on—the phonetics of second occurrence foci—does not, contra Beaver et al. (2007), provide clear-cut evidence one way or another.³⁹

We are prepared, then, to proceed to the first major case study of the dissertation, where a pragmatic approach to focus association seems necessary. In judging sentences involving certain configurations of *only*-type operators, we find that speakers differentiate *only*-type operators associated with the IS focus from those not associated with the focus. The phenomenon in question—focus intervention effects—thus provides further support for a pragmatic approach, according to which there is no grammaticized relation between *only*-type operators and prosodic prominence as a correlate of IS focus. In other words, semantic foci are not necessarily IS foci.⁴⁰

³⁹ By contesting the semantic approach to focus association, I relinquish the use of SOF as evidence for recursive focus-ground partitions and hierarchical ordering of IS representations (see section 2.2).

⁴⁰ Satoshi Tomioka (p.c.) points out a possible problem with the claimed distinction between semantic focus and IS focus. According to certain theories, all foci are associated with some operator, including hypothetically "free" IS foci, as in the answer to a question (cf. Krifka 1992). On the one hand, given that

We also find that there is a distinction in how *only*-type operators pattern vis-à-vis intervention effects compared to other expressions. This seems at first glance to support Beaver and Clark's theory of focus association, which invokes grammaticization in analyzing the behavior of this class of operators. However, there is an alternative account, appealing to the same contextual considerations which were brought up to explain why the associates of *only*-type operators tend to also be the IS focus. Speakers project a default IS articulation when judging an out-of-context sentence; if there is an *only*-type operator in the sentence, they will associate it with the IS focus. They do not do so, however, if given a context which prompts them to do otherwise, and their judgments change accordingly. Therefore, there is no need to assume that the attested pattern reflects a grammatically encoded property of the class of *only*-type operators.

Before moving on to focus intervention effects, however, it is necessary to address another type of operator for which focus has been invoked: *wh*-phrases. These surface in both intervention configurations and weak crossover configurations—the subjects of chapters 3 and 4, respectively—where their IS status is of crucial importance.

2.4 *Wh*-topics

It is a longstanding assumption in the literature that *wh*-phrases are universally foci (Culicover & Rochemont 1983, Horvath 1986, Rochemont 1986, Lambrecht 1994, a.o.).⁴¹ I maintain, however, that this view is misguided to some extent: *wh*-phrases are only necessarily *semantic* foci, as claimed by Vallduví and Vilkuna (1998), in that they invoke alternatives, i.e. a set of potential instantiations for the *wh*-phrase. This accords with the traditional view of questions as denoting the set of answers to the question (Hamblin 1973), where these answers differ only in the element replacing the *wh*-phrase. Although *wh*-phrases are typically IS foci as well, they do not have to be IS foci. Rather, a *wh*-phrase can function as the topic of the IS articulation. The compatibility between *wh*-phrases and topics is expected given the observation that quantifiers can be topics (Portner & Yabushita 1998, 2001, Endriss 2009, and see chapter 4) and the assumption that *wh*-phrases are existential quantifiers (Karttunen 1977). The relationship between *wh*-phrases and focushood is very much like what we found in the previous section regarding *only*-type operators and focushood: a strong correlation but not a grammatical rule. In order to make my case, I first go through the reasons given for the generalization equating *wh*-phrases with foci, and then present a range of examples which contest the possibility that this generalization is correct with respect to IS focus. In these examples, *wh*-phrases retain their normal semantic function, but pattern like topics in IS terms.

The primary reason for treating *wh*-phrases as foci is the structural parallelism found between *wh*-phrases and non-*wh*-phrase foci across a wide range of languages. In one group of languages, both *wh*-phrases and IS foci obligatorily appear in a fixed preverbal position. This includes Basque (Arregi 2002), as exemplified in the subject questions and corresponding answers in (74)-(75), where the base order is SOV: the object must move

the needed distinction between semantic focus and IS focus becomes moot under such theories, as with any semantic theory of focus, they seem incompatible with the results of the current study. On the other hand, there may be interpretive distinctions between foci in answers to questions and contrastive topics, which require the inclusion of a free focus operator. I leave this issue for future research.

⁴¹ Authors often equivocate on the exact notion of "focus" they are referring to. This is expected given the tendency in the literature to conflate the IS and semantic categories of focus.

in order to make the subject *wh*-phrase/focus adjacent to the verb.

- (74) a. Jon_i seńek t_i ikusi rau?
 Jon.ABS who.ERG see.PRF AUX.PR
 'Who saw John?'
 b. Jon_i Miréńek t_i ikusi rau.
 Jon.ABS Miren.ERG see.PRF AUX.PR
 'MIREN saw John.'

- (75) a. *seńek Jon ikusi rau?
 who.ERG Jon.ABS see.PRF AUX.PR
 b. #Miréńek Jon ikusi rau.
 Miren.ERG Jon.ABS see.PRF AUX.PR

(Arregi 2002:173)

In another group of languages, the focus status shared by *wh*-phrases and non-*wh*-phrase foci is indicated by a focus morpheme; e.g. the particle *wè* in the Gungbe examples in (76)-(77).

- (76) a. Ménù wè dà Àsíàbá?
 who FOC marry Asiaba
 'WHO married Asiaba?'
 b. Sésínú wè dà Àsíàbá.
 Sessinou FOC marry Asiaba
 'SESSINO married Asiaba.'
 (77) a. Ménù wè Sésínú dà?
 who FOC Sessinou marry
 'WHO did Sessinou marry?'
 b. Àsíàbá wè Sésínú dà.
 Asiaba FOC Sessinou marry
 'Sessinou married ASIABA.'

(Aboh 2007:289)

As expected if the two types of phrases are realized in the same syntactic position in Gungbe, they are mutually exclusive (78); the same type of complementary distribution is also reported in Italian (Rizzi 1997) and Hungarian (Horvath 1986).⁴²

- (78) a. *Àsíàbá wè ménù wè dà?
 Asiaba FOC who FOC marry
 b. *Ménù wè Àsíàbá wè dà?
 who FOC Asiaba FOC marry

(Aboh 2007:289)

An additional formal similarity between *wh*-phrases and non-*wh*-phrase foci is their occurrence in the pivot position of clefts. Some languages, such as Malayalam and Sinhala, prefer to use cleft constructions for *wh*-questions (Jayaseelan 2003); this follows

⁴² Unlike the similar Italian and Hungarian constructions, the Gungbe sentences may in fact be clefts, and this would be the reason for their behavior. That is, it might be more accurate to say that the ungrammaticality of (78) reflects the impossibility of placing a focused phrase in the presupposed portion of the cleft (cf. (79b) and Lambrecht 1994 for additional examples from French), rather than competition for a single focus position, as Aboh (2007) maintains.

from the fact that clefting is a syntactic mechanism for encoding focus. However, even languages in which the cleft construction is not necessarily favored, like English and French, require both *wh*-phrases and non-*wh*-phrase foci to be the pivot when a cleft is used. This requirement with respect to *wh*-phrases in clefts is exemplified in (79): French allows in situ *wh*-phrases in standard questions (79a), but not in cleft questions (79b).

- (79) a. Audrey a acheté QUOI?
 Audrey has bought what
 'What did Audrey buy?'
 b. *C'est Audrey qui a acheté QUOI?
 it.is Audrey who has bought what (Lambrecht & Michaelis 1998:523)

The structural arguments seem to support the idea that *wh*-phrases are IS foci.⁴³ One can add to these arguments the observation that *wh*-phrases tend to be prosodically prominent in *wh*-in-situ languages, on a par with IS foci (see Ladd 1996).⁴⁴ It is necessary, then, to consider how these empirical findings fit in with our conception of information structure. That is, why would a *wh*-phrase serve as the focus of the question, and does it always have to be the focus?

Wh-questions are composed of the same IS categories as declaratives, with the *wh*-phrase normally serving as the IS focus and the rest of the question as the ground (Lambrecht 1994, Lambrecht & Michaelis 1998).⁴⁵ They differ from declaratives in that the knowledge state of the speaker, rather than the hearer, determines the IS articulation. From the perspective of the purpose of information packaging, this makes sense: while a declarative is packaged so that the hearer's knowledge store can be efficiently updated, an interrogative is organized to ensure proper updating of the questioner's knowledge store. Thus, the topic of a question indicates the address in the questioner's knowledge store where the information to be contributed by the focus in the answer will be entered; it is what the question primarily requests information about (Jaeger 2004), a characterization which fits with our original definition of topic.

Wh-questions also differ from declarative sentences in the definition of their focus. A *wh*-phrase obviously does not and cannot contribute information, unlike the focus in declaratives; instead, its focus status is a byproduct of the pragmatic meaning of the question. The content of a question excluding the *wh*-phrase is typically given, meaning that the *wh*-phrase is the only portion which could potentially function as the focus (cf.

⁴³ Cable (2008) argues that in Hungarian, the prototypical language used to justify the claim that *wh*-phrases are foci, *wh*-fronting and focus fronting are actually separate constructions, thus weakening the claim. Going into his analysis would take us too far afield; in any case, he does not provide an alternative explanation for the fact that *wh*-phrases in Hungarian obligatorily surface in the preverbal position and bear the main stress.

⁴⁴ Of course, this leaves open the question why *wh*-phrases in languages with *wh*-movement, such as English, do not bear the main stress. See Lambrecht and Michaelis (1998) for an explanation which retains the analysis of *wh*-phrases as foci.

⁴⁵ Conditions under which the *wh*-phrase is not the IS focus are described below. Some arguments made in the literature against *wh*-phrases as foci are unwarranted, since they are based on a misunderstanding of the relevant discourse-related properties. Aboh (2007), for instance, assumes that a *wh*-question with a non-cleft-like interpretation involves a non-focused *wh*-phrase. Though it is true that clefted *wh*-phrases are necessarily foci, the inverse does not hold: non-clefted *wh*-phrases can be foci or topics.

Erteschik-Shir 1986).^{46,47} A simple illustration of the topic and focus categories in a question is provided by (80), where the *wh*-phrase is the focus and *John* is the topic; the book given as the answer will replace *x* in the record '*John read x for the book report*', stored under the address *John*.

(80) [FOC What] did [TOP John] read for the book report?

Notwithstanding the fact that *wh*-phrases are usually the IS focus, in particular environments they are assigned to a different IS category, that is, they are the topic of the *wh*-question. These environments include questions with an overtly topic-marked *wh*-phrase and multiple *wh*-questions; in addition, d-linked *wh*-phrases are ordinarily construed as topics, though this is not required by rule.⁴⁸ In all these cases, the *wh*-topic remains a *wh*-expression in the semantic sense, i.e. it is still a semantic focus, introducing alternatives into the semantics.

Before turning to these cases, let us consider how a question with a *wh*-topic differs in its IS articulation from the more standard *wh*-questions just described. When a *wh*-expression is a topic, the restrictor of the *wh*-expression, whether or not realized independently of the *wh*-head, designates a discourse referent which the question requests information about. Like the more standard topics we have already encountered, it also points to the address where this information will be entered. Thus, the question (81a) can be paraphrased as in (81b) under the appropriate contextual conditions, where the speaker knows that the set of test-takers is limited to John, Bill, and Mary.

(81) a. [TOP Who] failed the exam?

b. As for John, Bill, and Mary [=the contextually relevant set of people], who among them failed the exam?

Now we can examine, in turn, the relevant environments for *wh*-topics. First, there are languages which allow *wh*-phrases to be topic marked, as illustrated in the Japanese example in (82), where the topic marker *wa*- is attached to the *wh*-phrase *dare* 'who'.

(82) *dare-wa* kite, *dare-wa* konakatta no?

who-TOP came.GER who-TOP didn't.come Q

'Who came, and who didn't?'

(Miyagawa 1987:186)

According to Miyagawa (1987), a *wh*-phrase can be marked with *wa*- only if there is a set of individuals constituting possible answers which are identifiable by both speaker and hearer in the immediate conversational context. This sort of discourse-anaphoricity is a common property of topics, whether in the specific way it is manifested in Japanese *wh-wa*, labeled "set-anaphoricity" by Miyagawa, or in a less restricted sense, where the topic is given due to a previous context, world knowledge, etc. Under the definitions of IS categories given above, an element which is an IS focus cannot simultaneously be a topic: if it points to an existing address in the knowledge store of the speaker or hearer,

⁴⁶ On the precise pragmatic status of the propositional content of questions see chapter 3.

⁴⁷ One could potentially unify the definition of the IS focus in declaratives and questions by identifying it as the complement to what is given.

⁴⁸ Additional cases of *wh*-topics are fronted *wh*-phrases in Chinese (Wu 1996, 1999) and the *wh*-phrase in unary *wh*-questions with an *only*-type operator. The former will be encountered in chapter 4 and the latter in chapter 3.

the information entered under this address cannot be the address itself.⁴⁹ Since there is no reason to believe that the incompatibility between topics and foci is overridden in certain cases, an example like (82) can only be accounted for if *wh*-phrases are not necessarily IS foci.

A similar morphosyntactic indication of the topichood of *wh*-phrases is evident in Bulgarian. In this language, a clitic-doubled *wh*-phrase behaves like a topic: it can be used only when its answer set is discourse-given and very salient (Jaeger 2004). Furthermore, it must front to a high topic position, preceding other *wh*-phrases. This is shown in (84), which is felicitous in the context (83), where the set of friends has been mentioned; the *wh*-phrase *kogo* 'whom' is doubled by the direct object clitic *go* and raises above the other *wh*-phrase *koj* 'who'.

(83) Context: Some of the most popular painters in town recently made portraits of a couple of my friends. I know that each of my friends wanted to be painted by a particular artist, but I don't know by whom. So the question is:

(84) *kogo koj go e narisuval?*
 whom who DOC has painted
 'Who has been painted by whom?' (Jaeger 2004:217)

A second category of *wh*-phrases relevant to the discussion of *wh*-topics is discourse-linked, or d-linked, *wh*-phrases. These are *wh*-phrases whose answer must come from a set of elements given by the discourse, and they are typically realized as *which*-phrases (Pesetsky 1987). The defining property of these *wh*-expressions—their discourse-anaphoricity—already suggests that they are prime candidates for topichood (cf. Grohmann 1998, Wu 1996, 1999, den Dikken and Giannakidou 2002). In addition, there are a variety of empirical observations that support this idea. First, they are selected more than non-d-linked *wh*-phrases as antecedents for pronouns; thus, in a series of questionnaire and online reading studies, Frazier and Clifton (2002) found that given a question pair like (85), the *wh*-expression was chosen as the antecedent for the pronoun *he* more often in the d-linked version (85b) than in the non-d-linked version (85a).

(85) a. Who did Dad deliver a book to before he went on vacation?
 b. Which son did Dad deliver a book to before he went on vacation?

The tendency of pronouns to prefer topics as their antecedents has been argued for on both theoretical (Reinhart 1981) and empirical grounds (Baauw, Ruigendijk & Cuetos 2004). The results of the experimental study on d-linked *wh*-phrases do not show, however, that the *which*-expression is necessarily picked as the antecedent. I suggest that this is due to two factors: the particular materials used in the experiments, and the properties of d-linked *wh*-phrases. D-linked *wh*-phrases are likely to function as topics, but do not have to; contextual factors may identify a non-*wh*-phrase in the sentence as the topic. In the specific experiments under discussion, the target sentences always included a lexical NP subject in addition to the d-linked *wh*-phrase. Given the correlation between subjects and topichood, this created a competition for pronoun resolution, resulting in the

⁴⁹ See Zubizarreta (1998) for an alternative account of the incompatibility between topichood and focushood. Some languages exhibit morphosyntactic evidence for this incompatibility; in Tsez, for example, topic and focus marking cannot co-occur on the same item (Polinsky & Potsdam 2001).

NP subject often being chosen as the topic and hence the antecedent.⁵⁰

The difference between the informational articulation of questions involving d-linked *wh*-phrases and questions with plain *wh*-phrases is also demonstrated by data from Italian. (86) shows that in the answer to a question with a non-d-linked *wh*-phrase in Italian, the focus cannot be left-peripheral (86b). For the answer to be acceptable, either the focus must remain in situ (86c), or the background material must be elided, leaving a fragment answer (86d).

- (86) a. Che cosa ha vinto Gianni?
 what has won Gianni
- b. ??_[FOC] La maglietta ha vinto Gianni.
 the T-shirt has won Gianni
- c. (Gianni) ha vinto _[FOC] la maglietta.
 Gianni has won the T-shirt
- d. _[FOC] La maglietta.
 the T-shirt
- (Brunetti 2003:95-96)

The constraint on answers does not apply when the question involves a d-linked *wh*-expression, such as the partitive phrase in (87). According to Brunetti (2003), ellipsis is not necessary here because the postfocal material in the answer does not correspond to the ground in the question, as indicated below; rather, the d-linked *wh*-expression serves as the ground, specifically the topic. Notice, once again, that this informational articulation is not fixed, meaning that the d-linked *wh*-expression does not have to be chosen as the topic, and then ellipsis can apply. What is important for our purposes is that it can be the topic, and is preferably so.

- (87) a. Chi di voi due _[FOC] ha rotto il vaso?
 who of you two has broken the vase
- b. _[FOC] Maria ha rotto il vaso.
 Maria has broken the vase
- (Brunetti 2003:105)

Additional support for the analysis of d-linked *wh*-phrases as potential topics comes from the case studies in this dissertation, i.e. focus intervention effects and weak crossover effects. In both cases, using a d-linked *wh*-phrase instead of a non-d-linked phrase ameliorates or eliminates the effects in question. I argue that it is the topic status of the d-linked *wh*-phrase which makes the resulting sentences acceptable. To get an idea of how these phenomena are sensitive to topichood, consider the weak crossover configurations in (88).⁵¹

- (88) a. ??*Who*_i do *his* children dislike *t*_i?
- b. ?*[Which man]*_j do *his* children dislike *t*_i?
- c. ?*Who*_i do even *his* children dislike *t*_i?
- d. *[Which man]*_j do even *his* children dislike *t*_i?

⁵⁰ It is also possible that an independent subject preference for pronoun resolution (Crawley, Stevenson & Kleinman 1990) is a factor in driving the competition.

⁵¹ Italics here indicate intended anaphoric relations.

(88a) is a classic example of the weak crossover effect: the pronoun in the subject cannot be bound by the object *wh*-phrase. (88b) illustrates how replacing the plain *wh*-phrase with a d-linked *wh*-expression ameliorates the effect, an observation which has long been known in the literature (Wasow 1972, 1979, Falco 2007). (88c) shows that focusing the potential bindee in the subject, in this case via the particle *even*, also alleviates the weak crossover effect; I claim that this is because focusing the subject forces the *wh*-phrase to be the topic, even if not d-linked. Finally, in (88d) both mechanisms of d-linking and focusing are applied simultaneously, resulting in a perfectly acceptable sentence. It is necessary, of course, to spell out why and how different informational articulations influence variable binding options, and this requires an IS-sensitive approach to scope and binding. The details of such an approach are provided in chapter 4, in the context of a general treatment of weak crossover.

In addition to questions involving an overtly topic-marked *wh*-phrase and questions with a d-linked *wh*-phrase, *wh*-topics also surface in multiple *wh*-questions. Multiple *wh*-questions are by definition a challenge for any IS analysis, since they consist of two *wh*-phrases, which are normally IS foci.⁵² Assuming that a *wh*-question can contain only one IS focus (Lambrecht 1994, and see below), and that multiple *wh*-questions do not involve embedded focus-ground partitions, two possible approaches suggest themselves. On the one hand, since multiple *wh*-phrases in a question are treated as an ordered pair in the answer, one might claim that they constitute a single IS focus, which happens to be split in the syntactic structure (cf. the notion of complex focus in Krifka 1992 and discontinuous focus in Herburger 2000). This tack, pursued by Zubizarreta (1998) and Irurtzun (2006), predicts symmetry in the behavior of multiple *wh*-phrases. On the other hand, it is possible that of the two *wh*-phrases, only one is a focus, and the other is a topic; under this analysis, the two *wh*-phrases are not expected to pattern identically. The data confirm the second analysis: one of the *wh*-phrases in a multiple *wh*-question—typically the one appearing first—is a topic.

The data supporting the *wh*-topic analysis includes the following. First, the leftmost *wh*-phrase in a multiple *wh*-question usually takes widest scope, on a par with other topics (cf. Erteschik-Shir 1997), and it determines the order in which the information in the answer is sorted.⁵³ In the terms of Kuno (1982) and Kuno and Takami (1993), this *wh*-phrase serves as the "sorting key" for organizing the information, and in our terms, it corresponds to the locus of information update in the answer.⁵⁴ Thus, because the two questions in (89) and (90) differ in the *wh*-expression placed first, they also differ in the order expected of their answers; swapping the answers leads to awkward results.

- (89) a. What students did they give A's to in which subjects?
 b. They gave A's to Peter Hanson in geometry, biology, and English, to Mary Murphy in history and music,...

⁵² For the sake of simplicity, I only discuss questions, though the same challenge is posed by answers to multiple *wh*-questions, and I limit myself to *wh*-questions with two *wh*-phrases. In addition, I do not address multiple *wh*-questions which do not ask for a list answer (e.g. *Who hit whom?*), known as incriminatory or concealed alternative questions (cf. Kitagawa et al. 2004)

⁵³ Although the *wh*-topic is typically the leftmost *wh*-phrase, Willis (2008) shows that this is not necessarily the case. It thus falls in line with non-*wh*-topics, which are usually, but not always, sentence-initial.

⁵⁴ Kuno (1982) explicitly rejects the view that his "sorting key" is the topic of the question. However, his position is based on the incorrect assumption that indefinites, including *wh*-expressions, cannot be topics (see Reinhart 1981 and Erteschik-Shir 1986, 1997, 2007 on specific indefinites as topics).

- (90) a. In which subjects did they give A's to what students?
 b. In geometry, they gave A's to Peter Hanson, Martha Mooney, and Dave Isenberg, in history to Mary Murphy and Alice Jamison,... (Kuno 1982:140)

The import of the initial *wh*-phrase is similarly demonstrated in (91): (91a) is a felicitous question, while (91b) is not, because national flags are a natural sorting key for organizing information, but their colors are not.

- (91) a. Which national flags use which colors?
 b. ??Which colors are used in which national flags? (Kuno 1982:142)

In addition, the leftmost *wh*-phrase in a multiple *wh*-question is unique among *wh*-phrases, and akin to non-*wh*-topics, in that it is necessarily d-linked: potential answers must come from a context-given reference set (Bolinger 1978). This is demonstrated in the multiple *wh*-questions in (92) vs. (93), inspired by Comorovski (1996): the question beginning with *who* in (92) is infelicitous because the potential answer set for *who* is not provided in the preceding sentence, whereas the non-initial *wh*-phrase *what* is not restricted in the same manner (93). This finding decisively refutes the idea of Zubizarreta (1998) and Irurtzun (2006), according to whom multiple *wh*-phrases are a type of complex focus.

- (92) a. I just received a couple of gifts.
 b. #Who gave you what?
 (93) a. My family was very generous with me.
 b. Who gave you what?

A final observation corroborating the *wh*-topic analysis of multiple *wh*-questions is the fact that their interpretation is sensitive to the topic status of the leftmost *wh*-phrase. That is, a pair-list (PL) reading of a multiple *wh*-question is licensed only if this *wh*-phrase is a topic (Kitagawa et al. 2004, Willis 2008). There are two ways to show that the topic status is crucial for this reading. First, modifying the initial *wh*-phrase with an expression indicating ignorance on the part of the speaker eliminates the PL reading, as illustrated with the Japanese expression *ittai* in (94) and the Hungarian equivalent of English *wh-the-hell* in (95).^{55,56} The Japanese example in (94b) is infelicitous because the embedding verb requires the unavailable PL reading, while '#' in (95b) indicates the lack of a PL reading for the Hungarian question. (94a) and (95a) have this reading because the second *wh*-phrase, though a *wh-the-hell* phrase, does not figure in the derivation of the PL reading.

⁵⁵ '/' in (94b) indicates a short intonation break, meant to avoid letting *ittai* take scope over the entire embedded CP.

⁵⁶ This is also true of the corresponding expression *wh-the-hell* in English (cf. den Dikken and Giannakidou 2002):

- (i) a. Who the hell ate what?
 b. John ate the mashed potatoes.
 c. #John ate the mashed potatoes, Mary ate the casserole, and Sue ate the rice.

- (94) a. kinoo-no paatii-de dono okyaku-ga
 yesterday's party-at which guest-NOM
 [ittai dono ryoori-o] motte-kita ka risuto-ni-site kudasai.
 ITTAI which dish-ACC bring-came Q list-DAT-do please
 'Please make a list of which guest brought which dish (ittai) at yesterday's party.'
- b. #kinoo-no paatii-de [ittai dono okyaku-ga] //
 yesterday's party-at ITTAI which guest-NOM
 dono ryoori-o motte-kita ka risuto-ni-site kudasai.
 which dish-ACC bring-came Q list-DAT-do please
 'Please make a list of which guest (ittai) brought which dish at yesterday's party.'
 (Kitagawa et al. 2004:220)

- (95) a. Ki mi a fenét vett?
 who what the hell.ACC bought
 'Who bought what the hell?'
- b. #Ki a fene mi vett?
 who the hell what.ACC bought (den Dikken & Giannakidou 2002:53)

Ignorance is incompatible with topichood, since by using a topic the speaker points to a specific address in his knowledge store or that of his hearer. Another way of precluding the initial *wh*-phrase from being a topic is by clefting it. The same expression cannot be both a topic and a focus, as observed above; clefted phrases are foci by virtue of their position and hence not available as topics. The result of clefting is as expected: in a language in which clefting a multiple *wh*-question is possible to begin with, such as Japanese, clefted multiple *wh*-questions lack a PL reading. Thus, (96b) is infelicitous under a list verb which demands such a reading, unlike its non-clefted counterpart (96a).

- (96) a. Ken-ga dono-peepaa-o dono-zyaanaru-ni okutta-ka
 Ken-NOM which-paper-ACC which-journal-DAT sent-Q
 risuto-ni-site kudasai
 list-DAT-do please
 'Please make a list of which paper Ken sent to which journal.'
- b. #[Ken-ga okutta-no]-wa dono-peepaa-o dono-zyaanaru-ni-ka
 Ken-NOM sent-NML-TOP which-paper-ACC which-journal-DAT-Q
 risuto-ni-site kudasai
 list-DAT-do please
 Lit. 'Please make a list of which paper to which journal it is that Ken sent.'
 (Kitagawa et al. 2004:221)

All in all, the existence of *wh*-topics is well-motivated, corroborating the claim that *wh*-phrases are not necessarily IS foci. There are, however, two potential objections to the *wh*-topic analysis, which must be addressed before moving on. First, one might claim that what is being attributed to *wh*-phrases is not topichood per se, but rather only discourse-anaphoricity. In some of the examples above, the sole overt marking related to topichood is the use of d-linked *wh*-phrases. Like other discourse-anaphoric expressions, these elements have a strong correlation with topichood (Vermeulen 2007), but it is not perfect, contra Rizzi (1997) and Grohmann (1998). Thus, perhaps *wh*-phrases differ in whether

their potential instantiations are drawn from a constrained set given by the context, but do not actually function as topics. I argue that the relevant notion here is indeed topichood. This is shown, for example, by the unique status of the first *wh*-phrase in a multiple *wh*-question, which determines whether or not the question has a PL reading. Singling out of the first *wh*-phrase makes sense only if the PL reading is dependent on topichood, given that topics usually appear sentence-initially (Li & Thompson 1976). If the interpretation were contingent on discourse-anaphoricity, rather than topichood, it would not be expected to care about the position of the *wh*-phrase. Discourse-anaphoric phrases, unlike topics, do not have a tendency to occur sentence-initially.

In addition, if *wh*-phrases could be discourse-anaphoric but were barred from topichood, we would be at a loss to explain the lack of PL readings in Japanese clefted multiple *wh*-questions. This explanation relies on the incompatibility between topics and (cleft) foci. There is no such incompatibility in the case of d-linked *wh*-phrases, and discourse-anaphoric expressions in general, which are perfectly acceptable in clefts (cf. *Which book is it that John read?*).⁵⁷ Finally, the relevance of topichood is established by the abovementioned behavior of clitic-doubled *wh*-phrases in Bulgarian. As pointed out by Jaeger (2004), these expressions are distinct from non-topic d-linked *wh*-phrases; for example, the former are higher than the latter in the syntactic structure.

A second possible challenge to the claim that *wh*-phrases can be topics comes from their syntactic behavior in English: *wh*-phrases cannot undergo topicalization in English (97)-(98).

(97) a. Who thinks that Mary hates which problem?

b. *Who thinks that which problem_i Mary hates t_i? (Bošković 2008:254)

(98) a. Who thinks that I like who?

b. *Who thinks that who_i I like t_i? (Lasnik & Uriagereka 1988:156)

However, this is an irrelevant observation, since it only pertains to the syntactic operation of topicalization, and not to the IS category of topic. (97)-(98) are ruled out for purely syntactic reasons, probably related to the constrained applicability of topicalization in English. Indeed, topicalization in English embedded clauses is not very good to begin with, regardless of the properties of the topicalized element:

(99) ??Who thinks that John_i I like t_i?

Furthermore, this supposed restriction is language-specific: Chinese, for example, exhibits syntactic topicalization of *wh*-phrases (Wu 1996, 1999). If the English prohibition referred specifically to IS categories, this crosslinguistic variation would be unexpected, while syntactic parameterization of this sort is not surprising.

In light of the separation between semantic focus and IS focus in the case of *only*-type operators, it is unsurprising that the two notions of focus need to be distinguished with respect to *wh*-phrases as well. Some have claimed that the distinction is reflected in the phonology of *wh*-questions, at least in languages which allow prominent vs. non-prominent *wh*-phrases. Thus, according to Vallduví (1990), the *wh*-phrase is necessarily the IS focus of a *wh*-question in Catalan only if it bears the main stress, as in (100b).⁵⁸

⁵⁷ Of course, a d-linked *wh*-phrase in the pivot of a cleft question cannot function as a topic.

⁵⁸ Wunderlich (1981) makes a similar claim about English, but the data is disputable. See also Engdahl

(100) a. Qui_i VINDRÀ t_i?
 who come.FUT.3S
 'Who will come?'

b. QUI_i vindrà t_i?
 'Who will come?'

(Vallduví 1990:123)

A similar correlation between prosodic prominence and focus status in languages in which *wh*-phrases are obligatorily accented is explored in chapter 3. At any rate, the distinction between semantic focus and IS focus, which has been confirmed for both *wh*-phrases and *only*-type operators independently of prosodic evidence, will be crucial for the analyses proposed in later chapters.

2.5 Summary

This chapter is intended as the necessary background for the empirical case studies presented in the dissertation, regarding focus intervention and weak crossover effects. By describing the general model of information structure adopted here, the terms relevant to it, and the mechanics of how it works in particular examples, I hope to have made it possible for the reader to follow the case studies and grasp their theoretical import. Inevitably, this chapter also tackled a number of controversies in the literature, arguing that only a particular perspective in each case accords with the data introduced in subsequent chapters.

To sum up this chapter, in (101)-(104) I reiterate the IS constraints which have been mentioned in passing, delimiting the properties of IS categories, the mapping to these categories, and the general makeup of IS articulations. These constraints are central not only to the specific analyses put forward, but also to the more general approach, whereby there exists an autonomous IS level of representation. Insofar as they are theoretically sound, empirically supported, and cannot be reduced to other well-formedness conditions, the constraints contest alternative approaches to IS.

(101) Aboutness topics must be referential.

(102) Tails must lack prosodic prominence.

(103) Prenuclear subjects resist serving as (part of) the tail.

(104) A clause contains one and only one IS focus.

The first constraint, which was touched upon in section 2.2, is posited *inter alia* in Lambrecht (1994) and É. Kiss (2002), and arises out of the theory of topics put forward in Reinhart (1981) and adopted here. Topics denote an individual or set of individuals, and must therefore be represented by a referring expression.^{59,60} Under the conception of

(2006) for examples of stressed *wh*-phrases in English that are not related to the focus vs. non-focus distinction.

⁵⁹ This constraint refers only to aboutness topics of the type discussed here, and not to contrastive topics. See Endriss (2009) for data from German syntactic topic marking which distinguishes between aboutness and contrastive topics, allowing certain quantificational expressions to be topics of the latter type but not the former.

⁶⁰ *Wh*-phrases are not excluded as topics, on a par with other specific indefinites (see fn. 54), insofar as the members of their restrictor set are identifiable and can thus serve as a discourse referent.

topics as mental addresses (Vallduví 1990), non-referential items cannot be topics since they can neither create nor activate an address in the hearer's knowledge store. Empirical evidence for the constraint is provided by various languages which morphosyntactically mark topics: non-referential expressions in these languages are incompatible with topic marking. This includes Hungarian, where non-referential expressions cannot occupy the designated topic position (Szabolcsi 1997, É. Kiss 2002), Japanese, Korean, and Tsez, where analogous expressions cannot take morphological topic marking (Polinsky & Potsdam 2001, Tomioka 2007b), and Spanish and Catalan, in which left-dislocation of non-referential expressions derives ungrammaticality. I illustrate this with an example involving left-dislocation of a negative quantifier in Spanish (105).

- (105) *A nadie, Juan lo conoció.
 to nobody John him met
 'Nobody, John met him.'

(Laia Mayol, p.c.)

As we will see in chapter 3, the class of non-referential items crucially includes phrases involving *only*-type operators, allowing us to explain the phenomenon of focus intervention. That is, placing an *only*-phrase in a sentence where it can only function as a topic renders the sentence unacceptable.

The second constraint on IS categories is a defining property of tails, as noted in section 2.2. It is particularly noticeable in languages which structurally mark their tails. In Catalan, for instance, prosodic prominence is fixed on the clause-final position of the core IP; elements normally surfacing in this position must be removed from it and right-adjoined to IP, avoiding prominence, if they are to serve as tails (Vallduví 1990). Phonetic studies have borne out this phonological characteristic of tails: right-dislocated tails in Bulgarian (Avgustinova & Andreeva 1999) and Catalan (Astruc 2004) have a low and flat pitch contour. In a language like English, which often marks IS labels via prosody alone, this requirement on tails can be demonstrated in a question-answer pair: in (106) the tail *Mary* in the answer must be phonologically reduced.

- (106) a. What about John? What did HE do for Mary?
 b. [_{TOP} John] [_{FOC} baked a CAKE] for Mary.
 c. #[_{TOP} John] [_{FOC} baked a CAKE] for MARY.

The import of the constraint in (102) is also borne out in focus intervention effects, across a wide variety of languages: placing an element which is normally prominent in a position where deaccenting applies yields a change in the status of these effects. This, I argue, is because removal of the prosodic prominence allows the element to be (part of) the tail.

The third condition, although reflected in the possible arrangements of IS categories in English presented in table 1, is difficult to directly demonstrate in English. Because the language only has a prenuclear subject position, the existence of subject tails cannot be illustrated and compared to subjects filling other IS roles. However, examples of subject tails are available in other languages, such as Catalan and Italian, where subjects can be placed in a postnuclear position. This is typically a right-dislocated position; the fact that subject tails must occur there confirms the validity of the constraint in (103). The constraint cannot be reduced to the obligatory absence of intonational prominence on tails (102), since it applies regardless of the prosodic status of the subject. Like the other constraints, it plays a part in intervention effects because it restricts the IS categories

available in particular sentences, when the subject is prenuclear. As expected, modifying the structure so as to make the subject postnuclear has an effect on the well-formedness of the sentence.

The fourth and final constraint, also proposed in Lambrecht (1994), can be divided into two parts, both of which were briefly addressed above. First, the claim that every clause must have a focus is uncontroversial, since the focus is, after all, the motivation for the utterance (see Vallduví 1990, Lambrecht 1994, Erteschik-Shir 1997, 2007, and Zubizarreta 1998). The second part of the constraint—that focus is unique—has been theoretically justified in different ways. Rizzi (1997) and Zubizarreta (1998), for example, state that a sentence can only have a single focus because everything outside the focus is given information, i.e. the ground, and therefore cannot contain a focus, which is not given by definition.⁶¹ This reasoning relies on the assumption that recursive focus-ground partitions do not exist, which I have adopted here.

Another explanation for the uniqueness of focus is provided by Lambrecht (1994). According to Lambrecht, a proposition cannot contain more than one focus because it cannot express more than one assertion, and this assertion necessarily contributes one piece of information, that is, one focus. To support his claim, Lambrecht presents two observations: (i) a sentence cannot be clefted twice (107), and (ii) a multiple *wh*-question cannot contain a cleft (108). These sentences are said to be ruled out because they include an IS focus in addition to the first IS focus created by clefting.

(107) *It is YOUR foot that it is HE that treads on. (Lambrecht 1994:329)

(108) *C'est qui qui a mangé quoi?
 it.is who who has eaten what
 'Who is it that has eaten what?' (Lambrecht 1994:330)

However, both examples constitute rather weak evidence. The ungrammaticality of the first seems to reflect a syntactic problem: any movement out of a cleft derives ungrammaticality, including topicalization (109) and relativization (110).

(109) *Your foot, it is HE that treads on.

(110) *The foot that it is HE that treads on is YOURS. (Dryer 2003:12)

The problem with clefted multiple *wh*-questions has been noted previously in the literature and given explanations different from Lambrecht's; see Hirschbühler (1985) for a semantic account and Erteschik-Shir (1986) for an alternative IS account. An additional explanation suggests itself based on an observation made above: perhaps clefted multiple *wh*-questions like (108) are impossible because the *wh*-phrase ends up in the presupposed portion of the cleft. Unfortunately, we cannot test this explanation separately from Lambrecht's idea appealing to the uniqueness of focus, since a cleft includes a fixed focus (the pivot) by definition. In any case, the two potential explanations are relevant only if both *wh*-phrases are IS foci, which, given the discussion above, does not necessarily have to be the case; support for the uniqueness of focus should therefore be sought elsewhere.

⁶¹ These authors invoke the sentence, rather than the clause, in discussing where focus uniqueness applies. It is an open question whether there is true crosslinguistic variation in this regard, or this inconsistency simply reflects imprecision in defining the generalization.

Leaving Lambrecht's data aside, there exist two forms of empirical evidence for the uniqueness of focus. One is based on morphosyntactic data: many languages prohibit multiple focus-marked elements. This is illustrated in the ungrammatical Tsakhur sentence in (111), where the two foci, *fāt'imat* 'Fatimat' and *mašina-ka* 'by car', are marked by auxiliaries.

- (111) **rasul fāt'imat-o=r mašina-ka wo=r a=r=īnGaI ark'in.*
 Rasul.1 Fatimat.2-AUX=2 car-COMIT AUX=2 2=come-TEMP 1.leave.PER
 'Rasul left after [_{FOC} Fatimat] came [_{FOC} by car].'
 (Kazenin 2001:62)

A second kind of evidence is more direct, in that it does not hinge on the morphosyntax: sentences which seem at first glance to include multiple IS foci turn out under scrutiny to adhere to the constraint in (104); i.e. they contain just one IS focus. Consider three such candidates for multiple foci. First, recall from section 2.4 the claim that multiple *wh*-questions (and their answers) do not consist of multiple foci, but rather one *wh*-phrase serving as the focus and the other as a topic.⁶² Second, multiple elements associated with a single *only*-type operator, as in (112), amount to a single focus in semantic and IS terms, which Krifka (1992) labels a complex focus.

- (112) John only introduced BILL to SUE.

Continuing with structures which might be expected to contain multiple IS foci, a third type involves multiple operators like *only* associated with different elements, i.e. multiple semantic foci.⁶³ I claim that these "true multiple foci", as Krifka calls them, are actually multiple foci in the semantic sense alone, since only one of the semantic foci serves as the IS focus, while the rest are in the ground. A typical example of this sort of structure is given in (113b): although often presented as if both semantic foci—*John* and *water*—are IS foci and thus prosodically prominent (cf. Krifka 1992:21), contexts in which such a sentence is felicitous (113a) force one of the semantic foci to be backgrounded. In (113b) *water* is associated with *only*, but is part of the information already given to the hearer and must therefore be phonologically reduced.⁶⁴

- (113) a. I think everyone drank only WATER.
 b. Indeed, [_{FOC} even JOHN] drank only water.

There is no context in which the two semantic foci can constitute new information and be accented. Thus, the all-focus question in (114a) allows the informational articulation in

⁶² A possible challenge for the hypothesis regarding multiple *wh*-questions is presented by analyses of languages that do not allow such questions (i.e. Italian, Somali, Berber, and Irish). These analyses typically characterize this class of languages as prohibiting multiple foci in general, unlike languages with multiple *wh*-questions, where there supposedly is no such prohibition (cf. Stoyanova 2008). While a detailed account of this phenomenon is beyond the scope of this study, at least in some cases the multiple focus explanation is unwarranted. Specifically, Berber and Irish *wh*-questions have the form of clefts, so that the ungrammaticality of multiple *wh*-questions in these languages parallels the ungrammaticality of clefted multiple *wh*-questions in languages like English or French (cf. (108)). As noted above, there is no evidence that this ungrammaticality is related to focus uniqueness; rather, it appears to derive from a ban on *wh*-phrases in the presupposed portion of a cleft. Because Berber and Irish do not provide other question formation strategies, there is no way to create a licit multiple *wh*-question in these languages.

⁶³ I thank an anonymous NLLT reviewer for calling my attention to this structure.

⁶⁴ Examples of this type are discussed further in chapter 3.

(114b), identical to (113b), but the informational articulation schematized in (114c) is virtually impossible to interpret.

(114) a. What happened?

b. [_{FOC} Even JOHN] drank only water.

c. ??[_{FOC} Even JOHN] drank [_{FOC} only WATER].

In fact, the status of a second *only*-type operator is a necessary consequence of the semantics of these operators: since the operator presupposes the content of the clause it takes scope over, it follows that the only new information in the clause is the operator itself and its associate (cf. Tomioka 2007a). If there are two such operators, one is inevitably part of the presupposed content. This is shown in (115), which spells out the meaning components of (113b)/(114b). The underlined VP, containing the second operator *only* and its associate *water*, is necessarily presupposed and hence given information.

(115) Even JOHN drank only water.

Presupposition: Someone other than John drank only water, and John was the least likely person to drink only water.

Assertion: John drank only water.

Once context, prosody, and interpretation are properly taken into account, it is possible to establish that multiple IS foci in a single sentence do not exist. I conclude that the uniqueness of focus hypothesis, and the constraint of which it is part (104), are well-motivated. This constraint, as well as the three others described here, will be revisited in the next chapter.

Chapter 3

Focus Intervention Effects

The first case study of the dissertation deals with focus intervention effects, a phenomenon that has challenged researchers since it was originally noticed in Hoji (1985). Contra the prevailing view in the literature, which attempts to reduce this phenomenon to syntactic or semantic factors, I endorse the claim that intervention effects are information structural in nature, deriving from failure to map a sentence onto a well-formed IS representation. Accordingly, they not only corroborate the existence of IS representations, guided by an independent IS component in the grammar, but also allow important insight into the workings of this component.

This chapter provides a detailed analysis of focus intervention effects, with the goal of both identifying the shortcomings of syntactic and semantic approaches and laying out the IS alternative. I begin in section 3.1 by describing the basic properties of intervention effects in questions; I confine myself to questions until section 3.6, since existing analyses have focused on this environment. Section 3.2 is devoted to review these analyses in depth: syntactic and semantic analyses, as well as the IS approach espoused here. Also taken up is the analysis proposed in Romero and Han (2004a), which, although not explicitly meant as an explanation of intervention, covers part of the data at issue. The strengths and weaknesses of the various analyses are highlighted, and their predictions regarding when intervention effects will appear and when they will not are spelled out. I then proceed to test the predictions in light of a wide range of data. The data examined includes contexts in which intervention effects are ameliorated or entirely eliminated (section 3.3), different question types which diverge in their status vis-à-vis intervention effects (section 3.4), and a language, Amharic, in which intervention effects are almost completely nonexistent (section 3.5). The first type of data confirms the predictions of the IS approach and disconfirms those of the other approaches, while the second and third types of data further strengthen the case for an IS analysis. In the discussion of this data, a number of issues whose import is independent of intervention effects are brought up, such as the meaning components of questions, the syntactic structure of the Amharic clause, and the relations between the IS and phonology.

Section 3.6 presents a set of data which has not been reported in the literature until now, demonstrating that intervention effects also surface in declarative sentences. Crucially, what differentiates the unacceptable sentences exhibiting intervention effects from their acceptable counterparts is their IS articulation, determined by a preceding context, whether in the form of a question or declarative. Traditional syntactic and semantic analyses of intervention cannot explain this pattern, nor can theories of focus realization, since these kinds of theories only take into consideration syntactic, semantic, and phonological factors. Conversely, the IS approach to intervention introduced in section 3.2 extends to the declarative data, thereby providing additional support for its

viability as a general explanation of intervention. Section 3.7 concludes the chapter by summarizing its findings and addressing the implications of the IS analysis of intervention effects, particularly regarding our conception of IS, its place in the grammar, and relations with other parts of the grammar.

3.1 Introduction

Intervention in the sense intended here refers to a configuration in which a certain type of expression precedes a *wh*-phrase or a disjunctive phrase in a question.¹ This expression may be a negative polarity item (NPI), an *only*-phrase, consisting of *only*, *even*, or *also* and its associate, or a quantifier. In the case of *wh*-questions, such a configuration results in judgments of degradedness across a wide range of unrelated languages. This is illustrated in (116a) for an *only*-phrase in Korean, and in (117a) for an NPI in Japanese; the *only*-phrase and NPI in these examples are labeled "interveners". (116b) and (117b) show that the questions become acceptable if the *wh*-phrase is scrambled over the intervener.

- (116) a. *Minsu-man nuku-lûl po-ass-ni?
 Minsu-only who-ACC see-PAST-Q
 b. nuku-lûl Minsu-man po-ass-ni?
 who-ACC Minsu-only see-PAST-Q
 'Who did only Minsu see?' (Beck 2006:3)

- (117) a. ?*daremo nani-o yom-ana-katta-no?
 anyone what-ACC read-NEG-PAST-Q
 b. nani-o daremo yom-ana-katta-no?
 what-ACC anyone read-NEG-PAST-Q
 'What did no one read?' (Tomioka 2007b:1571)

In questions involving a disjunction, intervention effects are manifested in the absence of an alternative question reading for the sentence, rather than degradedness as in *wh*-questions (Beck & Kim 2006). Thus, in (118), the intervener *only John* preceding a disjunctive phrase in English leaves the question with just a yes/no interpretation, allowing it to be answered as in (b), but not (a).

- (118) Does only John like Mary or Susan?
 a. #Mary. [*AltQ]
 b. Yes. [✓Yes/NoQ]

Although these patterns have been discussed at length in the theoretical literature, the issue of what underlies them has yet to be resolved.² The fact that a change in word order eliminates intervention effects does not entail that they are syntactic in nature, nor does the loss of an interpretation, as in questions with a disjunction, necessarily mean that we are dealing with a semantic effect. This is particularly true of the examples given in

¹ As noted above, I first deal exclusively with intervention effects in questions; declaratives are taken up in section 3.6.

² See Aoun and Li (2003), Beck (1996, 2006), Beck and Kim (1997, 2006), Choi (2007), Grohmann (2006), Hagstrom (1998, 2007), Hamlaoui (2007), Hoji (1985), Hwang (2008), Kim (2002, 2005), Lipták (2001), Pesetsky (2000), Shields (2008), Simpson and Bhattacharya (2003), Szabolcsi (2006), Takahashi (1990), Tanaka (1997, 2003), Tomioka (2007a,b, 2009), and Zubizarreta (2003).

(116)-(118), since what they have in common is related to the notion of focus, which involves not only the syntax and semantics, but also the prosody and IS, as discussed in chapter 2. It is not obvious what aspect of focushood in the intervener and/or the *wh*-phrase/disjunction brings about the attested deviance in these examples. Is this due to the syntactic position of the intervener qua focus? Its semantic properties? Perhaps the IS focus status of the *wh*-phrase/disjunction? The questions this case raises, regarding where to locate deviance, have been around since the earliest work in generative grammar:

"We may make an intuitive judgment that some linguistic expression is odd or deviant. But we cannot in general know, pretheoretically, whether this deviance is a matter of syntax, semantics, pragmatics, belief, memory limitations, style, etc." (Chomsky 1977:4)

Nevertheless, there are two facts all analyses of intervention agree on and must therefore account for, and it is important to present these before moving on to the ways in which existing approaches differ. First, as noted in Beck (2006), intervention effects seem to be universal, occurring in languages as diverse as Asante Twi, Bangla, Dutch, English, French, German, Hindi-Urdu, Hungarian, Japanese, Korean, Malayalam, Mandarin Chinese, Passamaquoddy, Persian, Thai, and Turkish (Kim 2002, Simpson & Bhattacharya 2003, Beck 2006, Beck & Kim 2006, Kobele & Torrence 2006).³ Thus, they clearly reflect a basic property of the grammar, and must be explained with this in mind. Second, though the set of expressions which constitute interveners differs to some extent from language to language, there is a core group of elements which trigger intervention effects in a wide range of languages, and which produce the most robust effects across speakers and languages. These intervention triggers are identified by Kim (2002) and Beck (2006) as the operators corresponding to English *only*, *even*, and *also*, as well as NPIs.⁴ Interestingly, these expressions are among those which Beaver and Clark (2008) classify as conventionally associating with focus; that is, their focus-sensitivity is said to be part of their lexical meaning, and they must have a focused—i.e. prosodically prominent—constituent in their scope.⁵ Expressions which are crosslinguistically less stable as interveners, such as quantificational adverbs and determiners, are not conventionally focus-sensitive according to Beaver and Clark, and thus do not require overt phonological material in their scope with which they can associate. I return to this distinction in section 3.2.2.

Taking these observations into consideration, and the fact that intervention effects disappear when the *wh*-phrase precedes the intervener, existing analyses have attempted to reduce the effects to independently motivated properties of the grammar. A majority of these analyses have been syntactic, typically arguing that interveners interfere with the

³ We will see in section 3.5 that Amharic generally lacks intervention effects. However, their absence stems from the same factors which make intervention effects otherwise so pervasive; moreover, even Amharic seems to exhibit a restricted set of such effects.

⁴ It would be misleading to follow existing syntactic and semantic approaches to intervention in labeling the operators alone "intervenors". Rather, as will become clear in the course of this chapter, the intervener is the phrase consisting of the operator and its associate; accordingly, the operator by itself is termed an "intervention trigger".

⁵ NPIs are known to be focus-sensitive (Tomioka 2007b). Although Beaver and Clark do not mention NPIs, one could classify them as conventionally associating with focus in Beaver and Clark's system if they consist of an *only*-type operator like *even* and an indefinite (as in Hindi; see Lahiri 1998).

relation between C^0 and the *wh*-phrase (Beck 1996, Hagstrom 1998, 2007, Pesetsky 2000, a.o.). Given theoretical and empirical problems with purely syntactic accounts, recent work has suggested an alternative explanation, whereby it is the process of semantic interpretation which breaks down in intervention configurations (Beck 2006). Although these two classes of approaches differ in many ways, they share a number of basic assumptions; for example, that the relevant configurations are to be identified in the hierarchical structure, and that their status should not be affected by the context. A major departure from these approaches is proposed in Tomioka (2007a,b), according to whom intervention effects result from failure to map a sentence onto a well-formed IS representation, due to incompatibility between certain elements of the sentence and the IS categories available to them. These elements—interveners—can nonetheless be accommodated in *wh*-questions by placing the *wh*-phrase before the intervener, because this changes the way the question is partitioned into IS categories, which is reflected in its prosody.

This chapter challenges the prevailing syntactic and semantic class of analyses using several types of data, which include the components associated with intervention effects—an *only*-phrase preceding a *wh*-phrase or disjunctive phrase—and yet are judged as acceptable. Since their syntactic structure and semantics are either identical to corresponding structures which exhibit intervention effects, or different in irrelevant ways, it is unclear how a syntactic or semantic analysis could explain the data. However, these examples are expected under an IS approach, because it is precisely their division into IS categories which distinguishes them from degraded sentences. Furthermore, in cases where a syntactic or semantic analysis could also claim to predict the absence of intervention effects, we will see that the IS approach is nonetheless preferable. Unlike other analyses, this approach manages to connect the findings to independently supported claims regarding the pragmatic status of the examples in question, establishing a coherent and comprehensive explanation for a wide range of data.

3.2 Existing Analyses

3.2.1 Syntactic and Semantic Theories

Focus intervention effects were initially treated as syntactic in nature. In the first detailed account of this phenomenon, Beck (1996) argued that they reflect a constraint on movement at LF: interveners block the covert movement of in situ *wh*-phrases, preventing them from reaching their licensing position in SpecCP, while overt movement is not constrained in this way. Beck's approach is viable as long as it is assumed that in situ *wh*-phrases necessarily undergo movement at LF (Huang 1982). However, this assumption has been abandoned in more recent work, and a number of mechanisms for interpreting a *wh*-phrase without movement have been proposed, including unselective binding (Pesetsky 1987, Tsai 1994, Cole & Hermon 1998) and quantification over choice functions (Reinhart 1998). Moreover, even if in situ *wh*-phrases did move, the claim that LF movement could be more constrained than overt movement is questionable. Theoretical considerations and empirical evidence suggest that LF movement is *less* restricted than overt movement (Huang 1982), or that the same restrictions hold of both (Chomsky 1993, *the Uniformity Condition* of Hornstein, Nunes and Grohmann 2005). A final problem with this analysis, shared by many other syntactic theories, is that it does not provide a clear definition for the set of interveners.

Pesetsky (2000) provides an alternative syntactic analysis, within a framework which assumes three types of movement: overt phrasal movement, covert phrasal movement, and feature movement. Intervention effects are claimed to indicate feature movement, as opposed to covert phrasal movement. The former separates the restriction on *wh*-quantification, which remains in situ, from the quantifier (i.e. the *wh*-phrase) in SpecCP, creating an intervention effect when a scope-bearing element appears between the two. Since Pesetsky links each type of movement to a number of properties, his theory makes clear predictions regarding phenomena that should correlate with the presence and absence of intervention effects. These are summarized in table 2.

Feature Movement	Covert Phrasal Movement
– Doesn't license Antecedent Contained Deletion (ACD)	– Licenses ACD
– No Superiority effects	– Superiority effects
– Intervention effects	– No intervention effects
– No Subjacency effects	– Subjacency effects
– Obeys Attract Closest	– Obeys Attract Closest

Table 2: Properties of Feature Movement vs. LF Phrasal Movement (Pesetsky 2000)

Beyond conceptual difficulties pertaining specifically to this analysis, such as the use of the notion of covert phrasal movement from the pre-Minimalist era (see Mathieu 2002, Grohmann 2006), most of the problems with Pesetsky's theory are common to all syntactic approaches, and will therefore be addressed below.

Other syntactic accounts appeal to a variety of factors. Lipták (2001), for example, views intervention effects as blocking of feature movement, specifically arguing that various adverbs in Hungarian block movement of the [+wh] feature of a *wh*-phrase to the C^0 probe, and hence prevent the uninterpretable [+wh] feature of C^0 from being checked. However, it is not clear why adverbs like *mindig* 'always' block this type of feature movement, given that they do not share relevant features with either the probe or the target. Similarly, Kim (2005) construes intervention effects as Relativized Minimality effects (Rizzi 1990), in which a focus operator with an interpretable focus feature blocks the Agree relation between C^0 and the *wh*-phrase. Again, it is difficult to establish that C^0 , the focus operator, and the *wh*-phrase necessarily have a feature in common. Tanaka (1997, 2003) goes in a different direction, maintaining that intervention effects arise from the violation of a linear constraint which bans crossing A'-dependencies.

All of the syntactic analyses suffer from a range of problems. First, they generally apply only to a subset of the data; Pesetsky (op. cit.), for example, is specifically geared for *wh*-questions. Second, as remarked above, the assumption made by many syntactic analyses, whereby the *wh*-phrase or a feature associated with it needs to be above the intervener at some point in the derivation, is unwarranted. It is also unclear how to extend a movement-based account to questions with a disjunction, as Beck and Kim (2006) note, because they show no evidence of obligatory movement, neither overt nor covert. Third, it remains a mystery under syntactic theories why the patterns observed differ from those triggered by other well-known syntactic constraints, such as Subjacency: in the case at hand, only covert movement is proscribed. Fourth, syntactic analyses either avoid defining the class of interveners or provide a definition which is essentially semantic.

Given these problems, Beck (2006) proposes a semantic theory of intervention in *wh*-

questions, which does not hinge on the assumption that the *wh*-phrase moves. Rather, what is crucial for Beck is the semantic interpretation of the *wh*-phrase, which is short-circuited due to the semantic content of the intervener. The account works as follows. Interveners are the set of operators which can have focus-affected readings, that is, those that come with the focus operator \sim in the sense of Rooth (1992). In the general case, when the operator \sim applies to its sister, it resets the focus semantic value of the c-commanding node to its ordinary semantic value, and the semantic computation proceeds along the tree. *Wh*-phrases are similar to focused phrases in that they introduce alternatives into the computation (i.e. the set of answers to the question; Hamblin 1973), but unlike focused phrases, their ordinary semantic value is undefined. Thus, when \sim applies to a complement containing a *wh*-phrase, the result is undefined, and this undefinedness is inherited by the larger structures in the course of the semantic derivation. Ultimately, the entire question ends up undefined, since the licensing question (Q) operator in C^0 requires a focus semantic value as its argument. A structure with an undefined semantic value is uninterpretable, and hence, according to Beck, ungrammatical. In order to be interpreted, *wh*-phrases demand the Q operator, which uses the focus semantic value of its sister and outputs it as the ordinary semantics of the question.

Beck's semantic theory has a couple of advantages over syntactic accounts. First, it uniquely defines the set of interveners by appealing to their semantic properties. Second, the semantic theory easily extends to questions with a disjunction, which lose their alternative question reading when an intervener precedes the disjunction. The logic, presented in Beck and Kim (2006), is the same as in the case of *wh*-questions: the alternatives introduced by the disjunctive phrase need to be evaluated by the question operator, but the \sim operator associated with the intervener gets in the way. The yes/no reading is not affected since it does not involve alternatives at the relevant stage of the semantic computation.

In order to allow a comparison of the semantic theory with the IS approach, which we turn to next, it is worth considering a number of predictions the former generates. First, we expect intervention effects to be immune to contextual influences. If a sentence violates a semantic or syntactic well-formedness condition, it should not improve given a change in context. This is a definitional property of semantic and syntactic phenomena, and it specifically applies to intervention effects under Beck's semantic approach, where the focus-sensitivity of a given item—the trigger for the effects—is considered invariant. That is, the focus Beck has in mind is the context-insensitive notion of semantic focus described in section 2.3.

A second prediction of the semantic theory is that the presence vs. absence of intervention effects depends on the hierarchical structure, since this is where both syntactic and semantic relations are encoded. Specifically, if the intervener does not c-command the *wh*-phrase or disjunction, no intervention effects should arise. Lastly, according to the semantic theory, a *wh*-phrase cannot be evaluated by an *only*-type operator (or focus operator, in Beck's terms): this is precisely the configuration that creates an intervention effect. If a *wh*-phrase seems to be c-commanded by an *only*-type operator and yet the result is acceptable, there must be a mechanism which removes the *wh*-phrase from the scope of the operator at LF. This mechanism should not be related to focus association, since the latter plays no role in the semantic theory; recall that in the

typical examples of intervention, the *only*-type operator is associated with the subject of the sentence and yet is said to evaluate the *wh*-phrase. Following this line of reasoning, we can think of a pattern which is unexpected and inexplicable for the semantic theory; namely, one in which intervention effects do not occur specifically when the *only*-type operator is associated with the *wh*-phrase.

Although these predictions have been formulated as stemming from the semantic approach to intervention, they are similarly derived by syntactic accounts. Hierarchical relations and insensitivity to context are necessarily part of any syntactic or semantic approach; therefore, establishing that they do not figure in intervention effects creates a major obstacle for such approaches. The assumption that intervention is not related to focus association is also a characteristic of syntactic accounts, since their concern is usually the licensing of the *wh*-phrase. Whether or not the *wh*-phrase is associated with an *only*-type operator is orthogonal to its licensing. Below I show that the syntactic/semantic predictions are refuted by data from English and other languages; this data is compatible only with the IS approach. In addition, cases where a syntactic or semantic analysis has been proposed or is at least conceivable also favor an IS explanation.

3.2.2 An Information Structural Approach

A general critique of syntactic and semantic approaches to intervention effects is given in Tomioka (2007a,b). The critique is grounded in four observations which pose a problem for approaches of this type: (1) there is a great deal of interspeaker variability in judging intervention configurations; (2) there exist intraspeaker distinctions in the acceptability of configurations involving different interveners: in Japanese and Korean, NPIs always lead to the greatest degree of unacceptability, while other interveners vary in their degradedness; (3) some quantificational NPs do not give rise to intervention effects (e.g. Japanese *subete*-/zenbu-no-NP, Korean *motun*-NP both 'all (the) NP'), while Japanese nominative-marked subjects (as opposed to topic-marked subjects) unexpectedly constitute interveners; (4) intervention effects are much weaker when the intervener is an embedded subject and when it is not a subject, at least in Japanese and Korean. All four observations can be satisfactorily explained, Tomioka argues, under an IS analysis.

According to Tomioka, intervention effects reflect a mismatch between two things: on the one hand, properties of elements of the sentence which IS is sensitive to, and on the other hand, the IS categories which these elements can be mapped onto. While I adopt this IS explanation of intervention effects, the specifics of the explanation are revised and/or clarified here, in accordance with the fully developed and independently supported model of IS described in chapter 2. Recall that the informational articulation is composed of three primitives—focus, topic, and tail—as exemplified in (119b), where *John* is the topic, the verb is the prosodically prominent focus, and *Mary* serves as the tail.

- (119) a. What about John? What did HE do to Mary? (=17)
 b. [TOP John] [FOC INSULTED] Mary.

The articulation in (119b) instructs the hearer to go to the address *John* in his knowledge store and substitute the new information *insulted* for V in the record '*John V Mary*', which is under the address *John*.

Wh-questions, which until now have been the center of attention in research on intervention effects, consist of the same IS categories as declaratives. The *wh*-phrase, however, is defined as the IS focus by default; this is illustrated in (120), where the book given as the answer will replace *x* in the record '*John read x for the book report*', stored under the address *John*.

(120) [_{FOC} What] did [_{TOP} John] read for the book report? (=80)

Section 2.4 provided a detailed defense of this conception of the IS articulation of *wh*-questions. It was also noted that there are certain environments in which the *wh*-phrase is not the focus; below we will see how the IS status of the *wh*-phrase figures in intervention effects, and how it is subject to crosslinguistic parameterization, which is reflected in its prosody.

Having in hand our model of the informational articulation of declaratives and *wh*-questions, it is possible to explain what goes wrong when a phrase associated with an *only*-type operator or an NPI appears in such structures. This phrase needs to fit in the informational articulation, as an IS focus, topic, or tail, but it cannot do so, thus becoming an "intervener". Let us consider each IS category in turn, and see why it is not compatible with the intervener; this exposition greatly expands on the original IS analysis of intervention presented in Tomioka (2007a,b).

First, the status of the *wh*-phrase in a *wh*-question as the IS focus forces the remainder of the question to occupy the ground, meaning that the intervener cannot be a focus. This follows from the IS well-formedness constraint in (121), repeated from section 2.5.

(121) A clause contains one and only one IS focus. (=104)

The restriction to one focus per clause is particularly relevant for elements that are likely to function as IS foci, because they are expected to compete, so to speak, with the *wh*-phrase for the status of focus. This, I claim, is precisely what characterizes associates of the core set of intervention triggers, *only*, *even*, *also*, as well as NPIs.

A few words on the classification of the core set of intervention triggers are in order. In section 2.3 we concluded that semantic foci need to be distinguished from IS foci, so that the associate of *only*, for example, is not necessarily the IS focus of the sentence. This led us to renounce semantic theories of focus, which conflate the semantic and IS categories of focus, as well as the approach of Beaver and Clark (2008), who maintain this conflation for *only*, *even*, and *also* (in addition to other expressions which are not relevant here). At the same time, it is true that the associates of *only*-type operators and NPIs tend to function as IS foci, for reasons related to their use in discourse, as outlined in section 2.3.⁶ As a result, they are usually prosodically prominent, while this is not as likely with other expressions. Speakers will treat *only*-phrases and NPIs this way when asked to judge sentences out of context, even in silent reading. Thus, the distinction Beaver and Clark attribute to *only*, *even*, and *also* is a real one, with ramifications for intervention effects. This is not, however, a grammaticized distinction, as Beaver and

⁶ It is possible that NPIs do not pattern monolithically in terms of their IS status, and hence as interveners, given that categorization as an NPI is based on distribution, rather than IS-related properties. Nevertheless, the NPIs of the languages which are most often discussed in the context of intervention effects, Japanese and Korean, as well as Hindi, Malayalam, and Chinese, include an *only*-type operator (see fn. 5); assuming a compositional interpretation, it is expected that they would behave on a par with *only*-phrases in terms of IS. This is corroborated by the phonological properties of NPIs in Japanese (see Ishihara 2007).

Clark maintain, meaning that even associates of *only*-type operators and NPIs need not be IS foci under particular circumstances; as we will see below, under such circumstances they also do not function as interveners.

At this point, it is necessary to return to our generalization regarding the IS status of *wh*-phrases. If everything I have said thus far is correct, one predicts that English should exhibit intervention effects in *wh*-questions with *only*-phrases, since there is no room for the latter insofar as they are IS foci. To explain the fact that no such effects are found, we need to examine more closely what happens in terms of IS when an *only*-phrase surfaces in an English *wh*-question.

Although *wh*-phrases *normally* serve as the IS focus, they can be assigned to a different IS category in certain contexts. In particular, overtly topic-marked *wh*-phrases and the initial *wh*-phrase in a multiple *wh*-question function as topics, and d-linked *wh*-phrases are prone to be topics rather than foci (see section 2.4). Another situation in which the *wh*-phrase is not obligatorily the IS focus is subject to crosslinguistic variation; namely, when an *only*-phrase appears in a unary *wh*-question. I argue that in certain languages, the informational articulation of unary *wh*-questions is rigid, prohibiting anything other than the *wh*-phrase from being the IS focus, while in other languages the articulation is flexible.^{7,8} Languages with a rigid informational articulation of *wh*-questions include Japanese and Korean, whereas English is an example of a language possessing a flexible articulation. In the latter type of language, an *only*-phrase can be integrated in a *wh*-question as the IS focus and avoids violation of the uniqueness of focus (121), because the *wh*-phrase may waive its IS focus status, correctly predicting that intervention effects will not appear.⁹

To establish this explanation for English, consider (122), an example of a *wh*-question including an *only*-phrase functioning as the IS focus. This sentence does not exhibit an intervention effect and is perfectly acceptable, just like the standard *wh*-question with no *only*-phrase in (123). An appropriate context for these sentences is one in which each student had to choose two books to write a book report about.

(122) [_{TOP} What] did [_{FOC} only JOHN] read for the book report?

(123) [_{FOC} What] did [_{TOP} John] read for the book report? (=80)

In (123), *John* is the topic—i.e. the address in the questioner's knowledge store—and the books provided as the answer will be stored under this address. In (122), however, *only John* is the IS focus of the sentence, while the *wh*-phrase is a topic. This question is not about John, and the book given in the response will not be entered under the address *John*.¹⁰ Rather, the question asks the hearer to partition the set of books read for the book report into the book that John alone read vs. the books which were read by other people.

⁷ The idea of a rigid IS articulation has been invoked in the literature for a variety of constructions, including specificational sentences (Mikkelsen 2009) and Pred NP structures (Paul & Stainton 2006), as well as for languages as a whole (cf. the notion of "rigid focus structure" in Van Valin 1999).

⁸ In multiple *wh*-questions the first *wh*-phrase is always a topic; whether or not the rigid vs. flexible classification applies to the second is a question I leave for future research.

⁹ The examples of alleged intervention effects in English *wh*-questions provided by Pesetsky (2000) are all multiple questions, primarily involving negation and quantificational elements, which lose their pair-list reading. They apparently do not reflect the same phenomenon as the one addressed here.

¹⁰ Assume, for the sake of simplicity, that there is one book that only John read.

The address is the specific book that only John read, and to this address is added the information that only John read the book in question.

The parameterization of the informational articulation of *wh*-questions seems to correlate with the prosodic status of *wh*-phrases in the language: in Japanese and Korean the *wh*-phrase necessarily bears prosodic prominence, and in English it does not. I hypothesize that a single property underlies the IS and phonological distinctions between these languages, namely, whether the interrogative force of *wh*-elements is inherent to them or requires a licenser. The *wh*-elements of Japanese and Korean are used as indefinites, and acquire their force—interrogative, existential, or universal—via some type of licensing mechanism (e.g. Cole & Hermon 1998); the interrogative mechanism, in turn, has certain ramifications for the IS and the phonology. English *wh*-phrases come with their force built in, and therefore do not exhibit the IS and phonological correlates of an interrogative *wh*-licenser.

To sum up, in the group of languages where intervention effects are found in *wh*-questions, the category of IS focus is not available for *only*-phrases and NPIs in this environment due to the invariant focus status of the *wh*-phrase and the uniqueness of focus. We are then left with two possible IS categories for *only*-phrases and NPIs: topic and tail. However, they are incompatible with both categories, rendering them interveners.

Only-phrases and NPIs cannot be topics due to the constraint in (124), which was corroborated independently of intervention effects in section 2.5.

(124) Aboutness topics must be referential. (=101)

This constraint is manifested in the observation that non-referential expressions in languages like Japanese, Korean, and Spanish cannot take morphosyntactic topic marking. It is obviously relevant for intervention effects only if interveners fall into the class of non-referential expressions. To empirically determine whether this is the case, we can examine if the items which give rise to intervention effects are the same items which cannot be morphosyntactically marked as topics. Indeed, they are: Tomioka (2007b) shows that this is true of Japanese and Korean, as exemplified with a number of interveners in Japanese in (125a) and their Korean equivalents in (125b). He therefore labels the class of interveners 'anti-topic items' (ATIs).¹¹

(125) a. *John-mo-wa *daremo-wa *daremo-wa¹²
 John-also-TOP anyone-TOP everyone-TOP
 b. *John-to-nun *amuto-nun *nwukwuna-nun
 John-also-TOP anyone-TOP everyone-TOP (Tomioka 2007b:1576)

Grohmann (2006) shows that downward-entailing quantifiers which trigger intervention effects in German cannot be topicalized, and in (126) I illustrate that the crosslinguistic

¹¹ Quantificational items in Japanese and Korean which allow topic marking and do not constitute interveners, mentioned at the beginning of this section (e.g. Japanese *subete-no NP-wa* 'all (the) NP-top'; see Tomioka 2007b), can in fact function as aboutness topics. The claim that certain quantificational expressions are possible topics was made already in Reinhart (1981) and is developed in Endriss (2009). Readers are referred to Tomioka (2007b) for discussion of the opposite case, i.e. Japanese nominative-marked subjects which surprisingly function as interveners.

¹² See below for the issue of quantifiers like *daremo* 'everyone' functioning as interveners.

core set of intervention triggers—*only*, *even*, and *also*—cannot be left-dislocated in Spanish.¹³

- (126) a. *Sólo a María, Juan la conoció.
 only to Mary John her met
 'Only Mary, John met her.'
- b. *Incluso a María, Juan la conoció.
 even to Mary John her met
 'Even Mary, John met her.'
- c. *También a María, Juan la conoció.
 also to Mary John her met
 'Mary also, John met her.'
- (Laia Mayol, p.c.)

We can also test the compatibility of the core class of intervention triggers with topichood in English, using the 'as-for' test (Gundel 1974) and the 'what-about' and 'said-about' tests (Reinhart 1981).¹⁴ Negative quantifiers and *only*-phrases fail these diagnostics, as shown in (127)-(130).¹⁵

- (127) a. *As for nobody, I met him.
 b. *What about nobody? I met him.
 c. *I said about nobody that I met him.
- (128) a. *As for only John, I met him.
 b. *What about only John? I met him.
 c. *I said about only John that I met him.
- (129) a. *As for even John, I met him.
 b. *What about even John? I met him.
 c. *I said about even John that I met him.
- (130) a. *As for John also/too, I met him.
 b. *What about John also/too? I met him.
 c. *I said about John also/too that I met him.

If the constraint in (124) indeed refers to aboutness or thematic topics, but not to contrastive topics, we expect intervention effects to differentiate between the two types of topics; specifically, no effect should be observed with the latter. This prediction is confirmed: as pointed out by an anonymous reviewer for NLLT, a potential intervener in Hungarian is innocuous if pronounced with contrastive topic intonation. Compare the

¹³ The fourth type of robust intervener, NPIs, are known to be non-referential (see Giannakidou 1998). This could be derivative of the fact that they are made up of an *only*-type operator and indefinite (see fn. 6) and/or are often interpreted as negative quantifiers (cf. (105) in section 2.5).

¹⁴ Although these tests fail to perfectly identify topics in a given text (Vallduví 1990), they do not yield "false positives", i.e. wrongly rule out expressions which can be topics. They thus remain reliable diagnostics for our purposes.

¹⁵ These examples must be interpreted with the operator in its surface position.

unacceptable (131a), exhibiting an intervention effect, with the acceptable (131b), where the rising tone indicated by the forward slash marks *mindenki* 'everyone' as a contrastive topic.

- (131) a. *Mindenki kit hívott meg?
 everyone who.ACC invited VM
 'Who did everyone invite?'
 b. /Mindenki kit hívott meg?
 everyone who.ACC invited VM
 'As for everyone, who did everyone invite?'

In the discussion of Amharic in section 3.5 we will encounter a similar example of a potential intervener causing no problems when treated as a contrastive topic.

The last IS category left to consider is tails. A defining property of tails, which are necessarily given material, is that they lack prosodic prominence (132).

- (132) Tails must lack prosodic prominence. (=102)

The constraint in (132) helps explain intervention effects insofar as interveners are prosodically prominent. As pointed out above, this is usually true of the class of crosslinguistically robust interveners, as a consequence of their tendency to serve as IS foci; moreover, these items are treated as prominent IS foci by default when interpreted by speakers without a context, which is how they are ordinarily tested by linguists.

The status of other expressions as interveners may vary within languages as a function of whether or not they are construed as the IS focus. Focushood for these expressions is optional, is not strongly favored as is the case with the core class of interveners, and therefore does not consistently arise in speaker judgments. Similarly, variation across languages stems from the fact that the prosody of the expressions in question differs from language to language. For example, distributive quantifiers in Hungarian bear obligatory stress (É. Kiss 2002) and constitute interveners, as shown in (131a). Conversely, the Chinese universal quantifier *meigeren* 'everyone' does not bear the main stress (Yanyan Sui, p.c.), and it is therefore not surprising that it does not cause intervention effects, as noted in Kim (2002). It is also possible that crosslinguistic variation in prosody is not connected to particular lexical expressions, but rather to language-specific constraints on prosodic contours. Thus, Tomioka (2007b) assumes that in Japanese and Korean, material to the left of IS foci, including *wh*-phrases, receives secondary stress and cannot be reduced. This would make all items preceding an IS focus in these languages incompatible with tailhood, and not just those which correspond to *only*, *even*, *also*, and NPIs. I come back to the issue of variation in intervention effects and how it is influenced by prosody below.

The IS approach to intervention, put forward in Tomioka (2007a,b) and extensively developed here, identifies expressions as interveners on the basis of their semantic and phonological properties, as well as IS properties of the sentence they are in. A number of observations mentioned above remain to be explained under this approach. First, recall that intervention configurations become fully acceptable when the *wh*-phrase is scrambled above the intervener, as in (133b).

- (133) a. *Minsu-man nuku-lûl po-ass-ni? (=116)
 Minsu-only who-ACC see-PAST-Q

- b. nuku-lûl Minsu-man po-ass-ni?
 who-ACC Minsu-only see-PAST-Q
 'Who did only Minsu see?'

As Tomioka (2007b) argues, this effect is mediated by the phonology: moving the *wh*-phrase to the left of the intervener places the latter in the phonologically reduced domain which follows IS foci, including *wh*-phrases (cf. Féry and Ishihara 2009). Therefore, the intervener is no longer in violation of (132) and can function as the tail.

Second, intervention effects also arise in questions involving a disjunction, as repeated in (134), where the intervener *only John* removes the alternative question reading.

- (134) Does only John like Mary or Susan? (=118)
 a. #Mary. [*AltQ]
 b. Yes. [✓Yes/NoQ]

This type of question, which Tomioka does not address, is amenable to the same IS explanation as *wh*-questions. In the informational articulation representing the alternative question reading, the disjunctive phrase is the fixed IS focus, akin to *wh*-phrases in Japanese and Korean.¹⁶ Given the uniqueness of focus constraint, the remainder of the sentence must be the ground. However, as in *wh*-questions, interveners cannot be topics because they are non-referential, nor are they compatible with tailhood, due to their phonological prominence. The polar reading of the question is nonetheless retained in the presence of an intervener because yes/no questions have a different articulation. Basically, they are like declaratives in that the focus is not fixed, and so the articulation is shaped by the context (cf. *Does JOHN like Mary?* vs. *Does John like MARY?*, and see also Hedberg 2007). Thus, the potential intervener can be the IS focus and the remainder can serve as the ground, averting an intervention effect. The articulations of the two readings of (134) are schematized in (135).

- (135) a. AltQ: Does [_{FOC}*TOP/*TAIL only JOHN] like [_{FOC} MARY or SUSAN]?¹⁷
 b. Yes/NoQ: Does [_{FOC} only JOHN] like [_{TOP} Mary or Susan]?

An additional set of findings, mentioned above as a problem for syntactic and semantic theories, is accounted for in Tomioka (2007b). First, NPIs are singled out among the interveners, at least in Japanese and Korean, as exhibiting the greatest degree of unacceptability. This follows from the existence of phonological restrictions on the licensing of NPIs. Because *wh*-phrases in Japanese and Korean are foci, they place an intermediate phrase boundary to their left, and hence separate a clause-initial NPI from its licenser—negation in the verbal complex—in terms of phonological phrasing. Thus, NPIs not only fail to surface in the ground portion of the sentence, like other interveners, but also violate a phonological locality condition, which states that they must be in the same intermediate phrase that includes their licenser.¹⁸ This double violation is the source of their strong unacceptability in intervention configurations.

¹⁶ Like *wh*-phrases in *wh*-in-situ languages, the disjuncts in an alternative question are obligatorily accented; removing their accents yields a yes/no question.

¹⁷ In a coordinate structure, the conjuncts are each marked in the prosody but jointly constitute a single IS category (focus in (135a) and topic in (135b)).

¹⁸ NPIs are also subject to a syntactic locality condition, requiring clausemate negation for their licensing.

A second observation which Tomioka calls attention to is that embedded subjects and non-subjects in Japanese and Korean are exceptional, in that they give rise to much weaker intervention effects than matrix subjects.¹⁹ Embedded subject interveners in Japanese are demonstrated in (136) and indirect object interveners in (137).

- (136) a. *?(?)Kimi-wa [CP daremo nani-o yom-ana-katta-to] omotteiru-no?*
 you-TOP anyone what-ACC read-NEG-PAST-C think-Q
 'What do you think that no one read?'
 b. *?(?)Kimi-wa [CP John-sika nani-o yom-ana-katta-to] omotteiru-no?*
 you-TOP John-except what-ACC read-NEG-PAST-C think-Q
 'What do you think that no one but John read?' (Tomioka 2007b:1573)
- (137) a. *Ken-wa Erika-ni-mo nani-o mise-ta-no?*
 Ken-TOP Erika-DAT-also what-ACC show-PAST-Q
 'What did Ken show also to Erika?'
 b. *Ken-wa Erika-ni-dake nani-o mise-ta-no?*
 Ken-TOP Erika-DAT-only what-ACC show-PAST-Q
 'What did Ken show only to Erika?' (Tomioka 2007a:105)

The improved status of sentences involving these types of interveners can be linked to IS properties as well, in particular to the IS constraint in (138), repeated from section 2.5.²⁰

- (138) Prenuclear subjects resist serving as (part of) the tail. (=103)

Because the constraint does not apply to non-subjects, the indirect objects in (137) may be treated as tails, on condition that they are not prosodically prominent. As for embedded subjects (136), there is evidence that they too can be tails, suggesting that (138) should be restricted to matrix subjects. Thus, Tomioka (2007b) points out that while matrix nominative subjects in Japanese, marked via the suffix *-ga*, are generally interpreted as IS foci, this is not true of embedded nominative subjects. Such distinctions between the IS articulation of root vs. embedded contexts lead us to expect corresponding differences in the status of interveners. Since there is no parallel semantic difference between root and embedded contexts—the intervener remains a semantic focus throughout—a semantic approach is unable to account for this pattern.

Finally, there is the issue of variation, widely reported in the literature on intervention effects: between different expressions within a given language (Beck 2006), among speakers within the language (Tomioka 2007b), and between languages for a specific intervener (Beck 2006). I claim that all three types of variation stem from properties of the expressions in question, and not from structural characteristics of the language. These are semantic properties and properties related to focus association, which the IS constraints described above are sensitive to. Of the three IS constraints—the uniqueness of focus, the referentiality condition on topics, and the requirement that tails be phonologically reduced—the second and third arguably leave room for some degree of

¹⁹ This is true for most interveners. NPIs constitute a unique class, nonetheless triggering intervention effects under these conditions, for the reason just mentioned in the body of the text.

²⁰ This constraint seems to make the phonological condition on tails redundant in accounting for intervention effects, since all the examples consist of prenuclear subject interveners. See below for why the phonological condition is nevertheless needed.

variation between and within languages.

Consider the referentiality condition: certain potential interveners allow for both a referential and a non-referential interpretation, and are thus expected to exhibit variation among speakers. This distinguishes them from expressions which only allow a non-referential interpretation, are therefore not possible topics, and, in turn, constitute invariant interveners. NPIs are expressions of the latter kind, while existential quantifiers exemplify the variable type. Existentials are interveners at least in some languages, such as Japanese (Tomioka 2007b), but seem to elicit a lesser degree of degradedness than the core set of interveners; this is putatively related to the fact that they are possible topics, provided that are understood as specific and thus designate a discourse referent. Given such an interpretation, an existential quantifier will exhibit the morphosyntactic correlates of topichood. In Hungarian, for instance, it can occupy the topic position: (139) is felicitous in a situation in which the existence of an unidentified person has been inferred, e.g. when knocking has been heard at the door (cf. É. Kiss 2002).

(139) Valaki kopog.

somebody knocks

'Somebody is knocking.'

(É. Kiss 2002:11)

The requirement that tails be phonologically reduced opens the door to variation as well. As mentioned above, this variation depends on the degree to which the intervention trigger is normally interpreted as associating with the IS focus, distinguishing between those items for which association with focus is the default option vs. those for which it is not. The former make up the core set of intervention triggers—*only*, *even*, *also*, and NPIs—because they are incompatible with tailhood in the absence of a context explicitly marking them as tails. Expressions for which association with the IS focus is possible but not the default (e.g. quantificational adverbs like *always* and *often*, and quantificational determiners like *most* and *few*) can abide by the phonological requirement on tails without a particular context, and therefore do not necessarily constitute intervention triggers.

Not only does the difference in properties of focus association account for the division into separate classes of intervention triggers, it also explains interspeaker variation and crosslinguistic variation. The non-core set of triggers allow association with a focused element; accordingly, if asked to judge a *wh*-question with a trigger of this sort, speaker A might interpret the question as including a focused element other than the *wh*-phrase, with which the intervention trigger is associated. He would then report the sentence as unacceptable. Speaker B might not posit a focused element, and hence find it acceptable. Since data on intervention effects has thus far been gathered through informal means, with no control of the context or the prosody intended for the sentence, such differences between speakers would not be surprising. Neither would the fact that these differences have not been properly reported. In addition, it is possible that supposedly equivalent items in different languages belong to separate classes in terms of focus association. The fact that these items are translated as corresponding to one another does not mean that their underlying properties are the same. As a result, a given item in one language could constitute a stable, robust intervener, while its assumed counterpart in another language would exhibit more variability in speaker judgments.

Although variation of different forms has been cited in syntactic and semantic studies of intervention, they are generally unable to explain this variation, or attribute it to the

syntax of the language. The explanations for variation provided here are not available under syntactic or semantic analyses, since these do not take into account notions like referentiality or prosodic prominence. The next section presents one case of variation within a language—Chinese—which is erroneously credited to the syntax by Beck (2006); this variation is actually due to the association properties of the intervener, which also distinguish Chinese from Japanese. The fact that this case reduces to properties expected under the IS approach supports the claim that other examples of variation are of a similar sort, and not related to the syntax.

To summarize the description of the IS approach, I go through the predictions it derives, corresponding to the predictions of the semantic approach presented at the end of section 3.2.1. First, the notion of focus relevant for intervention effects should be the information structural one; given that this is a context-sensitive notion by definition, intervention effects are expected to exhibit context-sensitivity. As for the issue of hierarchical relations, these should not play a role in determining whether or not intervention effects occur, since the IS constraints underlying them are not formulated in hierarchical terms. If a prosodically prominent phrase that is incompatible with topichood occurs in a *wh*-question or a question with a disjunction, the question ought to be unacceptable regardless of whether or not this phrase c-commands the *wh*-phrase/disjunction. Finally, *only*-type operators should be able to evaluate *wh*-phrases and associate with them. In fact, it is predicted that intervention effects will be absent specifically when an *only*-type operator associates with a *wh*-phrase, because then the only IS focus in the sentence is the *wh*-phrase. The uniqueness of focus constraint is not violated under such circumstances, and as long as the remaining elements of the sentence can map onto appropriate IS categories, the sentence will be acceptable. The IS predictions are listed in table 3, alongside the predictions of the semantic approach. Section 3.3 establishes that the former are all confirmed, while the latter are not.

Semantic approach	IS approach
– Semantic notion of focus	– IS notion of focus
– No context-sensitivity	– Context-sensitivity
– Sensitive to hierarchical relations	– Insensitive to hierarchical relations
– <i>Wh</i> -phrases cannot be evaluated by operator	– <i>Wh</i> -phrases can be evaluated by operator

Table 3: Predictions of the Semantic vs. IS Approaches to Intervention

3.2.3 Romero & Han (2004a)

Before moving on to the next section, where the IS approach is directly compared to syntactic and semantic analyses, I wish to briefly address a final alternative to the IS approach proposed here. Romero and Han (2004a) investigate the lack of alternative question readings when a focus precedes a disjunction in a question; although not explicitly intended as an explanation of intervention, their analysis applies to some of the data presented above. Their idea, roughly, is that alternative questions are derived through ellipsis, so that if focal material appears in the disjuncts of an alternative question it is elided. Since elision of focal material is prohibited (140), this leads to ungrammaticality.

(140) Focus Deletion Constraint (FDC): Focus marked constituents at LF (or their phonological locus) cannot delete at Spell-Out. (Romero & Han 2004a:199)

A basic illustration of how the theory works is given in (141)-(142), where an alternative question includes the verum focus associated with preposed negation in English. The sentence (141) is ungrammatical because the verum focus in the second disjunct has undergone deletion, as shown in the LF representation (142). In (142), \sim is the focus operator from Rooth (1992), C is a contextual free variable adjoining to the constituent containing the focus marking, and subscript F indicates LF focus marking.

(141) *Didn't John drink COFFEE or TEA?

(142) *Q_i t_i [C₁' [VERUM_F didn't John drink COFFEE_{F1}]-~C]~C₁
or [C₂' [~~VERUM_F didn't John drink~~ TEA_{F2}]-~C']~C₂

Romero and Han consider (141) a violation of the Focus Deletion Constraint in (140) and do not refer to it as intervention. Rather, they assume that intervention effects are an independent phenomenon, reflecting a ban on covert movement of the Q operator across interveners, following Beck (1996) (see section 3.2.1). In fact, they are forced to adopt such an assumption, given examples like (143). In (143), verum-focused *didn't* is generated outside the disjuncts, so that no elision of focal material takes place, and there is thus no violation of (140). (144a) is the LF representation of the unavailable alternative question reading, while (144b) shows the representation for the possible yes/no reading.

(143) Didn't Mary say that John was retiring or resigning? (Romero & Han 2004a:210)

- a. *Q_i VERUM_F [didn't Mary say t_i [that John was RETIRING] or [~~that John was~~ RESIGNING]]?
- b. Q_i t_i (or not) [VERUM_F [didn't Mary say [that John was retiring] or [~~that John was~~ resigning]]]?

Since nothing in Romero and Han's ellipsis-based explanation prohibits the alternative question reading for (143), they appeal to the supposedly separate notion of intervention to exclude it. That is, they claim that verum focus in (143) interferes with movement of the Q operator to its scopal position, C⁰. This is a significant weakness of the theory: not only does it have to draw on two independent mechanisms to explain the relevant set of data, it also makes use of the idea that intervention effects reflect a constraint on LF movement, which is rejected by Beck herself in later work (Beck 2006) and in the discussion above. Conversely, the IS approach to intervention advocated here does not run into such difficulties. According to this approach, there is one and only one mechanism underlying the patterns in question: (143) lacks an alternative question reading because no IS focus, including verum focus, can occur outside the disjunctive phrase.²¹

There is one piece of data in Romero and Han (op. cit.) which could prima facie be detrimental to the IS theory of intervention. As Romero and Han correctly note, the example in (144) is difficult to construe as an alternative question, and they again call on

²¹ This example brings up the issue of the relevant domain for intervention effects under the IS approach, that is, the size of the unit to which focus uniqueness applies (see fn. 61 in section 2.5). For our purposes, it suffices to assume that a clause embedded under a bridge verb like *say* does not constitute a novel informational articulation, and thus the entire sentence in (143) allows no more than one IS focus.

their notion of intervention—i.e. blocking of covert movement—to rule it out.

(144) *Did Mary not say that John was RETIRING or RESIGNING?

(Romero & Han 2004a:210)

Non-preposed negation in English, unlike preposed negation, is not focused, and hence there does not seem to be any focused element preceding the disjunction in this sentence. Consequently, the IS theory of intervention does not predict the status of (144); does this mean that Romero and Han's conception of intervention, which we have abandoned, is nonetheless needed? I claim that it is not, because (144) does not reflect an intervention effect. Rather, this is a case of actual-world infelicity, which we also observed in the context of backgrounded *only*-phrases in section 2.3. Simply put, it is difficult to conjure up a situation in which a speaker knows that someone did not say one of two things, but does not know which of the two he did not say. In fact, any question about what someone did not say seems pragmatically unlikely. There are two pieces of evidence for this claim regarding the unacceptability of (144). First, replacing the matrix clause predicate *say* in (144) with *know* makes the sentence acceptable (145), because it is easier for the hearer to imagine a situation in which the speaker is interested in what Mary didn't know.

(145) Did Mary not know that John was RETIRING or RESIGNING?

Second, (144) can retain *say* as the matrix predicate and yet be judged acceptable, if it is set in a context in which the questioner has a clear reason for wanting to know what wasn't said, as in (146)-(147).²²

(146) Context: The faculty are poring over the recommendation letter Mary sent on John's behalf, trying to decipher what she really thinks of him. What Mary didn't include in the letter is just as important as what she included, and so someone asks:

(147) Did Mary not say that John excels at TEACHING or ADVISING?

Although Romero and Han's proposal for explaining what I call intervention effects is plausible at first glance, the need to augment it with an additional mechanism, which is questionable in and of itself, puts it at a clear disadvantage compared to the IS approach. Moreover, the proposal is limited to alternative questions, and cannot be extended to environments in which there is no ellipsis, namely, *wh*-questions and the declarative examples to be discussed in section 3.6. It is therefore out of the running as a possible analysis of intervention.

3.3 Contexts without Intervention Effects

Having unpacked the details of the IS approach to intervention in the previous section, as well as its semantic and syntactic rivals, we are in a position to examine these approaches against the full range of available data. Once we move beyond the basic paradigm of intervention effects, the empirical picture unequivocally favors the IS approach. This section is specifically devoted to instances in which a change in the status of intervention effects correlates with a change in the informational articulation, which is generally reflected in the prosody, but without any evidence of a structural change to the sentence. Clearly, these cases constitute the strongest evidence for the IS approach.

²² I thank Lucas Champollion for suggesting the context in (146).

A first example involving manipulation of the informational articulation shows that what is relevant for intervention effects is the IS category of focus, rather than the semantic category, as claimed by Beck (2006). If the two categories are teased apart, by backgrounding the potential intervener and thus rendering it a focus only in terms of its semantics, the sentence is acceptable. Compare the standard example of an intervention effect in an alternative question, repeated in (148), with (149)-(150), where the information that only John passed a certain exam is given in a context preceding the question. Judgments regarding questions with a disjunction here and below refer only to the alternative question reading; sentences are therefore marked with '*' when this reading is unavailable.

(148) *Does only John like Mary or Susan? (=118)

(149) Context: The graduate students in linguistics took two preliminary exams, in syntax and phonology, last week. The results were surprising: there was one exam that all the students, including John, passed, but no one except John passed the other.

(150) Did only John pass syntax or phonology? (Eilam 2009:243)

Speakers judge (150) to be much better than (148) as an alternative question, if not perfectly acceptable. The contribution of (149) here is clear: it sets up *only John* as part of the backgrounded material in the subsequent question (150), and therefore allows it to be part of the ground in the informational articulation of the question. The IS role of *only John* in (150) is also borne out in its reduced prosodic prominence. This result conflicts with the predictions of the semantic approach, whereby a semantic focus should invariably give rise to intervention effects. The operator *only* uses the alternatives introduced by its associate *John* in (150) just as it does in (148); in the semantic literature this type of focus is known as a second occurrence focus, because it is a repeat, not necessarily verbatim, of an earlier semantic focus (see section 2.3). The acceptable status of (150) is also at odds with syntactic analyses, since there is no structural difference between (150) and (148): in both sentences, the potential intervener c-commands the disjunction. An example comparable to (150), where the disjuncts are verbs rather than direct objects, is provided in (151)-(152).

(151) Context: For the first challenge on yesterday's episode of "Top Chef", the contestants were asked to decorate a cake. They all managed to put the same garnish on the cake, but only John succeeding in adding a second garnish.

(152) Did only John powder or caramelize the cake?

Similar examples can be found in other languages. For instance, in Chinese, providing a context which backgrounds a potential intervener in a *wh*-in-situ question greatly improves the status of the question, as witnessed in (153) vs. (154)-(155) (see also Xie 2008 for a similar example).

(153) ?*zhiyou Lili kan-le na-ben shu?
 only Lili read-ASP which-CL book
 'Which book did only Lili read?' (Beck 2006:6)

(154) Context: The class was assigned two book reports. Lili read one book that everyone else had read, but there was one book that only she had read.

- (155) (?)zhiyou Lili kan-le na-ben shu?²³
 only Lili read-ASP which-CL book
 'Which book did only Lili read?' (Yanyan Sui, p.c.)

In addition to identifying IS focus as a factor in the creation of intervention effects, the examples in (150), (152), and (155) demonstrate that these effects are context-sensitive. That is, whether or not an intervention effect occurs may depend on the discourse context in which the sentence is embedded. This finding runs counter to the idea that intervention effects are a syntactic or semantic phenomenon.

The manipulation of context also influences the acceptability of *wh*-questions involving negation, which is often said to constitute a potential intervener. In French, it is claimed that negation creates intervention effects in *wh*-in-situ questions, as in (156) (Chang 1997, Bošković 2000, Pesetsky 2000, Beck 2006). However, (157) shows that the effect disappears once the negative proposition is established in the discourse.

- (156) a. Ils ont rencontré qui?
 they have met who
 'Whom did they meet?'
 b. #Il n'a pas rencontré qui?
 he NE.has NEG met who
 'Whom did he not meet?' [only as echo question] (Beck 2006:7)
- (157) A: Mon fils ne mange pas de POISSON.
 my son NE eats NEG of fish
 'My son doesn't eat fish.'
 B: Et ta fille, elle ne mange pas QUOI?
 and your daughter she NE eats NEG what
 'What about your daughter? What doesn't she eat?' (Engdahl 2006:100)

It is not at all clear that negation should in fact be treated on a par with other interveners, since it has long been known that negative questions require unique discourse conditions (Kroch 1989, Erteschik-Shir 1997, Kuno & Takami 1997), and these are unrelated to the IS well-formedness constraints which underlie intervention effects. Moreover, because French *wh*-in-situ questions have discourse properties which are unlike those of fronted *wh*-questions in French or English (Hamlaoui 2007), it is not surprising that the way in which they interact with negation is also different.²⁴ In any case, purely syntactic or semantic theories are at a loss to explain the observation in (157).

Another kind of contextual variability, reflected in the prosodic status of the potential intervener, is similarly attested in French *wh*-in-situ questions. Specifically, floating quantifiers in French create intervention effects when they are contrastively focused, but not otherwise. (158) shows that floated *tous* 'all' may, but need not be, contrastively focused, and (159) establishes that it yields ill-formedness only when focused.

²³ This order is always dispreferred compared to the order with the *wh*-phrase preceding the intervener, because the latter represents the ideal realization of IS, in which the intervener is unambiguously positioned in the ground (see Tomioka 2007b, 2009 for further discussion).

²⁴ See also Wu (1999) for a discourse-based explanation of the incompatibility of negation with Chinese fronted *wh*-phrases. The behavior of these phrases is addressed in chapter 4.

- (158) a. Ils ont tous mangé une PIZZA (et non pas une tarte à la crème).
 they have all eaten a pizza and NEG a pie of the cream
 'They have all eaten a pizza, and not a cream pie.'
 b. Ils ont TOUS mangé une pizza (*et non pas une tarte à la crème).
- (159) a. Ils ont tous mangé quoi?
 they have all eaten what
 'What have they all eaten?'
 b. *Ils ont TOUS mangé quoi? (Zubizarreta 2003:363)

According to the IS approach to intervention, the difference between (159a) and (159b) is due to the presence of a prosodically prominent element, which cannot be a topic, in the latter sentence. The semantic approach would arguably claim that the difference is because of the semantics of *tous* in (159b), which, as a contrastively focused quantifier, invokes alternatives. Although it is impossible to determine which approach is correct on the basis of (159) alone, this example indicates that the prosodic status of the potential intervener needs to be considered in analyzing intervention configurations.

The import of the prosody is clearest in an example provided by Beck and Kim (2006), which also allows us to test another one of the predictions differentiating the syntactic/semantic vs. IS approaches. This example, in (160), is claimed by Beck and Kim to prove that the hierarchical relation between the intervener and disjunction plays a part in determining whether or not intervention effects occur. That is, since the disjunction is not c-commanded here by the potential intervener *only Mary*, the absence of an intervention effect is said to be correctly predicted by syntactic and semantic approaches.

- (160) Did John or Susan invite only Mary? (Beck & Kim 2006:172)

However, Beck and Kim overlook the fact that (160) is acceptable as an alternative question, yielding the answer *John* or *Susan*, only if the potential intervener *only Mary* is prosodically reduced and the disjuncts are focused. Pronouncing the sentence as in (161), where *only Mary* is marked with a pitch accent, eliminates the alternative question reading, so that it can only be answered with *yes* or *no*.

- (161) *Did John or Susan invite only MARY?

This sentence is similar to the French example (159) in that lack of prosodic prominence on a potential intervener correlates with the absence of an intervention effect. It differs, however, from the French example in two respects. First, the potential intervener *only Mary* is not ordinarily accented, as the result of an automatic process of postnuclear deaccenting, which we have already observed in Japanese and Korean *wh*-questions. This process suppresses the realization of pitch following the main stress, which in alternative questions must be on the disjuncts (see fn. 16). Second, unlike the French example, in the English sentence the potential intervener is below the disjunction; in other words, the c-command relation between the intervener and disjunction, which syntactic and semantic analyses view as required for intervention effects, does not hold.²⁵ The fact that (161) is nonetheless unacceptable constitutes decisive evidence against

²⁵ There is no independent evidence that the intervener raises above the disjunction at LF when accented, which would allow a syntactic or semantic analysis to work.

these analyses: an item which cannot fit in the informational articulation derives unacceptability, whatever its syntactic position. We have thus confirmed another prediction of the IS approach, and disconfirmed the opposite prediction of syntactic and semantic analyses.

Moving on to a fourth and final case of variability, connected to both the prosody and the interpretation, we find that the occurrence of intervention effects depends on the expression which an *only*-type operator chooses to associate with, when such a choice is available. This can be illustrated in Chinese, where the focus marker *zhi* 'only' may associate with elements that are not adjacent to it, including *wh*-phrases (Xie 2008).²⁶ In an intervention configuration, the result is that intervention effects arise when *zhi* is associated with any element other than the *wh*-phrase, such as the verb in (162a), but not when its associate is the *wh*-phrase (162b).²⁷ Italics here mark the associate of the focus marker, while small caps continue to indicate accents.

- (162) a. */??ta zhi *MAI* SHENME?
 he only sell what
 'What is the thing x such that he only sells x (and does not e.g. make it)?'
- b. ta zhi mai *SHENME*?
 he only sell what
 'What is the thing x such that he sells only x (and not y)?' (Xie 2008:33)

This pattern is expected under the IS approach: (162a) is unacceptable because *mai* 'sell', which is accented and not a possible topic, cannot be accommodated in the informational articulation, while in (162b) there is no element that is incompatible with the informational articulation. However, the pattern is a mystery for syntactic and semantic analyses, which do not take the issue of focus association, including its prosodic and interpretational correlates, into consideration. Thus, under Beck's (2006) semantic approach, one cannot explain why intervention effects are evaded when the focus marker is associated with the *wh*-phrase. Moreover, the fact that this association is allowed to begin with casts serious doubt on the entire reasoning underlying Beck's theory: if a focus marker can be associated with a *wh*-phrase, it should also be able to evaluate the *wh*-phrase.²⁸

Attending to data similar to (162), Beck reports interspeaker variation in Chinese regarding intervention effects with standard *wh*-phrases (as opposed to d-linked *which*-phrases); that is, some speakers judge the relevant sentences as acceptable while others do not. Beck suggests that the speakers for whom the sentences are acceptable allow non-d-linked *wh*-phrases to undergo covert phrasal movement, meaning that the *wh*-phrase is not c-commanded by the intervener at LF. No intervention effects should then arise under

²⁶ Use of the terms focus marker or focus particle here and below is in accordance with the existing literature, and is not meant to imply a semantic approach to focus, whereby the marker/particle must associate with the IS focus (see section 2.3).

²⁷ Apparently, the same variability depending on the associate of the *only*-type operator can be demonstrated in English alternative questions: an intervention effect is found if *only* is associated with the verb in (ia), but not when it associates with the disjuncts (ib), which are the fixed IS focus.

(i) a. *Did John only *PASS SYNTAX* or *PHONOLOGY*?

 b. Did John only pass *SYNTAX* or *PHONOLOGY*?

²⁸ Beck and Kim (2006) mention the possibility of *wh*-phrases as associates of *only*-type operators, but seem to wrongly assume that this leads to ungrammaticality.

the semantic approach. However, this analysis of the data overlooks its prosody and interpretation, leading to erroneous conclusions. The supposed variation Beck describes is actually ambiguity, as illustrated in (162): the sentence has multiple interpretations, depending on what *zhi* associates with. When given without a context and prosodic contour, this sentence is likely to elicit different judgments from different speakers. That is, speaker A might give the judgment for (162a) while speaker B would report (162b). Accordingly, I maintain that variation among Chinese speakers in judging intervention effects has nothing to do with the movement properties of *wh*-phrases, as Beck claims. Rather, it is a function of the element the speaker associates with the focus marker, in accordance with the reading he gives to the sentence.²⁹

Support for the proposed explanation of the Chinese data comes from a comparison with Japanese. In Japanese, focus particles can only associate with the NP to which they are adjoined (Kishimoto 2009), unlike Chinese *zhi* described above. Thus, the sentences in (163) only have the readings given; in (163a), *dake* 'only' cannot associate with anything but the subject, in (163b) it can only associate with the direct object, and in (163c) with the locative adjunct.

- (163) a. John-dake-ga koko-de hon-o yon-da.
 John-only-NOM here book-ACC read-PAST
 'Only John read books here.'
- b. John-ga koko-de hon-o-dake yon-da.
 John-NOM here book-ACC-only read-PAST
 'John read only books here.'
- c. John-ga koko-de-dake hon-o yon-da.
 John-NOM here-only book-ACC read-PAST
 'John read books only here.'
- (Kishimoto 2009:471)

Furthermore, Japanese focus particles cannot attach directly to *wh*-phrases. As expected under the analysis presented here, there is no "variation" in Japanese of the sort exemplified in the Chinese question (162). All speakers report the equivalent of (162) as unacceptable, because the interpretation in (162b) is unavailable in Japanese.

The example in (162) corroborates the IS approach in a number of ways. It establishes that part of the variation in intervention effects between speakers and languages reduces to properties of focus association and concomitant prosodic prominence, as was claimed in the previous section. These properties do not figure in syntactic or semantic analyses, making them unable to account for the data. The example also confirms the prediction that *wh*-phrases can be associated with an *only*-type operator, and that under such circumstances intervention effects will be absent. I take the possibility of association as evidence that the *wh*-phrase can also be evaluated by the operator. This finding joins the results regarding the other predictions which distinguish the syntactic/semantic vs. IS approaches, decisively adjudicating in favor of the latter. The results are summarized in table 4, showing that all the predictions of the IS approach,

²⁹ This is reminiscent of the controversy which arose in the 1970s regarding scope possibilities in English sentences involving quantifiers and negation. Interspeaker variation reported in this case by Carden (1970) turned out to result from the elicitation method (see Labov 1975). In the case of Chinese intervention, the mere existence of multiple possible interpretations has been overlooked in the literature. I thank Tony Kroch for bringing the English case to my attention.

but none of the predictions of syntactic and semantic analyses, have been confirmed.

Semantic approach	IS approach	Examples
× Semantic notion of focus	✓ IS notion of focus	} (149)-(150), (151)-(152), (154)-(155)
× No context-sensitivity	✓ Context-sensitivity	
× Sensitive to hierarchical relations	✓ Insensitive to hierarchical relations	(161)
× <i>Wh</i> -phrases cannot be evaluated by operator	✓ <i>Wh</i> -phrases can be evaluated by operator	(162)

Table 4: Predictions of the Semantic vs. IS Approaches to Intervention – Results

3.4 Structures without Intervention Effects

3.4.1 Introduction

In this section, the body of data that can be subsumed under an IS approach to intervention is expanded to include questions which differ from each other in their makeup and structure.³⁰ In order to explain distinctions in acceptability among them, it will be necessary to introduce a novel typology of questions in terms of their meaning components. Subsection 3.4.1 presents the various types of questions under discussion, subsection 3.4.2 describes the novel typology just mentioned and corroborates its validity, and subsection 3.4.3 concludes and ties loose ends from previous subsections.

The basic pattern to be accounted for is given in (164)-(166): *wh*-questions with an adjunct *wh*-phrase and clefted questions exhibit weak intervention effects or no effects at all. (164a) illustrates a standard intervention effect in Korean with the *wh*-argument *nuku* 'who', while (164b) shows that the same configuration with the *wh*-adjunct *encey* 'when' does not give rise to the same effect. In (165), similar results are obtained in Japanese when the *wh*-argument *nani* 'what' is replaced by the *wh*-adjunct *naze* 'why', and (166) demonstrates that using a cleft question in English also removes the intervention effect (see Beck and Kim 2006).

- (164) a. *amuto nuku-lul manna-chi anh-ass-ni?
 anyone who-ACC meet-CHI not.do-PAST-Q
 'Who did no one meet?'
 b. (?)amuto encey sukce-lul cechulha-chi anh-ass-ni?
 anyone when homework-ACC submit-CHI not.do-PAST-Q
 'When did nobody submit their homework?' (Yoon 2008:381)
- (165) a. ?*Ken-sika nani-o yom-ana-katta-no?
 Ken-except what-ACC read-NEG-PAST-Q
 'What did no one but Ken read?'
 b. Ken-sika naze ko-nak-atta-no?
 Ken-except why come-NEG-PAST-Q
 'Why did no one but Ken come?' (Tomioka 2009:256)
- (166) a. *Does only John like Mary or Susan? (=118)
 b. Is it Mary or Susan that only John likes?

³⁰ I thank Catherine Lai for helpful discussion of this section.

The observation that question types may differ in whether or not they can accommodate interveners is not novel (cf. Ko 2005, Yoon 2007, 2008, Tomioka 2009). However, existing accounts have treated only a subset of the data in (164)-(166), and moreover, all but Tomioka (2009) propose a syntactic or semantic explanation. Besides the weaknesses of such explanations reviewed in previous sections, they face difficulties which are specific to the data exemplified in (164)-(166) and which will be noted below. Conversely, the IS approach provides a consistent and comprehensive account of this data, which ties in to independently motivated pragmatic distinctions between the question types.

I argue that the presence vs. absence of intervention effects in (164)-(166) reflects differences in the status of the existential proposition associated with different *wh*-questions and alternative questions, henceforth the associated proposition (AP). An example of an AP of a *wh*-question is given in (167): use of such a question is typically taken to indicate that the speaker believes that some referent instantiates the *wh*-phrase. (168) illustrates an alternative question AP.

(167) Who read the book? *AP*: Someone read the book.

(168) Does John like Mary or Susan? *AP*: John likes someone.

The status of the AP of *wh*-questions is a longstanding issue in the literature; it is usually claimed to be a presupposition, as stated in Beaver (2001:11): "*Wh*-questions presuppose existence of an entity answering the question, or speakers' expectation of such an entity" (see also Katz and Postal 1964, Comorovski 1996). However, some researchers, including Groenendijk and Stokhof (1984) and Ginzburg (2003), have analyzed the AP as a (generalized conversational) implicature. As for alternative questions, ever since Karttunen (1977), these have generally been assumed to carry an existential presupposition that one of the alternatives is true and a uniqueness presupposition that *only* one of the alternatives is true. Thus, the question in (168) is said to presuppose that John likes Mary or John likes Susan, but not both. For the purposes of this study, the sole relevant meaning component, which is entailed by the supposed existential presupposition, is that labeled the AP in (168).

3.4.2 A Novel Typology of Questions

Contra the received view in the literature, which advocates a uniform analysis of APs as either presuppositions or implicatures, I follow Brandtler (2008) in claiming that their status depends on the type of question. However, I depart from the particular classification Brandtler suggests, presupposition vs. implicature, because the notion of implicature seems inappropriate in this case. For one thing, the AP does not appear to be part of the communicative intent of the speaker, which is a defining property of implicatures (see Simons 2007). That is, a speaker who asks a *wh*-question does not necessarily intend to convey that he believes that some referent instantiates the *wh*-phrase; this is at most a byproduct of him asking the question. Second, deriving the AP does not seem to involve Gricean-type inferential reasoning, as would be expected of an implicature. The hearer arrives at the AP simply by virtue of interpreting the question, and he does not have to calculate it based on the literal meaning of the utterance. Thus, while I adopt the label of *presupposition* for the AP of adjunct *wh*-questions and clefted *wh*- and alternative questions, I submit that the AP of argument *wh*-questions and non-

clefted alternative questions is associated with an *epistemic bias*, defined in (169) (cf. Romero and Han 2004b, Tomioka 2009).^{31,32}

(169) Bias: a speaker's belief, not necessarily shared by the hearer, that the probability that a proposition is true is greater than the probability that it is false.

Unlike a bias, a presupposition must be satisfied by the common ground, that is, shared by the discussants, before the common ground can be updated with the proposition expressed by the sentence (von Stechow 2008).³³ This distinction is relevant to the issue of intervention effects because it affects the informational articulation of the question: a presupposition serves to background its content, but a bias does not. If the former includes a potential intervener, the intervener is backgrounded, and hence no clash with the informational articulation of a *wh*- or alternative question arises. In the case of a bias, no content is marked as backgrounded, and the effect of not being able to accommodate the intervener manifests itself in the form of unacceptability judgments.

There is ample support for the need to distinguish adjunct *wh*-questions and clefted *wh*- and alternative questions from argument *wh*-questions and non-clefted alternative questions. Two pieces of evidence are reviewed here: the felicity of negative answers and the ability to serve as an antecedent for *too*.³⁴ First, as has been noticed previously (e.g. Brandtler 2008), the felicity of negative answers depends on the type of question. Thus, they are felicitous with argument *wh*-questions (170) and alternative questions (171), but not with adjunct *wh*-questions (172), clefted *wh*-questions (173), and clefted alternative questions (174).

(170) Q: Who failed the test?

A: No one.

(171) Q: Did John or Mary fail the test?

A: No one failed the test.

³¹ A finer-grained partition between *why* and other adjunct *wh*-phrases is probably justified (see Tomioka 2009), but nothing here hinges on such a distinction. Also immaterial for our purposes is Fitzpatrick's (2005) claim that the presuppositional flavor of *why*-questions derives from an inference from the set of possible answers, rather than an actual presupposition.

³² According to Tomioka (2009), the AP itself can be a bias. It seems more accurate to assume, as I do, that it can be *associated* with a bias.

³³ An anonymous reviewer for NLLT asks how this notion of bias relates to the notion of negative bias invoked *inter alia* in *wh*-questions involving *even* and certain NPIs (Guerzoni 2003). Descriptively, the notions are opposites: having a negative bias means that the speaker believes that it is more likely that the AP is false. In theoretical terms, the set of possible answers to questions with a bias includes the negative answer, and bias amounts to the speaker's attitude towards this answer set, i.e. whether he believes that one of the positive answers or the negative answer is more likely. The issue of deriving negative bias from the components of the question (see Guerzoni 2003, a.o.) is beyond the scope of this study.

³⁴ Satoshi Tomioka (p.c.) suggests that the argument-adjunct asymmetry discussed here might be related to the distinction in (ia) vs. (ib), where the former involves an adjunct *wh*-phrase and the latter a *wh*-argument:

(i) a. I wonder whether and when John will invite people to his new house.

b. *I wonder whether and who John will invite to his new house.

However, I am skeptical about this possibility: Giannakidou and Merchant (1998) show that such cases of what they call "reverse sluicing" are subject to crosslinguistic variation, so that the Greek equivalent of a sentence like (ib) is grammatical. This indicates that syntactic factors most likely underlie the distinction.

(172) a. Q: When did John buy that book?³⁵

A: #Never.

b. Q: Where did John buy that book?³⁶

A: #Nowhere.

(173) Q: Who is it that failed the test?³⁷

A: #No one.

(174) Q: Was it John or Mary who failed the test?

A: #No one failed the test.

Negative answers are felicitous with certain types of questions because they are among the set of possible answers, as per Ginzburg (1995) and Fitzpatrick (2005). Questions that are associated with a presupposition do not have the negative answer in the set of possible answers, and denial of their presupposition requires a particular kind of response, which does not directly answer the question (see fn. 35 and 37).³⁸

A second diagnostic which distinguishes different kinds of questions is their ability to serve as an antecedent for *too*.³⁹ Winterstein (2009) shows that almost any material can be an antecedent for the presupposition of *too* (i.e. that the predication is true of an element in the alternative set; see Rullmann 2003), including conversational implicatures, conventional implicatures, and presuppositions. The latter, illustrated in (175), is crucial for our purposes: *too* in the second sentence is felicitous because it can use the presupposition associated with *quit* in the first, namely, that John used to smoke.

³⁵ Analyses assuming that the AP of *wh*-questions is a presupposition often claim that a negative answer constitutes a denial of this presupposition (e.g. Comorovski 1996). However, not only does this leave the distinction between the different types of questions in (170) vs. (172)-(173) unexplained, it also overlooks a distinction in the felicity of different types of answers: (172a) vs. (i) below. Under the approach proposed here, negative answers are logical answers to a question (cf. (170)), while presupposition denial requires a roundabout response, not directly answering the question, as in (i).

(i) Q: When did John buy that book?

A: He didn't.

³⁶ The relevance of the distinction between *wh*-arguments and *wh*-adjuncts is even clearer if (172b) is compared to (i). Both involve the same *wh*-phrase, but only in (i) is it an argument and hence allows a negative answer. Thanks to Dave Embick for pointing out this observation.

(i) Q: Where did you go yesterday?

A: Nowhere.

³⁷ Unlike its non-clefted version in (170), the only way to negatively respond to (173) is by providing a complete sentence and stressing the element corresponding to the *wh*-phrase. This response denies the presupposition of the question.

(i) Q: Who is it that failed the test?

A: (Huh?!) NO ONE failed the test.

³⁸ The proposed distinction between questions in terms of the inclusion of the negative answer in their set of possible answers (see also fn. 33 and 35) helps account for whether or not they can be used as rhetorical questions, assuming that rhetorical questions denote the negative answer (cf. Han 1998, 2002). That is, questions associated with a bias can function as rhetorical questions (ia) because they allow a negative answer, but cleft questions like (ib), which presuppose their AP and do not have the negative answer in the set, cannot.

(i) a. Who could have predicted this disaster?

b. Who is it that could have predicted this disaster?

³⁹ I thank Florian Schwarz for suggesting this diagnostic.

(175) John quit smoking. I used to smoke too.

If all types of questions were associated with a presupposition, we would expect them to uniformly be possible antecedents for *too*. However, what we find is the partition argued for here: adjunct *wh*-questions (176), clefted *wh*-questions (177), and clefted alternative questions (178) can be antecedents for *too*, whereas argument *wh*-questions (179) and non-clefted alternative questions (180) cannot. The relevant context for (178) and (180) is one in which the discussants were given a book report assignment for which they could read any book of their choice.

(176) Q: Where on campus did John give the lecture yesterday?

A: I don't know, but he gave it at Drexel too.

(177) Q: Who is it that had a meeting with the dean yesterday?

A: I don't know, but I did too.

(178) Q: Was it "The Hobbit" or "The Lord of the Rings" that John read?

A: I don't know, but I read Tolkien too.

(179) Q: Who had a meeting with the dean yesterday?

A: #I don't know, but I did too.

(180) Q: Did John read "The Hobbit" or "The Lord of the Rings"?

A: #I don't know, but I read Tolkien too.

Not much needs to be said with respect to the first group of questions, since it has already been established in (175) that presuppositions are possible antecedents for *too*. The behavior of the second group of questions is similarly in line with what I have claimed regarding the status of their AP. That is, an AP associated with a bias is not sufficient to license *too* because it is not part of the common ground. In (179), for example, the proposition that someone had a meeting with the dean is not necessarily assumed by either interlocutor, and so cannot be used by *too*.⁴⁰

Given that I am arguing against the widespread assumption that the AP of *wh*-questions is uniformly a presupposition, it is worth taking a moment to review some of the evidence provided for this assumption. As a matter of fact, this evidence does not hold up under scrutiny. For instance, it has been claimed that the AP cannot be canceled by the speaker who uttered the question, as in (181)-(182), making it look different from conversational implicatures, which can be canceled, as in (183).

(181) #Although nothing is on the table, what is on the table? (Postal 1971:73)

(182) #I know that Mary doesn't read anything. What (exactly) does she read?
(Karttunen & Peters 1976:355)

(183) John has three cows, in fact ten. (Levinson 1983:115)

However, Fitzpatrick (2005) notes that examples like (181)-(182) are ruled out simply

⁴⁰ Satoshi Tomioka (p.c.) notes that *too* does seem able to pick up the positive bias of questions with preposed negation (see Romero and Han 2004b), as in (i). It is unclear to me at this point why this sort of example differs from the examples involving bias in the body of the text.

(i) Q: Didn't John and Mary get divorced?

A: I don't know, but I thought they got divorced too.

because they violate the condition on question asking in (184).⁴¹

(184) A speaker can only ask an information-seeking question if he or she does not know the answer(s). (Fitzpatrick 2005:143)

Another argument in favor of a presuppositional analysis is given in Haida (2003), based on the infelicity of answering a *wh*-question with a positive indefinite replacing the *wh*-phrase. Thus, Haida states that the answer in (185) is infelicitous because it duplicates the information provided by the presupposition of the question.

(185) Q: Who called John?

A: #/*Somebody called John.

I argue, however, that the status of (185) stems from the fact that it involves a non-resolving answer (cf. Ginzburg and Sag 2001) which is not licensed in the context nor intonationally marked, as is necessary.⁴² In the terms of Ginzburg and Sag (2001), the answer is non-resolving because it does not provide sortal information about the instantiator of the *wh*-phrase that distinguishes it from other potential instantiators; all it does is indicate that there exists such an instantiator.

Non-resolving answers to *wh*-questions are licensed provided that there is an implicit yes/no question in the discourse, or at least the answerer thinks there is one. This is demonstrated in the felicitous answer in (186), inspired by Ginzburg (1995), where the context allows the answerer to entertain a yes/no question of the form *Did someone lock up the house?* as an implicit sub-question of the overt *wh*-question.

(186) Q: Oh gosh, who locked up the house?

A: Don't worry, somebody did.

L*+H L- H%

An additional requirement on such answers is illustrated in (186): they must be accompanied by a rise-fall-rise contour (L*+H L- H%), which conveys that alternative propositions to the answer cannot be safely claimed by the speaker (see Constant 2006). In this case, the contour indicates that the answerer cannot commit to an alternative resolving answer (e.g. *John locked the house*, *Mary locked the house*, etc.), apparently because he lacks evidence for such an answer. Answers of the form exemplified in (185) and (186) arguably require the rise-fall-rise contour because they are non-resolving by definition.

If the infelicity of the answer in (185) were driven by a presupposition in the question, we would not expect it to be flexible in the way that (186) illustrates. Moreover, the fact that this type of answer, involving a positive indefinite, is invariably unacceptable when the question is a cleft (187) indicates that only in this case should we attribute presuppositional status to the AP. Here no implicit yes/no question is available, because both questioner and answerer share the belief that someone locked up the house. The same seems to be true of adjunct *wh*-questions: (188)-(189) are infelicitous even if associated with the rise-fall-rise contour marked in (187).

⁴¹ In any case, the logic of the original claim is not entirely clear, since presuppositions are also defeasible under various conditions (see Levinson 1983). This supports Fitzpatrick's contention that the ill-formedness of (181)-(182) is not related to the status of their AP.

⁴² I thank an anonymous NLLT reviewer for encouraging me to clarify the argumentation here, and Kyle Rawlins for suggesting the intonational analysis.

(187) Q: Who is it that locked up the house?

A: #Somebody did.

L*+H L- H%

(188) Q: When did John buy that book?

A: #He bought it at some point.

(189) Q: Where did John give the lecture?

A: #He gave it somewhere.

As pointed out by an anonymous NLLT reviewer, the claim that the AP of alternative questions is a presupposition has also been defended in the literature. In particular, Rawlins (2008) provides evidence to show, in his terms, that alternative questions have an exhaustivity presupposition, which roughly means that the options presented in the disjuncts exhaust the set of possible answers; if true, this would entail that the AP is presupposed. Although full discussion of the various observations Rawlins makes would take us too far afield, their analysis does not seem to hinge on the notion of presupposition in the sense of something taken for granted by both participants in the conversation. Rather, it is possible that this is a bias on the part of the speaker, who believes that the question includes all possible answers. Furthermore, there is a basic problem with the presuppositional analysis of alternative questions, as with the presuppositional analysis of *wh*-questions, due to the parallel existence of clefted versions of these question forms. That is, this analysis makes it impossible to distinguish the non-clefted variants from their clefted counterparts, since the latter indisputably have the presuppositional properties of declarative clefts.

3.4.3 Conclusion and Remaining Issues

The proposed classification of questions as being associated with a presupposition or a bias elegantly connects to differences in their informational articulation, and thus ultimately to distinctions in the status of intervention effects. Although syntactic explanations for subparts of the data have been offered in the literature, none of them propose a comprehensive explanation which ties together the observations, and it is difficult to see how they could do so. Why, for example, would the acceptability of a negative answer to a *wh*-question have anything to do with the structural position of the *wh*-phrase in the question?

At any rate, syntactic analyses also suffer from basic problems in accounting for the distinctions between question types with respect to intervention effects. Ko (2005) only deals with the behavior of *why* in intervention configurations, and it is not clear how she would extend her syntactic analysis to the full range of data. Attempting to cover a broader set of observations, Yoon (2007, 2008) hypothesizes that *wh*-adjuncts are generated higher than arguments, and particularly higher than NegP; that is, either as adjuncts somewhere above vP (*when*, *how*) or directly in SpecCP (*why*). Assuming, first, that *wh*-phrases move at LF and, second, that NegP is the actual intervener, *wh*-arguments will be prevented from reaching SpecCP by NegP, but *wh*-adjuncts will not. However, both these assumptions are suspect. First, as noted in section 3.2.1, there is reason to believe that *wh*-phrases do not have to move at all, and even if they did move, it is unlikely that covert movement would be restricted in a way in which overt movement is not. Second, the definition of NegP as the intervener is inadequate, given that many

expressions which have no relation to negation may create intervention effects. In addition to these problematic assumptions, Yoon herself notes that the order in which the intervener precedes the *wh*-phrase, even if a *wh*-adjunct, is always disfavored by speakers.⁴³ This is unexpected under her syntactic analysis; if the *wh*-phrase is generated high enough, as in the case of *wh*-adjuncts, its status should not be dependent on the overt position of the intervener. These difficulties are not encountered in the IS approach, and the disparate behavior of different question types vis-à-vis intervention thus provides further support for this approach.

Before ending this section, it is worth briefly addressing an additional category of questions which allow a comparison of syntactic analyses with the IS approach, namely, d-linked *wh*-questions. As noted in Endo (2007), among others, these questions exhibit weaker intervention effects than standard *wh*-questions, or no effects at all, as shown in the Japanese example (190).

- (190) daremo dono hon-o kawa-nakat-ta-no?
 anyone which book-ACC buy-NEG-PAST-Q
 'Which book did no one buy?' (Endo 2007:53)

Like other exceptional subtypes of questions, d-linked *wh*-questions have been analyzed under a syntactic approach to intervention; specifically, Endo (2007) appeals to a feature-based version of Relativized Minimality (Rizzi 1990) to explain their status. He claims that d-linked *wh*-phrases target the specifier of a topic phrase as their licensing site at LF, so that the chain connecting the d-linked phrase to this site is a "topic chain". Because the potential intervener is quantificational, and not topical, it does not obstruct the topic chain; movement of the d-linked phrase above it thus does not violate Relativized Minimality.

Under our IS account, d-linked *wh*-phrases are potential topics in the informational articulation, and not necessarily IS foci (see section 2.4). Accordingly, non-*wh*-material can be the focus (e.g. the NPI *daremo* 'anyone' in (190)), and there is no other focus in the sentence to violate the constraint on the number of foci allowed per clause. While this account shares with Endo's proposal the use of the notion topic, it is able to base the explanation entirely on a model of IS, which was not devised specifically for intervention. The IS account is therefore better motivated, as well as more simple and parsimonious, since it makes it unnecessary to invoke an additional feature-based syntactic constraint. The finding that changes in the informational articulation bring about changes in the status of intervention effects fits in perfectly with the general perspective espoused here.

3.5 Amharic: A Language without Intervention Effects

3.5.1 Introduction

In this section, I discuss the case of a language which almost entirely lacks intervention effects, making it seem crosslinguistically unique.⁴⁴ I show that this exceptionality is not as fantastic as it appears to be, but rather follows from certain IS and prosodic properties

⁴³ See fn. 23.

⁴⁴ This section supersedes previous publications of mine on the topic of intervention effects in Amharic (Eilam 2008, 2009).

of the language. It is not, however, predicted by the syntax or semantics. The first subsection, 3.5.1, introduces the data to be explained, and subsection 3.5.2 reviews possible evidence for a syntactic analysis, appealing to the position of the potential intervener in the clausal structure. Subsection 3.5.3 then presents a number of data points casting doubt on such an analysis, followed by discussion of an alternative, IS explanation in 3.5.4.

The language in question is Amharic, an SOV *wh*-in-situ language belonging to the Ethiopic branch of Semitic. Unlike any other language documented until now, and contra the descriptive generalization suggested in Beck (2006) whereby intervention effects are universal, Amharic does not generally exhibit degradedness when a focus particle precedes a *wh*-phrase. Thus, the intervention configurations with the core triggers *bəčča* 'only' in (191a), *dägmo* 'also' in (192a) and *-mm + ənkw* 'even' in (193a) are fully acceptable, with either a plain *wh*-phrase or a d-linked *which*-phrase.^{45,46} In fact, these are preferred over the versions in (b), on a par with run-of-the-mill *wh*-questions in Amharic (see Halefom 1992), making it an almost ideal mirror image of languages like Japanese and Korean.

- (191) a. haile bəčča mən/yätəññaw-ən mäs'haf anəbbäb-ä?⁴⁷
 Haile only what/which-ACC book read.PER-3MS
 b. ?mən/yätəññaw-ən mäs'haf haile bəčča anəbbäb-ä?
 'What/which book did only Haile read?'
 (192) a. haile dägmo mən/yätəññaw-ən mäs'haf anəbbäb-ä?
 Haile also what/which-ACC book read.PER-3MS
 b. ?mən/yätəññaw-ən mäs'haf haile dägmo anəbbäb-ä?
 'What/which book did Haile also read?'
 (193) a. haile-mm ənkw mən/yätəññaw-ən mäs'haf anəbbäb-ä?
 Haile-FOC even what/which-ACC book read.PER-3MS
 b. ?mən/yätəññaw-ən mäs'haf haile-mm ənkw anəbbäb-ä?
 'What/which book did even Haile read?'

Similarly, placing an intervener before a disjunctive phrase does not exclude the alternative question reading in Amharic, as demonstrated in (194).

- (194) haile bəčča šay wäyäss bunna t'ät't'-a?
 Haile only tea or coffee drink.PER-3MS
 'Did only Haile drink tea or coffee?'

⁴⁵ The Amharic transcription is as follows (see Leslau 1995, 2000): *č'*, *k'*, *p'*, *s'* and *t'* are ejective stops; *ñ* is the palatal nasal; superscripted *w* indicates labial secondary articulation; *ə* is a high central vowel and *ä* is a mid-central vowel.

⁴⁶ The following abbreviations are used for the Amharic data: ACC = accusative, AUX = auxiliary, COP = copula, DEF = definite, F = feminine, FOC = focus, IMP = imperfect, M = masculine, NEG = negation, subscripted O = object, P = prepositional suffix, PER = perfect, POSS = possessive, REL = relative marker, S = singular, TOP = topic.

⁴⁷ The fact that *bəčča* 'only' is post-nominal and derived from the adverb 'alone' does not seem relevant to the analysis, since these properties are not unique to Amharic. Many of the languages discussed here use post-nominal focus markers, including Japanese and Korean, and their equivalents of 'alone' in its exclusive particle function also give rise to intervention effects (e.g. Japanese; Satoshi Nambu, p.c.). Moreover, even if *bəčča* were somehow unique this would not extend to the entire set of potential interveners.

- a. šay. [✓AltQ]
tea
- b. awo / aydälläm. [✓Yes/NoQ]
yes no

The only clear-cut case of intervention in Amharic is observed with NPIs, which elicit judgments of degradedness when preceding a *wh*-phrase (195a). Since scrambling the *wh*-phrase above the intervener does not result in an ideal sentence in Amharic (195b), as noted above, speakers tend to prefer the cleft strategy illustrated in (196) when using an NPI in a *wh*-question.

- (195) a. ?mannəmm mən al-anäbbäb-ä-mm?
 anyone what NEG-read.PER-3MS-NEG
b. ?mən mannəmm al-anäbbäb-ä-mm?
 'What did no one read?'
- (196) mändən näw mannəmm y-al-anäbbäb-ä-w?
 what COP.3MS anyone REL-NEG-read.PER-3MS-DEF
 'What is it that no one read?'

Although it is *prima facie* possible to handle the exceptional status of Amharic by simply ascribing the presence or absence of intervention effects to a parameter, such a solution is uninteresting and stipulative. An alternative solution, both empirically possible and theoretically preferable and hence taken up here, is to reduce the status of Amharic to independent properties of the language. By doing so, one can retain the idea that intervention effects are derivative, while acknowledging that the properties which conspire to produce them are subject to crosslinguistic variation.

3.5.2 A Syntactic Analysis

In order to account for the fact that Amharic does not show intervention effects, a semantic theory of intervention could claim that the semantics of Amharic *wh*-phrases and/or focus is unique, or that Amharic interveners are above the Q operator in C^0 . If the latter were true, the Q operator, rather than the intervener, would be the closest c-commanding potential binder to the *wh*-phrase, and hence no intervention effects would be expected. A syntactic approach would likewise have to appeal to a particular clausal structure, in which potential interveners do not come between Q and the *wh*-phrase, and therefore do not preclude the necessary relation between the two from being established.

The semantic explanation is discarded because there is no indication of something unusual about the semantics of *wh*-phrases or focus particles in Amharic; they seem to introduce alternatives and make use of alternatives, respectively, as in other languages. In fact, it is difficult to see how they could be different in this regard, since alternatives are a defining component of the semantics of *wh*-phrases and focus particles. Consequently, the second hypothesis, whereby potential interveners in Amharic, like subjects in general, are positioned above C^0 , is the only non-information structural option left to explore.

Before discussing Amharic clausal structure, it is necessary to rule out an alternative explanation based on Pesetsky's (2000) theory of movement, described in section 3.2.1. Under this theory, *wh*-phrases do not create intervention effects if they are licensed through covert phrasal movement, because the restriction on the *wh*-phrase is not

separated from it, preventing a scope-bearing element from appearing between the two. The data in (197) shows that this option cannot be correct for Amharic: *wh*-phrases are acceptable inside relative clauses in Amharic (197a) despite the fact that the latter are islands for overt movement (197b).⁴⁸

- (197) a. haile astāmari-w lä-man yä-sät't'-ä-w-ən mäs'haf anäbbäb-ä?
 Haile teacher-DEF to-who REL-give.PER-3MS-DEF-ACC book read.PER-3MS
 'Who is the person x such that Haile read the book that the teacher gave to x?'
 b. *lä-man haile astāmari-w yä-sät't'-ä-w-ən mäs'haf anäbbäb-ä?
 to-who Haile teacher-DEF REL-give.PER-3MS-DEF-ACC book read.PER-3MS

Since Pesetsky assumes uniform constraints on overt and covert movement, the lack of Subjacency effects in (197a) proves that Amharic *wh*-phrases do not undergo covert phrasal movement. If we follow Pesetsky, this leaves the possibility of feature movement, which is expected to create intervention effects; their absence must therefore be explained on independent grounds.⁴⁹

Returning to the hypothesis that interveners in Amharic occur above C^0 , we can now consider the evidence available to support it. There does not seem to be any morphological data pointing one way or the other: elements marking the position of C^0 , like complementizers and question particles, do not occur in simple *wh*-questions. Moreover, even if these did surface, they would not help, since Amharic is a head-final language with specifiers to the left. Thus, elements in C^0 will typically surface at the right edge of the clause, while interveners and subjects in general end up at the left edge. As for possible syntactic evidence, which is necessarily more indirect, there are four observations that warrant examination.

Let us begin with a clear example of elements occupying positions in the C domain, found in Amharic clefts. Constituents can appear above the pivot, or cleft focus, which is the subject in SpecIP (or moved through SpecIP) and controls agreement on the copula. This is demonstrated for an object in (198a) and a subject in (198b); in both examples '/' marks a low boundary tone and optional pause.⁵⁰

- (198) a. girma-n // haile näw yä-tägānaññ-ä-w.
 Girma-ACC Haile COP.3MS REL-meet.PER-3MS-DEF
 'Speaking of Girma, it is Haile that met him.'
 b. girma-ss // əssu näw haile-n yä-tägānaññ-ä-w.
 Girma-TOP he COP.3MS Haile-ACC REL-meet.PER-3MS-DEF
 'As for Girma, it is he that met Haile.'

As expected of the left periphery, the clause-initial constituents in such examples are

⁴⁸ This is true of relative clause and adjunct islands. I illustrate with a nominal *wh*-phrase and leave the issue of whether *wh*-adverbials pattern differently in islands for future research (for this distinction in Chinese see Tsai 1994).

⁴⁹ There is a third type of movement, overt phrasal movement, which would also predict no intervention effects under Pesetsky's theory. However, if Amharic *wh*-phrases overtly raised, despite appearances to the contrary (see Simpson and Bhattacharya 2003 for such a proposal for Bangla), constituents preceding the *wh*-phrase would have to be higher than SpecCP. Thus, the implications of this idea parallel those of the hypothesis that interveners are above C^0 and need not be discussed separately.

⁵⁰ The non-contrastive "speaking of" or thematic topic of (198a) is to be distinguished from the contrastive "as for" topic in (198b), marked by the suffix -ss (see Demeke and Meyer 2007).

topics: they are intonationally set off from the rest of the clause by a low boundary tone and/or pause, used to demarcate intonational phrases, as illustrated in (198), they can take morphological topic marking (-ss in (198b)), and, as shown in (199), they cannot be non-referential, in accordance with the referentiality condition on topics.⁵¹

- (199) a. haile nāw lä-girma mənəmm y-al-sät't'-ä-w-əmm.
 Haile COP.3MS to-Girma nothing REL-NEG-give.PER-3MS-DEF-NEG
 'It is Haile that gave nothing to Girma.'
- b. *mənəmm haile nāw lä-girma y-al-sät't'-ä-w-əmm.
 nothing Haile COP.3MS to-Girma REL-NEG-give.PER-3MS-DEF-NEG

A second potentially relevant observation is that Amharic is a null subject language with obligatory, rich subject agreement, marked for person, number, and gender. (200) shows that the subject need not be overtly expressed, while (201) establishes that subject agreement is necessary.

- (200) sak'-äčč.
 laugh.PER-3FS
 'She laughed.'
- (201) aster doro-wa-n arräd-*(äčč).
 Esther hen-DEF-ACC butcher.PER-3FS
 'Esther butchered the hen.'

Following Alexiadou and Anagnostopoulou (1998), among others, one could assume that agreement is pronominal in null subject languages. It would therefore occupy SpecIP, and overt subjects would have to be dislocated in a higher position in the C domain. This type of correlation between agreement and dislocation has been argued for in a wide variety of languages (see Baker 2003 for recent discussion), raising numerous questions; for example, are the agreement markers indeed arguments or do they simply license null *pro* arguments in A-positions, and is the dislocated NP base-generated in its surface position or does it arrive there by movement. Since these questions are tangential to the goals of this section, they can be left aside.

A third possible piece of evidence for the hypothesis that interveners in Amharic are above C⁰ comes from adverb placement: sentential adverbs may follow the subject in Amharic, as in (202) and (203). While the order in (202) is also possible in English (*The police, fortunately, caught the thief*), in (203) *mənaləbatə* 'probably' is able to take sentential scope from its position following the subject, which seems to be impossible in the English equivalent (*??No one probably read the book*).

- (202) polis-u daggənnātu leba-w-ən yaz-ä.
 police-DEF fortunately thief-DEF-ACC catch.PER-3MS
 'Fortunately, the police caught the thief.'
- (203) mannəmm mənaləbatə mäs'haf-u-n al-anäbbäb-ä-mm.
 anyone probably book-DEF-ACC NEG-read.PER-3MS-NEG
 'Probably, no one read the book.'

⁵¹ The phonological properties of these clause-initial constituents may indicate that they are specifically hanging topics.

Assuming that this class of adverbs is adjoined to IP (e.g. Jonas & Bobaljik 1993), we can infer that the subject is positioned higher up. Unfortunately, the behavior of other types of adverbs does not allow such a conclusion. Although manner adverbs in Amharic can appear between the subject and verb (204) or object (205), in order for this to bear on the position of the subject, one has to adopt a set of debatable assumptions, namely, that Amharic has V-to-I movement, and that adverbs cannot adjoin to the X' level (Alexiadou & Anagnostopoulou 1998). The former assumption seems to have no support beyond arguments for a general correlation between V-to-I movement and null subject languages (Alexiadou & Anagnostopoulou 1998) or rich subject-verb agreement languages (Platzack 2003), while the latter has been disputed (e.g. Chomsky 1995).

(204) aster tolo č'affär-äčč.

Esther quickly dance.PER-3FS

'Esther danced quickly.'

(205) aster bät'ənək'uk'ə bär kăffät-äčč.

Esther carefully door open.PER-3FS

'Esther carefully opened a door.'

A fourth observation bearing on the hypothesis comes from an Amharic construction which seems to displace elements in the C domain, but nonetheless allows them to remain below the subject. Displacement could be "hidden" in this way if subjects, including potential interveners, are above the position of the displaced element; i.e. higher in the C domain (see Uribe-Etxebarria 2002 and Simpson and Bhattacharya 2003 for other cases of putative "masked" movement). Although this string-vacuous clitic-left-dislocation (CLLD) differs from other left-dislocation phenomena in not requiring a phrase in the clause-initial position (cf. the Lebanese Arabic example in (206) and van Riemsdijk 1997), it shares interpretive and syntactic properties with them, in particular with CLLD in Arabic (see Aoun and Benmamoun 1998, Alexopoulou, Doron and Heycock 2004).⁵² Some of these properties of Amharic CLLD will be discussed in turn, as will an apparent word order reflex it exhibits.

(206) <naadya> šeeḥ-a <*naadya> kariim <*naadya> mbeeriſ.

Nadia saw.3MS-her Nadia Karim Nadia yesterday

'Nadia, Karim saw her yesterday.'

(Lina Choueiri, p.c.)

Consider (207a), which is a standard declarative sentence in Amharic with a transitive verb, compared to (207b), illustrating CLLD: the resumptive clitic *-w*, labeled an object marker in the Amharic literature, is suffixed to the verb and refers to the object *anbässawən* 'the lion (accusative)', the latter putatively positioned in the left periphery despite its occurrence below the subject.⁵³

⁵² The difference in the position of the left-dislocated phrase is not related to the SOV word order of Amharic, which distinguishes it from many languages that possess CLLD: in other SOV languages, such as Hindi (Pritha Chandra, p.c.), left-dislocated phrases must also appear clause-initially. An anonymous reviewer for BAALL comments that some languages exhibit non-clause-initial CLLD topics; however, as in the case discussed here, it is often argued that these topics are merged in the left periphery but do not surface first because of further movement within the clause (cf. Frascarelli 2007).

⁵³ I remain agnostic about the mechanism involved in this displacement, base-generation or movement.

- (207) a. yonas anbässa-w-ən gäddäl-ä.
Jonas lion-DEF-ACC kill.PER-3MS
'Jonas killed the lion.'
- b. yonas anbässa-w-ən gäddäl-ä-w.
Jonas lion-DEF-ACC kill.PER-3MS-3MS_o
'Jonas killed the lion.'
- (Demeke 2003:66)

Object marking (OM) as in (207b) is restricted in a way that is expected if the NP referred to is a topic. Under a cartographic approach to the syntax-IS interface along the lines of Rizzi (1997), espousing a rigid mapping between IS categories and syntactic positions (see section 3.7 and chapter 5), the NP would have to be in the C domain, the component of the clause structure which licenses discourse dependencies.⁵⁴ The topic properties of NPs resumed by OM are as follows. First, non-referential pronouns and plain *wh*-phrases are incompatible with OM, as shown in (208) and (210), respectively; (209) and (211) provide the corresponding data from CLLD in Lebanese Arabic. The unacceptability of (208) with OM derives from the referentiality condition on topics, while in (210) a *wh*-phrase cannot function as both the IS focus and a topic.^{55,56}

- (208) aster and nəgər ayy-äčč-(*əw).
Esther a thing see.PER-3FS-3MS_o
'Esther saw something.'
- (Amberber 1996:139)
- (209) *waahed šeft-o mbeeriʕ.
someone see.PER.1MS-3MS_o yesterday
'Someone, I saw him yesterday.'
- (Lina Choueiri, p.c.)
- (210) aster mən ayy-äčč-(*əw)?
Esther what see.PER-3FS-3MS_o
'What did Esther see?'
- (Amberber 1996:139)
- (211) *šu štriit-o mbeeriʕ?
what buy.PER.2MS-3MS_o yesterday
'What did you buy yesterday?'
- (Lina Choueiri, p.c.)

Second, the forms used as reflexive pronouns can only have their non-reflexive interpretation if referred to by OM, so that in (212b) *rasun* is understood as meaning 'his

⁵⁴ OM seems to primarily be a cataphoric device, correlated with the recurrence of the marked object in subsequent sentences (Haile 1970, Hetzron 1971, Gasser 1983). It is sometimes also said that OM is used to mark "emphasis" and/or is a marker of contrastive focus (Demeke 2003, Yabe 2003), but this claim is difficult to assess, since no independent evidence is provided.

⁵⁵ The referentiality condition on topics marks (208) as ill-formed insofar as the indefinite is not specific (see section 3.2.2).

⁵⁶ As expected, the generalization regarding *wh*-phrases does not apply to d-linked *wh*-phrases, which are possible topics and hence can be topic-marked, as in (ib). See section 2.4 for discussion of d-linked *wh*-phrases and Androulakis (1998) for similar data from Greek clitic-doubling.

- (i) a. *haile mən gāzz-a-w?
Haile what buy.PER-3MS-3MS_o
'What did Haile buy?'
- b. ?haile yätəññaw-ən mäs'haf gāzz-a-w?
Haile which-ACC book buy.PER-3MS-3MS_o
'Which book did Haile buy?'

head' rather than the reflexive 'himself'. Reflexive pronouns are not possible topics due to their non-referentiality (Polinsky & Potsdam 2001).

- (212) a. haile ras-u-n ayy-ä.
 Haile head-POSS.3MS-ACC see.PER-3MS
 'Haile saw himself.'
- b. haile ras-u-n ayy-ä-w.
 Haile head-POSS.3MS-ACC see.PER-3MS-3MS_o
 'Haile saw his head/*himself.'

Beyond its interpretive properties and related distributional characteristics, which suggest displacement in the C domain, OM has a reflex in linear order. This is not observed with respect to the subject, as illustrated above, but rather is evident when OM resumes a phrase base-generated below an object; since the latter is not in the high left periphery, it does not hide displacement which places phrases in a higher position. Thus, (213a) is an example of a simple transitive verb with a direct object and PP adjunct, while in (213b) the prepositional suffix *-bb-* and OM *-ät* referring to the PP have been added to the verb.⁵⁷ Crucially, the PP must then precede the direct object. (213c) illustrates the same point with a slightly different structure, in which the PP surfaces without a preposition, and instead takes the topic marker *-(ə)n*.

- (213) a. aster bet-u-n bā-mät'rägiya-w t'ärräg-äčč.
 Esther house-DEF-ACC with-broom-DEF clean.PER-3FS
 'Esther cleaned the house with the broom.' (Yabe 2007:80)
- b. aster <bā-mät'rägiya-w> bet-u-n <??bā-mät'rägiya-w>
 Esther with-broom-DEF house-DEF-ACC with-broom-DEF
 t'ärräg-äčč-əbb-ät.⁵⁸
 clean.PER-3FS-P-3MS_o
 'Esther cleaned the house with the broom.'
- c. aster <mät'rägiya-w-ən> bet-u-n <*mät'rägiya-w-ən>
 Esther broom-DEF-TOP house-DEF-ACC broom-DEF-TOP
 t'ärräg-äčč-əbb-ät.⁵⁹
 clean.PER-3FS-P-3MS_o
 'Esther cleaned the house with the broom.' (Yabe 2007:82)

Note that the question of whether or not (213a) is the base-generated order is not essential for the issue at hand. If it is, (213b-c) indicate that the PP adjunct necessarily takes a higher position than the direct object only when it is resumed through OM, that is, having undergone CLLD. If (213a) is not the base-generated order, but rather PP-direct object is, (213b-c) show that the direct object cannot be higher than the PP adjunct solely when the latter is referred to by OM, arguably because CLLD positions phrases in the

⁵⁷ The prepositional suffixes *-ll-* and *-bb-* are derived from the prepositions *lä-* and *bä-*, respectively, and carry a range of meanings similar to the latter two forms (Leslau 1995).

⁵⁸ Yabe (2007) says that leaving the PP adjunct in the lower position is dispreferred only by some speakers, while Haile (1970) claims that it is ungrammatical. I have found some interspeaker variation in such cases.

⁵⁹ Yabe (2007) analyzes (213c) as an applicative construction. Although this possibility cannot be ruled out offhand, the alleged applied argument does not exhibit the hallmark properties of argumenthood found crosslinguistically with applicatives, such as allowing passivization (Baker 1988, Peterson 2007).

high left periphery, whereas scrambling as in (213a) does not.

Considering (213a) from another perspective provides further demonstration that subjects can be high in the C domain. (214) is a variant of this sentence with scrambling of the PP adjunct (or its base order; see above), establishing that scrambling can displace elements locally. However, as shown in (215), scrambling does not enable phrases to precede the subject, conceivably because it is limited to adjunction to IP, VP, or AP, on a par with German and Japanese (Grewendorf & Sternefeld 1990, Müller & Sternefeld 1993), while CLLD derives this order, because it is associated with the C domain. If the subject remained within IP, it is not clear what would preclude another phrase from scrambling over it.

- (214) aster bā-māt'rāgiya-w bet-u-n t'ärräg-äčč.
 Esther with-broom-DEF house-DEF-ACC clean.PER-3FS
 'Esther cleaned the house with the broom.'

- (215) wəšša-w-ən_i aster t_i mätt-äčč-*(əw).⁶⁰
 dog-DEF-ACC Esther hit.PER-3FS-3MS₀
 'Esther hit the dog.' (Amberber 1996:138)

To summarize, Amharic possesses a construction which resembles clitic-left-dislocation in other Semitic languages: a phrase is resumed in the verb, and consequently takes on topic-like functions typically associated with the high left periphery. Unlike these languages, however, Amharic does not require the phrase which has putatively undergone CLLD to appear clause-initially. The hypothesis that subjects can be displaced in the C domain captures this peculiarity; the CLLDed phrase could then surface to the left or to the right of the subject, depending on its precise position within the C domain, assuming that more than one such position is available.⁶¹

On the whole, we have amassed a reasonable amount of observations to back up the hypothesis that subjects in Amharic, and potential interveners among them, can be in the C domain. Findings from clefts, subject agreement, adverb placement, and string-vacuous CLLD suggest that subjects do not necessarily occupy a position between the Q operator in C⁰ and the in situ *wh*-phrase, but rather may be above C⁰. If potential interveners are always higher than the Q operator, the relation between the latter and the *wh*-phrase can be established, and hence intervention effects are not expected under a syntactic or semantic approach. However, the story does not end here. Beyond a variety of reservations regarding these findings, some of which were noted above in passing, the syntactic analysis does not successfully explain the entire range of data, and it derives a number of predictions which are not confirmed by the data. I turn to these problems next.

3.5.3 Problems for a Syntactic Analysis

Although the type of syntactic explanation presented in the previous subsection could in principle handle the absence of intervention effects in Amharic, it suffers from a fundamental weakness: the data used to support it only establishes that subjects,

⁶⁰ There is some interspeaker variation in the acceptability of (215) without OM, perhaps suggesting that some speakers allow scrambling to target CP-adjoined positions. I leave this issue for future research.

⁶¹ Alternatively, the availability of the order CLLDed phrase-subject may indicate that subjects do not have to raise beyond their base position in the I domain (but see (215)).

including interveners, *can* be above C^0 , and not that they *must* be. As will be shown below, there is explicit evidence that subjects can remain in the I domain; moreover, when they are interveners, intervention effects nonetheless do not arise. The obvious conclusion is that the position of the subject is not related to the presence or absence of intervention effects, and a syntactic analysis must therefore be rejected.

Four observations refute the possibility that subjects are fixed in the left periphery. To begin with, when functioning as subjects, non-referential indefinite NPs surface in the same position as other subjects and are obligatorily agreed with, as in (216). Given the incompatibility between non-referential NPs and the C domain (Baker 2003), this indicates that subjects may occupy SpecIP; subject agreement, then, does not have to be pronominal.⁶²

- (216) mannəmm ya-n mäs'haf al-anäbbäb-ä-mm.
 anyone that-ACC book NEG-read.PER-3MS-NEG
 'No one read that book.'

Second, quantified subjects in Amharic allow a narrow scope, nonspecific interpretation which should not be available if they are uniformly dislocated in the C domain (Alexiadou & Anagnostopoulou 1998, Baker 2003, Frascarelli 2007). Thus, (217) is ambiguous between a wide scope reading for the subject (i.e. 'some specific policeman stood in front of every bank') and a narrow scope reading, according to which 'in front of every bank stood a different policeman'.

- (217) tənant and polis kä-yyä bank fit k'om-ä.
 yesterday a policeman at-every bank front stand.PER-3MS
 'A policeman stood in front of every bank yesterday.'

Third, the absence of intervention effects in Amharic extends to configurations in which the intervener is an embedded subject (218) or a non-subject (219).

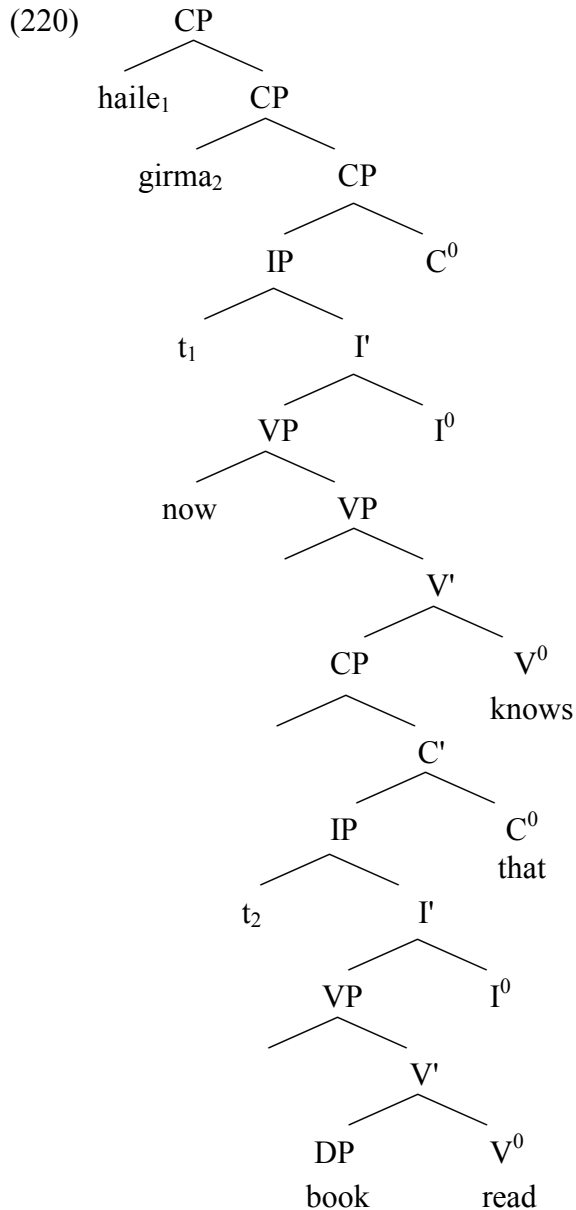
- (218) girma haile bəčča mən ənd-anäbbäb-ä y-asəb-all?
 Girma Haile only what that-read.PER-3MS 3MS-think.IMP-AUX.3MS
 'What does Girma think that only Haile read?'

- (219) girma lä-haile bəčča mən sät't'-ä?
 Girma to-Haile only what give.PER-3MS
 'What did Girma give only to Haile?'

In order to contend with these facts, the syntactic analysis would have to assume that both the matrix subject and potential intervener are above C^0 . However, by doing so, one muddles the putative relation between verbal marking, whether subject agreement or object marking, and displacement in the C domain, since the indirect object in (219) is not marked on the verb. In addition, the idea that embedded subjects surface high in the clause leads to the prediction, schematized in (220), that they could precede adverbs associated with the matrix clause.⁶³ The prediction fails, as shown in (221).

⁶² This observation is at odds with the analysis of (203), where a non-referential NP was claimed to be in the C domain, based on the position of the sentential adverb. I do not have a satisfactory explanation for the adverb placement facts.

⁶³ I thank Julie Legate for suggesting this prediction.



- (221) <ahun> haile <ahun> girma < *ahun> tənant mäs'haf-u-n
 now Haile now Girma now yesterday book-DEF-ACC
 ənd-anəbbāb-ä <ahun> y-awk'-all.⁶⁴
 that-read.PER-3MS now 3MS-know.IMP-AUX.3MS
 'Haile now knows that Girma read the book yesterday.'

A final observation confirming that subjects, including interveners, are not necessarily in a left peripheral position, and that such a position is not relevant for the issue of intervention, involves an interpretational distinction overlooked until now. Returning to the basic example of a *wh*-question with a potential intervener, as in (222),

⁶⁴ The fact that the matrix adverb may immediately precede the matrix verb indicates that it can right-adjoin to VP, and that the verb raises to I⁰, thus surfacing to the right of the adverb. In any case, this does not bear on the position of the embedded subject.

we find that it actually has two possible readings.

(222) haile bəčča mən anäbbäb-ä?

Haile only what read.PER-3MS

a. 'What did only Haile read?'

b. 'Only speaking of Haile, what did he read?'

The (a) interpretation, mentioned above, is the same as in the corresponding English sentence, while in (b), which was noted in passing in section 2.3 and is missing from the English sentence, the speaker indicates that the question *What did he read?* refers exclusively to Haile.

To illustrate the distinction between the two readings more clearly, consider the context in (223) and the subsequent question-answer pairs in (224)-(225): the answer in (224) reflects the (a) reading of the question, while that in (225) reflects the reading in (b). The latter reading, unlike the former, is felicitous in a context in which each book was read by more than one person.

(223) Context: There are four students in the class. All four have read "The Neverending Story" and "Harry Potter and the Philosopher's Stone", but only Haile has read "The Hobbit".

(224) Q: haile bəčča mən anäbbäb-ä?

A: "The Hobbit".

(225) Q: haile bəčča mən anäbbäb-ä?

A: "The Neverending Story", "Harry Potter and the Philosopher's Stone", "The Hobbit".

The critical datum against a syntactic analysis of intervention in Amharic is given in (226): the (b) reading of the question is lost when the *wh*-phrase precedes the subject, rendering the reply below infelicitous given the context in (223).

(226) Q: mən haile bəčča anäbbäb-ä?

what Haile only read.PER-3MS

'What did only Haile read?'

A: # "The Neverending Story", "Harry Potter and the Philosopher's Stone", "The Hobbit".

The finding in (226) shows that the topic interpretation is necessarily associated with a left peripheral position; I submit that this is the same topic position illustrated in the clefts in (198). The upshot of this is that a clause-initial subject, as in (222), may be in one of two hierarchical positions—the canonical SpecIP position or a higher, left peripheral position—but that intervention effects are nonexistent regardless of its location.⁶⁵

⁶⁵ Given an expanded left periphery, one could assume that the subjects under both readings (222a) and (222b) are topics in the C domain, differing in the height of the topic projection which houses them, and that the lower of these projections hosts the subject in (226). However, if discourse properties are signaled uniformly syntactically and phonologically, as claimed by current cartographic approaches (cf. Frascarelli 2007), we would then expect both types of topic to exhibit certain prosodic correlates which differentiate them from non-topics. While such correlates exist in the case of the topic of (222b) (i.e. a low boundary tone and/or pause, as in (198)), canonical subjects as in (222a) and (226) have the prosodic characteristics of IP-internal material.

Given the data examined in this subsection, what are we to make of the various observations provided in favor of the syntactic analysis in the previous subsection? At best, these show that subjects can be in the left periphery. Standard subjects do not exhibit the range of topic properties associated with the pre-pivot position in clefts (cf. (198)-(199)), as clearly indicated by the difference between the unacceptability of (227), with a non-referential NP above the pivot, vs. (228), where a non-referential NP causes no problems in the canonical subject position.

(227) *mənəmm haile nāw lä-girma y-al-sät't'-ä-w-əmm. (=199b)
 nothing Haile COP.3MS to-Girma REL-NEG-give.PER-3MS-DEF-NEG

(228) mannəmm ya-n mäs'haf al-anäbbäb-ä-mm. (=216)
 anyone that-ACC book NEG-read.PER-3MS-NEG
 'No one read that book.'

As for the pronominal status of subject agreement, Sheehan (2006) shows that not all preverbal subjects in Romance null subject languages undergo CLLD to an A'-position, pace Alexiadou and Anagnostopoulou (1998). Thus, the putative correlation between null subjects and pronominal agreement should be established on a language-specific basis, rather than serve as an argument for the position of the subject.

Finally, the claim that the IS properties of phrases resumed by OM indicate their syntactic position hinges on a Rizian approach to the syntax-IS interface. The actual syntactic evidence for the position of these phrases is rather weak, and they may be more akin to clitic-doubled phrases in certain Romance languages, which are generally not assumed to occupy the left periphery.⁶⁶ Furthermore, even if phrases marked by OM are in the left periphery, this does not entail that subjects are always in the periphery. In particular, the fact that these phrases can precede the subject may indicate that the latter has remained in the I domain, as suggested in fn. 61.

In light of the data presented above, I conclude that the clausal structure of Amharic is not as unusual as a syntactic approach to intervention would predict. Intervenors, as well as subjects in general, can be above C⁰, but are not required to. Thus, the absence of intervention effects in Amharic cannot be attributed to its syntax, and a different explanation must be sought.⁶⁷

3.5.4 An Information Structural Approach

The absence of intervention effects in Amharic is a challenge for all existing approaches to intervention, since this phenomenon is generally believed to reflect basic properties of the grammar. Maintaining the latter idea, this section is devoted to showing how the IS approach to intervention advocated here successfully accounts for the Amharic data. As anticipated by this approach, there exist characteristics of Amharic prosody and the way in which it realizes IS-related properties which distinguish it from languages that exhibit

⁶⁶ See Kramer (2010) for such a proposal regarding Amharic OM.

⁶⁷ Tony Kroch (p.c.) points out that one could attempt a syntactic analysis whereby subjects are in a left peripheral position in the specific intervention configurations under discussion, but not necessarily in other cases. This analysis is ruled out by the behavior of embedded subjects with respect to adverbs and by the interpretive distinction between topics and non-topics. The first observation shows that embedded subjects cannot be above C⁰, while the second establishes that potential intervenors functioning as matrix subjects do not have to be above C⁰.

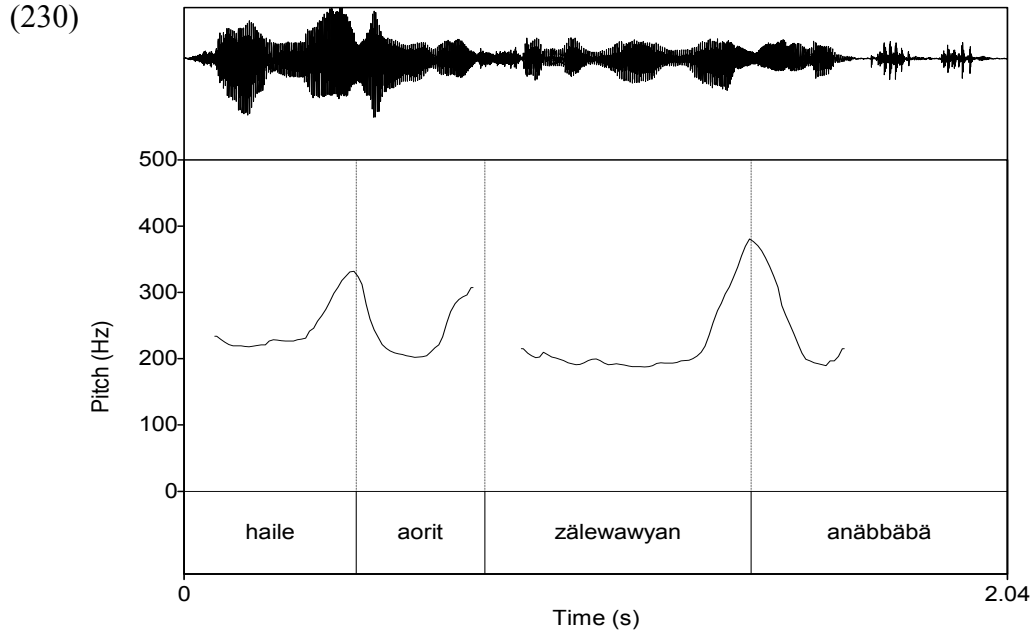
intervention effects.

Attending first to the prosody, Amharic interveners do not exhibit the tonal correlates of focus when preceding a *wh*-phrase, and therefore satisfy the requirement that tails be phonologically reduced. In order to spell out this claim, a brief description of the intonational phonology of Amharic is in order. In Amharic, pitch is not a stable property of the word, and thus an unlikely candidate to be the phonetic correlate of word-level prominence (cf. Hayward 1992). Rather, prominence is realized at the postlexical level via demarcative marking. In Ladd's (1996) crosslinguistic typology of intonational phonology, Amharic should therefore be classified as a postlexical pitch, non-stress accent language, akin to Bangla. In this type of language, also described in Jun (2005), pitch features are assigned by clause-level phrasing rules and not lexically specified on particular syllables, and the prosodic phrasing which these features mark performs the same function as postlexical pitch accent in English (e.g. marking focus). Furthermore, accent is not marked by features like duration, intensity, and vowel quality, as it is in English. In fact, culminative prominence marking—indicating the heads of prosodic units—seems to be weak or nonexistent. This explains why linguists (and speakers) have difficulties identifying prominent syllables: "stress" in Amharic is described in the literature as "weak", "variable" (Hayward & Hayward 1999), and almost evenly distributed on each syllable (Armbruster 1908, Cohen 1936, Leslau 2000).

In Amharic, there are two levels of phonological phrasing, the phonological phrase (P-phrase) and intonational phrase (I-phrase), the former roughly corresponding to a maximal projection, while the latter is the higher, clause-level unit. Non-final P-phrases are associated with a rising contour, composed of a low phrasal tone (L_P) ending right before the edge of the prosodic domain and a following high boundary tone (H_P), while final P-phrases are associated with a low boundary tone (L_P) (see Hayward 1992). I-phrases are characterized by a boundary tone, which is low in statements (L_I) and high in questions (H_I). These tonal events are illustrated in the pitch track (230) for the simple transitive sentence (229), in which prosodic constituents have been indicated.⁶⁸

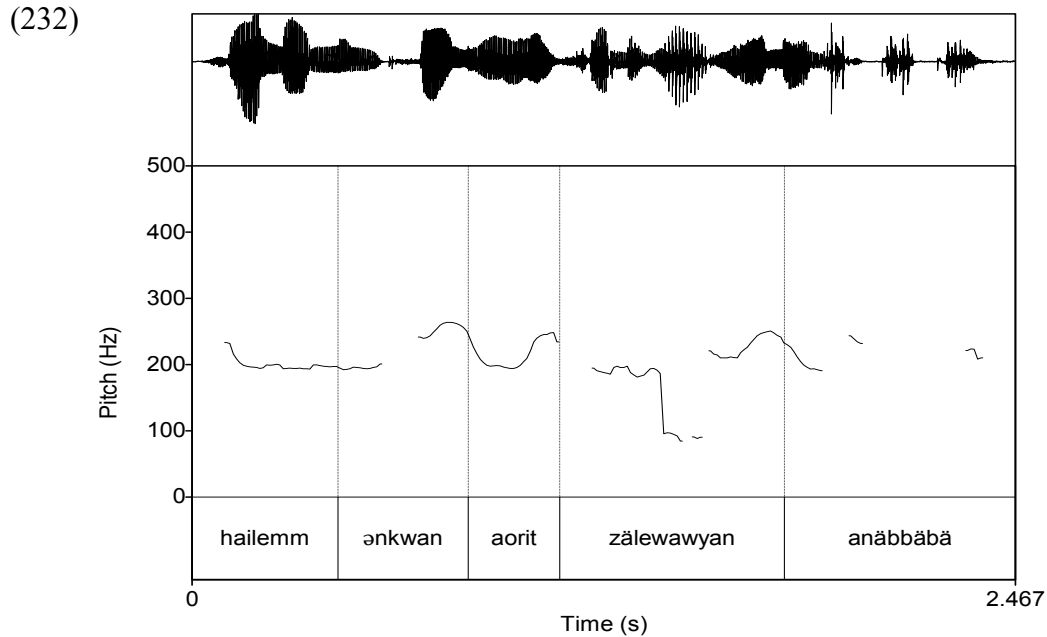
(229) ((haile)_P (aorit)_P (zälewawyan)_P (anäbbäb-ä)_P)_I
 Haile book Leviticus read.PER-3MS
 'Haile read the Book of Leviticus.'

⁶⁸ Recordings were done with four native speakers of Amharic, three females and one male, who read written materials directly into Praat (Boersma & Weenink 2008), installed on a PC laptop. The pitch tracks presented here are from two of the four speakers, but all four produced the same general pitch contours.



Associating the subject in (229) with the focus particles *-mm + ən^wan* 'even', as in (231), creates a different phrasing, shown in (232): while the two constituents that make up the object retain their P-phrase high boundary tones, the subject does not. Rather, *haile* is phrased together with the following focus particle, which has its own high boundary tone.

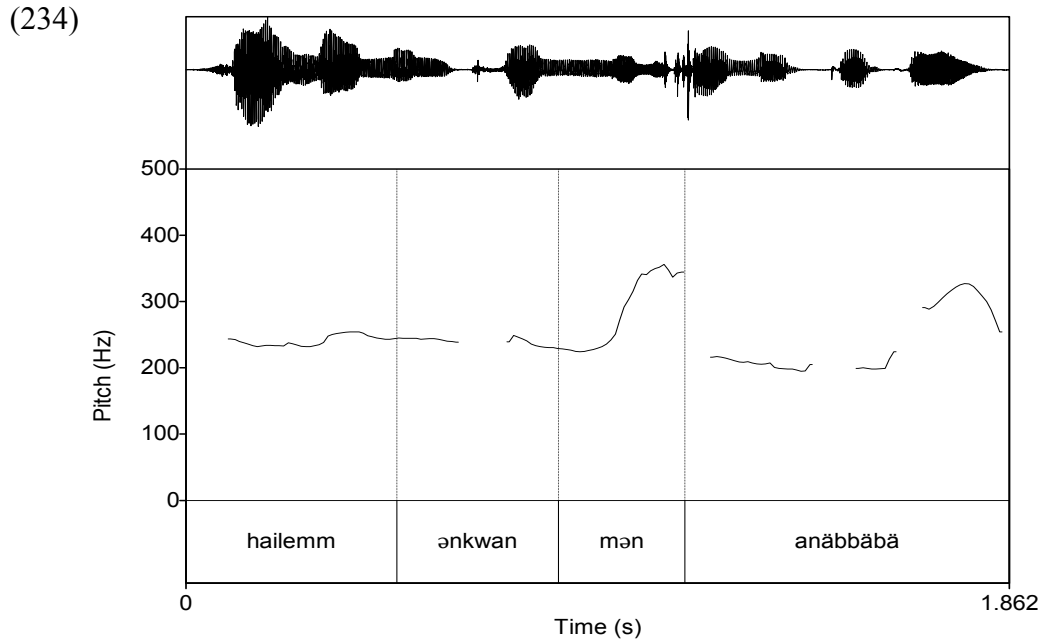
(231) ((haile-mm ən^wan)_P (aorit)_P (zälewawyan)_P (anäbbäb-ä)_P)_I
 Haile-FOC even book Leviticus read.PER-3MS
 'Even Haile read the Book of Leviticus.'



A full analysis of this tonal pattern, which also characterizes the other focus particles mentioned in this section, is tangential to the goals of this study; what is important for our

purposes is to examine what happens to the phonological realization of this type of focus in *wh*-questions.⁶⁹ As predicted by the IS theory, the focus-triggered phrasing is removed: the pitch contour of the standard intervention configuration in (233a), given in (234), shows a prosodic boundary following the *wh*-phrase (realized as a pitch peak, as is common in *wh*-in-situ languages; see Ladd 1996), and an I-phrase-final high boundary tone typical of questions, but no other boundary tones.⁷⁰ Preserving the P-phrase boundary tone which sets apart the focused phrase yields an unacceptable sentence (233b).

- (233) a. ((haile-mm ənkw^wan mən)_P anäbbäb-ä)_I
 Haile-FOC even what read.PER-3MS
 'What did even Haile read?'
 b. *((haile-mm ənkw^wan)_P mən)_P anäbbäb-ä)_I
 Haile-FOC even what read.PER-3MS



The connection between the fact that focus particles show no phonological correlates of focus in a *wh*-question and the absence of intervention effects in Amharic is fairly straightforward. Simply put, Amharic allows in situ manipulation of the prosody of interveners, making it possible for them to be interpreted as (part of) the tail, whereas languages like Japanese and Korean require a syntactic operation—scrambling of the *wh*-phrase over the intervener—to derive the appropriate prosodic representation. As noted in section 3.2.2, these languages do not allow phonological reduction of material preceding IS foci, including *wh*-phrases. I leave open the question of whether the in situ manipulation possible in Amharic is a default property of its intonational phonology, i.e.

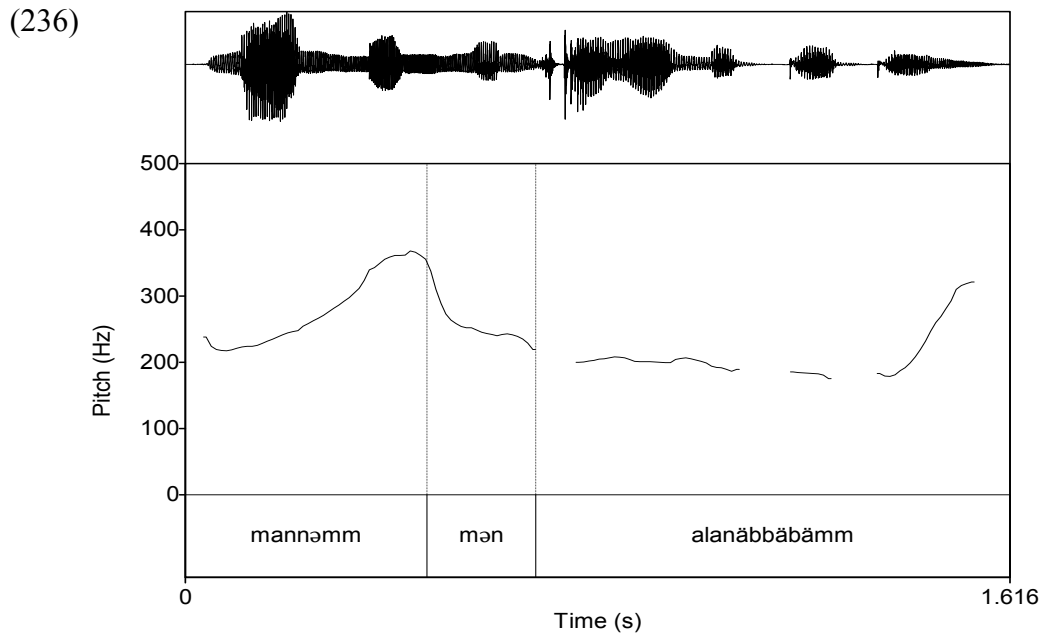
⁶⁹ See Li (2002) for description of a similar tonal structure in the related Ethiosemitic language Chaha, Truckenbrodt (1999) for other cases of focus-conditioned phonological phrasing, and Downing (2005) for rephrasing triggered specifically by focus particles.

⁷⁰ The prosody associated with the *wh*-phrase, akin to that of other *wh*-in-situ languages, indicates that it is an IS focus, and thus cannot be the source of the exceptionality of Amharic with respect to intervention.

a type of automatic pre-focal dephrasing, or an option which speakers make use of to accommodate an *only*-phrase in a *wh*-question. Careful examination of the prosody of *wh*-questions is required to resolve this issue: does all material preceding a *wh*-phrase lose its prosodic constituent status, including expressions which can be topics and hence need not be reduced, or is this only true of items which cannot function as topics?

Before moving on to a discussion of the relevant IS properties of Amharic, it is necessary to address one class of potential interveners which was singled out earlier, namely, NPIs. These elements did trigger a certain degree of unacceptability when preceding a *wh*-phrase, reflecting the type of intervention effect found in other languages but not elsewhere in Amharic. The difference between NPIs and other potential interveners in Amharic, and hence the cause underlying their divergent behavior in *wh*-questions, is the fact that NPIs do not permit in situ modification of their tonal correlates, and therefore cannot function as tails. Thus, when speakers are asked to produce a *wh*-question involving an NPI, as in (235), the latter exhibits an unambiguous H_P boundary tone: compare (236) to (234).⁷¹ As observed in 3.2.2, NPIs in other languages are also distinct in constituting the most robust type of intervener; moreover, while differing in its details, the explanation for this finding in Japanese and Korean is similarly phonological.

- (235) ?((mannəmm)_P mən al-anäbbäb-ä-mm)_I
 anyone what NEG-read.PER-3MS-NEG
 'What did no one read?'



Turning to IS, recall the finding that *wh*-questions like (237) actually have two possible readings, (a) and (b), the latter roughly meaning that the question *What did he read?* refers exclusively to Haile.

⁷¹ The absence of a prosodic boundary on the *wh*-phrase in (236) is putatively the type of post-focus reduction also observed following NPIs in Japanese (Ishihara 2007).

- (237) *haile bəčča mən anäbbäb-ä?*
 Haile only what read.PER-3MS
 a. 'What did only Haile read?'
 b. 'Only speaking of Haile, what did he read?'

The interpretation in (a), I assume, is sanctioned by virtue of the prosodic facts described above, allowing the *only*-phrase to be in the ground. In the (b) reading, the focus particle *bəčča* takes the topic as its argument, rather than the preadjacent proposition (i.e. *What did Haile read*), as English *only* does. Thus, *bəčča* here does not signal exhaustification over the proposition, but rather over the address in the questioner's knowledge store where the information contributed by the IS focus is to be entered. In other words, the constituent modified by *bəčča* is a type of contrastive topic.

The fact that Amharic enables focus particles like *bəčča* to take a topic as their argument provides it with a second way to evade intervention effects, since the resulting contrastive topic can be integrated in the IS articulation. Referentiality is not a requirement for contrastive topics (see also the similar Hungarian example in (131b)), and in any case, what serves as the contrastive topic in (237b) is the referential NP *haile*; *bəčča* is an element of the compositional marking used to indicate a contrastive topic, and not part of the propositional content of the sentence. Other languages lack the option of creating contrastive topics in this manner, or specifically in this environment: Tsez, for example, bans the combination of topic marking and focus particles altogether (Polinsky & Potsdam 2001), while Japanese allows *dake* 'only' to associate with *wa*-marked phrases (see (47b) in section 2.3), but excludes the combination *dake-wa* from questions (Hara 2006, 2007). An additional aspect of the Amharic data that sets it apart from other languages is the fact that although possible, overt morphological marking of the subject is not necessary to obtain the topic interpretation.⁷²

The account of why Amharic lacks intervention effects in *wh*-questions extends as is to alternative questions. First, interveners can be tails even when preceding the disjunctive phrase since they do not carry the phonological correlates of focus; the single IS focus is represented by the disjuncts, which are phonologically prominent as in English. Second, when interveners are interpreted as contrastive topics, they do not create intervention effects because they can be incorporated in the IS articulation of the alternative question without violating any IS well-formedness condition.

To conclude section 3.5, we have reviewed three categories of evidence which establish the validity of the IS approach to intervention proposed in Tomioka (2007a,b). The absence of intervention effects in certain contexts and structures, as well as in Amharic, was shown to be associated with particular prosodic and IS properties, but not necessarily with any distinguishing syntactic or semantic characteristics. The following section introduces a novel set of data, showing that intervention effects also appear in declarative sentences. This data serves to significantly strengthen the case for an IS approach, while further undermining syntactic and semantic analyses.

⁷² An example of the topic marker *-ss* is given in (198b).

3.6 Intervention Effects in Declaratives

3.6.1 Introduction

All in all, the case for an IS approach to intervention effects, based on *wh*- and alternative questions, is very strong. What would make the case even more compelling is data from environments other than questions. That is, if intervention effects reflect basic constraints on the informational articulation of sentences, there is no reason to assume that they should be limited to questions. Indeed, following her semantic line of inquiry, Beck (2006) also recognizes the implication that intervention effects are predicted to arise whenever multiple semantic foci are involved in a structure, and claims to have found such effects. However, because she neglects the role of IS, Beck does not consider a crucial set of declarative examples exhibiting varying patterns of acceptability. These examples are discussed in this section, and are shown to confirm the validity of an IS analysis.

This section is structured as follows. The first subsection, 3.6.1, presents the novel data, using examples from a number of languages, and shows that it is comparable to the data from questions reviewed in previous sections, thereby justifying a uniform analysis. In this subsection I also demonstrate that the ill-formedness of intervention configurations manifests itself not only in speaker judgments, but also restricts the truth conditions one can assign to a sentence. In subsection 3.6.2 I argue that the IS theory developed for questions naturally extends to declaratives, while subsection 3.6.3 establishes that syntactic and semantic approaches to intervention fail to capture the observations regarding declarative sentences. I also rule out explanations grounded in theories of focus realization: intervention effects in declaratives do not reflect illicit patterns of focus realization, determined by prosodic well-formedness constraints.

The occurrence of intervention effects in declaratives can be summarized in the following crosslinguistic generalization, which has gone unnoticed in the literature until now: an IS focus can precede an *only*-phrase which is not an IS focus, but the same string is unacceptable when the focus status of the arguments is reversed, that is, when the *only*-phrase which is not an IS focus comes before the IS focus.^{73,74} The ill-formed configuration—i.e. the intervention effect—is exemplified in the answers to a *wh*-question in (238b-c), where the IS focus is the element answering the question (question/answer focus), and in sentences in which the IS focus is a correction to a previous sentence (corrective focus), like (239).⁷⁵ In both examples, *only John* constitutes an intervener. Recall that italics are used to indicate the associate of *only* and small caps mark the pitch accent on the IS focus.

- (238) a. What did only John drink?
b. *Only *John* drank only *BEER*.
c. ??Only *John* drank BEER.

⁷³ I thank Tony Kroch for bringing the initial observations reported here to my attention.

⁷⁴ This generalization will have to be slightly modified when additional data is considered below.

⁷⁵ To the best of my knowledge, this data has been previously discussed in the literature only by Rooth (2010) and Toosarvandani (2010), who mention examples analogous to (238). However, both do not notice its acceptable counterpart in (240), and erroneously attribute its degradedness to an unspecified phonological constraint and a problem with focus association, respectively. See 3.6.3 for further discussion.

- (239) a. *It's not true that only John drank wine, only *John* drank only *BEER*.
 b. ??It's not true that only John drank wine, only *John* drank *BEER*.

The other part of the generalization, referring to the well-formed configuration, can be illustrated in a couple of ways. As in questions, the acceptable sentences all differ from the illicit examples in (238)-(239) in their informational articulation. First, if the IS focus is the subject, rather than the object as in the above examples, it will come before any potential intervener and the sentence is then acceptable; cf. the answer in (240b) and the corrective context in (241).

- (240) a. Who drank only beer?⁷⁶
 b. Only *JOHN* drank only *beer*.

(241) It's not true that Mary drank only beer, only *JOHN* drank only *beer*.

Second, it is possible to repair the unacceptable sentences in (238)-(239) by employing a structure which reverses the order of the IS focus and potential intervener, placing the former before the latter. For this purpose, speakers can choose whatever structures the syntax of their language makes available to them: in English this can be done inter alia via passivization (242) and specificational copular constructions (243), in Catalan right-dislocation is possible (244), and German allows topicalization (245). These examples show that there is nothing semantically or pragmatically wrong with the sentences in (238)-(239): the meaning can be conveyed via a different structure.

- (242) a. What did only John drink?
 b. Only *BEER* was drunk by only *John*.⁷⁷

(243) It's not true that only John drank wine, *BEER* was the only thing that only *John* drank.

- (244) a. Què va beure només el Joan?
 what drank only John
 'What did only John drink?'
 b. *Només el Joan va beure només cervesa.
 only John drank only beer
 'Only John drank only beer.'
 c. Només cervesa, va beure només el Joan.
 only beer drank only John
 'Only beer, only John drank.'

(Laia Mayol, p.c.)

- (245) a. Was hat nur Johann getrunken?
 what has only John drunk
 'What did only John drink?'

⁷⁶ The same judgments arise if we replace the lower DP-*only* in (238) and (240) with VP-*only*: (i) corresponds to (238) and (ii) to (240).

(i) a. What did only John drink?
 b. *Only *John* only drank *BEER*.

(ii) a. Who only drank beer?
 b. Only *JOHN* only drank *beer*.

⁷⁷ Any awkwardness arising from the use of a passive sentence to answer an active question should be ignored.

- b. ??Nur Johann hat nur bier getrunken.
 only John has only beer drunk
 'Only John drank only beer.'
- c. Nur bier hat nur Johann getrunken.
 only beer has only John drunk
 'Only beer only John drank.'

(Florian Schwarz, p.c.)

The effect of these structures on the IS status of the potential intervener—*only John*—is mediated by the position and/or grammatical function of the intervener. That is, the potential intervener fills a grammatical function correlated with a different IS status than in the unacceptable examples (e.g. *by*-phrase vs. subject), and/or falls in the postnuclear domain, where deaccenting applies (see sections 3.2.2 and 3.3). In this domain, the IS options for the potential intervener differ from those available in the prenuclear domain. When the IS focus is the subject, as in (240)-(241), accommodation of the *only*-phrase which is not an IS focus comes "for free", because it is always in the postnuclear domain. Further details on how examples like (240)-(245) work in IS terms will be provided in section 3.6.2.

The parallelism between the declarative examples and the questions examined in previous sections is clear. First, the unacceptable baseline configurations and their acceptable variants are the same, as schematized in (246): an *only*-phrase preceding an IS focus constitutes an intervener and yields an unacceptable sentence (246a), but if the *only*-phrase follows the focus the result is acceptable (246b). The difference between the configurations is correlated with a word order change in the case of questions, whereas in the declarative examples it is either a function of the IS alone, dictated by the preceding context and reflected in the prosody, or is associated with a structural change which has consequences for IS.

- (246) a. */??[... *only* ...] [... XP ...]
 b. [... XP ...] [... *only* ...]

Second, the set of interveners is the same in declaratives and questions; in addition to the examples with *only* above it is possible to illustrate that intervention effects in declaratives are also triggered by NPIs. However, this requires turning to a language possessing the type of NPI which is relevant for the structures we are testing, i.e. one which can appear in subject position. Japanese is just such a language.

Consider the Japanese example in (247), an object question and corresponding answer containing the NPI *daremo* 'anyone' as the subject. The answer is preferably ordered with the NPI subject following the object which answers the question—the IS focus—as in (247c). Notice that for it to be well-formed, the question (247a) must have the *wh*-phrase scrambled above the intervener; the base order would be unacceptable due to an intervention effect.

- (247) a. nani-o daremo nom-ana-katta-no?
 what-ACC anyone drink-NEG-PAST-Q
 'What did no one drink?'
- b. ??daremo biiru-o nom-ana-katta.
 anyone beer-ACC drink-NEG-PAST
 'No one drank beer.'

- c. biiru-o daremo nom-ana-katta.
 beer-ACC anyone drink-NEG-PAST
 'No one drank beer.'

(Satoshi Nambu, p.c.)

The fact that the question must have the word order given in (247a) introduces a confounding factor. That is, it is possible that (247c) is favored in part or wholly because of a preference for alignment in word order between questions and answers, whatever such a preference reduces to. Indeed, in a question-answer pair where the *wh*-phrase has been scrambled to the initial position but there is no intervention configuration or other interfering factor, speakers favor the answer which matches the word order of the question. Thus, (248c) is preferred over (248b) as the answer to (248a).

- (248) a. nani-o John-ga non-da-no?
 what-ACC John-NOM drink-PAST-Q
 'What did John drink?'
 b. ?John-ga biiru-o non-da.
 John-NOM beer-ACC drink-PAST
 'John drank beer.'
 c. biiru-o John-ga non-da.
 beer-ACC John-NOM drink-PAST
 'John drank beer.'

(Satoshi Nambu, p.c.)

There are two ways we can try to control for this confound. First, we can ask whether the preference for alignment in (248) is as robust as it is in (247); in other words, do speakers feel that (248b) is degraded to the extent that (247b) is? The answer is no: the preference for the object-initial answer is clearly more pronounced in (247) than it is in (248). Thus, a desire for question-answer parallelism is not the sole factor underlying the judgments reported in (247). A second, perhaps more instructive strategy for singling out the effect of the NPI is to use a different structure for question and answer. Fortunately, Japanese possesses cleft questions, and it allows them to be answered with a non-cleft declarative. As expected if the degradedness of an NPI-initial order cannot be attributed exclusively to the word order of the preceding question, an answer with this order is also unacceptable when the question is a cleft: (249b) is not a possible answer to the cleft question (249a), and the order in (249c), identical to (247c), must be used. The word order of the question is not a factor in this example, and we can therefore conclude that it is the NPI—as an intervener—which underlies the unacceptability of (249b), as well as that of (247b).

- (249) a. daremo nom-ana-katta-no-wa nani-o desu-ka?
 anyone drink-NEG-PAST-NML-TOP what-ACC COP-Q
 'What is it that no one drank?'
 b. ??daremo biiru-o nom-ana-katta.
 anyone beer-ACC drink-NEG-PAST
 'No one drank beer.'
 c. biiru-o daremo nom-ana-katta.
 beer-ACC anyone drink-NEG-PAST
 'No one drank beer.'

(Satoshi Nambu, p.c.)

A final aspect of the parallelism between the declarative and question examples is the amelioration of intervention effects in certain structures due to their pragmatic properties, not necessarily mediated by the syntax or the prosody. In the case of questions, this has been observed with adjunct *wh*-questions, where the content of the question without the *wh*-phrase is presupposed, and hence backgrounded in IS terms; the potential intervener is then accommodated and intervention effects are reduced or entirely eliminated (see section 3.4). In declaratives, it is possible to derive a well-formed sentence by placing the potential intervener in a pseudocleft, as in (250).

- The pragmatic meaning of (250b) is different from the non-cleft declaratives above: the pseudocleft presupposes and thus backgrounds the content of the free relative (i.e. that only John drank something in (250b)). Because this backgrounding includes the *only*-phrase, the latter is not an intervener.

(251) a. Only John eats only rice. → No one other than John eats rice.
b. Only rice is eaten by only John. → No one other than John eats rice.

(252) a. QUD: Who eats only rice?
b. Only *JOHN* eats only *rice*. \rightarrow No one other than John eats rice.

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- (253) a. QUD: What does only John eat? / What is eaten by only John?
 b. *Only *John* eats only *RICE*.
 c. Only *RICE* is eaten by only *John*. → No one other than John eats rice.
- (254) a. */??[... *only* ...] [... XP ...] (=246)
 b. [... XP ...] [... *only* ...]

Decisive evidence for the claim that the difference between the sentences in (251) is not a function of the active/passive distinction is provided in (255). This is a specificational construction and not a passive, and yet it has the same entailment as the passive in (251b).

- (255) *RICE* is the only thing that only *John* eats. → No one other than John eats rice.

The configurations schematized in (254) thus affect not only the judgments speakers give for a sentence, but also potentially its truth conditions. These configurations are clearly information structural in nature, as they make crucial reference to the notion of IS focus. Although the general IS approach to intervention described in section 2 and applied to questions can explain the difference between the configurations, there are certain aspects of the declarative examples which distinguish them from questions and therefore require further attention. These are taken up in the next subsection.

3.6.2 An Information Structural Analysis

The patterning of focus intervention effects in declarative sentences points to the IS approach to intervention, which was proposed for questions in section 3.2.2 and supported by the data in sections 3.3 through 3.5. The sensitivity of these effects to IS properties, which are determined by the preceding context, and by structural and pragmatic manipulations, suggests that they should be accounted for on a par with intervention effects in questions. Nevertheless, the declarative cases of intervention are not entirely identical to the question examples.

The key difference between the question and declarative contexts is the fact that in the latter case the *only*-phrases—i.e. the interveners—are not construed as IS foci. Rather, since they are material repeated from a lead-in sentence, whether an interrogative or a declarative, they are not potential candidates for focushood. Why are *only*-phrases nonetheless incompatible with the informational articulation of the declarative sentences under discussion? Two possible IS categories are available for the *only*-phrases in the declaratives, topic and tail, given that the third—focus—is filled by the element answering the question or correcting the previous sentence. However, I argue that in the ill-formed examples these *only*-phrases can be neither topics nor tails. They cannot be topics because they are non-referential, as discussed in section 3.2.2. The *only*-phrases in the declarative examples cannot be tails as well, though this is not attributable to their phonological status, as was the case with interveners in questions. Since these *only*-phrases do not function as IS foci, they have no phonological prominence, and therefore do not violate the condition requiring tails to be non-prominent.⁷⁹

Instead, the incompatibility of the *only*-phrases in the declarative examples with

⁷⁹ Although these *only*-phrases include foci in the semantic sense, this has no bearing on their phonological status, which is determined solely by the IS (see section 2.3).

tailhood is related to their status as prenuclear subjects. We have established that there is a strong crosslinguistic preference to interpret these subjects as topics, and they can be the IS focus given the right context. However, they are averse to tailhood. This generalization pertains only to prenuclear subjects, while subjects following the nuclear stress are free to be tails (Vallduví 1990). The option of postnuclear subject tails can be demonstrated in languages which have postnuclear subject positions, such as Catalan and Italian. Thus, in examples (256) and (257), repeated from section 2.2, the objects *de pa* and *le verdure* are the topics, respectively, and the subjects *mon germà* and *il capo* the tails. The awkward English translations, using right-dislocation, reflect the lack of an appropriate equivalent in this language.

The IS constraint which captures the generalization described above is repeated in (258); recall that we exploited it in section 3.2.2 to account for the status of Japanese and Korean sentences involving interveners which are not matrix subjects.

Notice that (258) is not formulated as an absolute constraint, and therefore allows exceptions. In fact, we have already encountered evidence that (258) is not categorical: the questions in (150), (152), and (155) are acceptable because prenuclear subjects can be tails, provided that they are deaccented and in a discourse context which explicitly sets them up as tails. (150) is given again below for convenience, together with its preceding context; also provided is its unacceptable counterpart without deaccenting.

(260) Did only *John* pass SYNTAX or PHONOLOGY? (=150)

The *only*-phrase is permitted in the alternative question (260) because it abides by the various IS well-formedness conditions. First, it has been introduced in a preceding context and hence does not compete with the disjunction for the status of IS focus. Second, *only John* is prosodically reduced, in accordance with the phonological condition on tails. Third, the context in (259) and the question itself unambiguously establish the exams, rather than the subject *only John*, as the topic of the question. The question is a request for information regarding the exam which only one student, John, passed, not a request for information about John. Thus, *only John* is a candidate for tailhood, rather than topichood; since the constraint on prenuclear subjects in (258) is not categorical, unlike the referentiality constraint on topics, *only John* can be accommodated in the IS

articulation. Conversely, the option of tailhood is not available for the subject *only John* in the declarative examples, and it is treated as a topic by default.

An indication of the favored topic interpretation of the *only*-phrase in the declaratives is provided by speaker comments. Speakers report that in trying to interpret the answers in (262), they feel compelled to construe the subject *only John* as a proper name.

- (262) a. What did only John drink? (=238)
 b. *Only *John* drank only *BEER*.
 c. ??Only *John* drank *BEER*.

A proper name, of course, is a possible topic, unlike the non-referential expression *only John*. In other words, speakers are driven to impose on the sentence an informational articulation in which the subject is the topic. Thus, despite the fact that *only John* does not violate the phonological condition on tails, and the fact that (258) can be overridden under certain circumstances, the context (or lack thereof) in (262) does not allow *only John* to be interpreted as a tail. The referentiality constraint on topics therefore applies, marking such an example as ill-formed.

Examples like (260)-(261) not only clarify the status of the constraint in (258), but also show that the phonological condition on tails, which requires them to lack prominence, needs to be maintained independently of (258) in the analysis of intervention effects. The phonological condition distinguishes the acceptable example in (260) from its unacceptable counterpart in (261), but the constraint in (258) does not. In addition, the import of the phonological condition is reflected in its ability to explain various patterns described in section 3.2.2, such as the difference between languages with stressed vs. non-stressed quantifiers, and distinctions within languages between intervention triggers that normally associate with the prominent IS focus and those that do not. The status of these items depends on whether or not they are phonologically prominent, indicating that they cannot be captured by (258) alone, and the phonological condition is therefore not redundant.

Returning to the declarative sentences, there is independent evidence that their ill-formedness is due to (258). That is, the conditions under which intervention effects in declaratives do not arise, listed in (263), are precisely the conditions that allow a phrase to be a tail according to (258).

- (263) a. The potential intervener is not the subject.
 b. The potential intervener is not in a prenuclear position.

The effects do not occur if at least one of these conditions is met. Let us consider them in turn, using both novel examples and examples already presented in the previous subsection. The impact of the first condition is shown below, where the potential intervener is an indirect object (264) and a direct object (265), rather than the subject, and the sentences are acceptable.⁸⁰

⁸⁰ For reasons that are unclear to me, (264b) seems to be judged as less acceptable if the *only* is placed adjacent to the object (DP-*only*), as in (i). In any case, this is not true of (265b), as shown in (ii).

- (i) a. What did Mary give only John?
 b. ??Mary gave only *John* only *A BOOK*.
 (ii) a. I hear that John gave only *A BOOK* to Mary.
 b. True, but John gave only *a book* to *MANY PEOPLE*.

- (264) a. What did Mary only give John?
 b. Mary only gave *John* (only) *A BOOK*.
- (265) a. I hear that John only gave *A BOOK* to Mary.
 b. True, but John only gave *a book* to MANY PEOPLE. (Dryer 1994:2)

These sentences parallel the Japanese and Korean *wh*-question examples from section 3.2.2, where non-subject interveners similarly differ from subjects. Non-subjects are not preferred topics, but instead can be assigned the category of tail. Accordingly, the referentiality constraint on topics does not apply.

The second condition under which an *only*-phrase does not trigger an intervention effect can be illustrated in Catalan. In (266), repeated from above, the (b) answer follows the word order of its English counterpart and is similarly ill-formed. In the structural variant (c), which English lacks, the *only*-phrase is placed in a postnuclear, right-dislocated position reserved specifically for tails (see Vallduví 1990), and the sentence becomes acceptable.

- (266) a. Què va beure només el Joan? (=244)
 what drank only John
 'What did only John drink?'
 b. *Només el Joan va beure només cervesa.
 only John drank only beer
 'Only John drank only beer.'
 c. Només cervesa, va beure només el Joan.
 only beer drank only John
 'Only beer, only John drank.'

Even if it is the subject, a postnuclear element may be a tail, allowing its (lack of) referentiality to be disregarded, as in (266c). The acceptability of the resulting sentence corroborates the idea that what goes wrong in the unacceptable declarative sentences is due to the absence of the tail option.

The two conditions in (263) may be satisfied simultaneously, if a potential intervener is both a non-subject and postnuclear; for example, when it is the object in the answer to a subject *wh*-question:

- (267) a. Who drank only beer? (=240)
 b. Only *JOHN* drank only *beer*.

Nothing bars *only beer* from functioning as the tail in (267b).

In addition to the conditions in (263), there is another circumstance in which intervention effects are absent from declaratives. That is, if the *only*-phrase is in a construction which prompts speakers to interpret it as a tail, regardless of whether it is a subject or in a prenuclear position, no intervention effect is observed. This is demonstrated in (268b), a *there*-existential sentence, where the subject *only skyscrapers*, which also happens to be a potential intervener, is not construed as the topic.⁸¹ Rather, this role is filled by the implicit spatio-temporal parameters of the sentence; in other

⁸¹ I thank Satoshi Tomioka for suggesting this type of sentence.

words, a stage topic (see Reinhart 1981, Erteschik-Shir 1997, and section 2.2).⁸²

- (268) a. Where are there only skyscrapers?
 b. There are only *skyscrapers* only in *TOKYO*.

We have come across a similar case with pseudoclefts, which make the option of tailhood available for an *only*-phrase contained in the free relative, yielding an acceptable sentence in (269b).

- (269) a. What did only John drink? (=250)
 b. What only *John* drank was BEER.

The kind of circumstance exemplified in (268b) may converge with fulfillment of the two conditions in (263). Thus, in the acceptable English passive sentence in (270b), *only John* is a non-subject, is postnuclear, and serves as a *by*-phrase, which generally precludes a topic interpretation.

- (270) a. What did only John drink? (=242)
 b. Only *BEER* was drunk by only *John*.

To recapitulate, the examples in (264)-(270) differ in acceptability from the previous declarative answers due to the IS status of the potential intervener. The key to avoiding intervention effects, reflected in (264)-(270), is that speakers are not coerced into construing the potential intervener as the topic, but instead can interpret it as the tail. Although this interpretation may be affected by linear order, order is not the only factor playing a part (cf. (264)-(265) and (268)-(269)), contra the original descriptive generalization put forward in section 3.6.1. The option of tailhood renders the non-referentiality of the potential intervener irrelevant, and thus no IS well-formedness condition is violated.

The IS approach to intervention has been successfully applied in this subsection to the novel data from declarative sentences. On a par with questions, intervention effects in these sentences result from a mismatch between the IS categories available in a sentence and the elements making up the sentence. The fact that the IS analysis proposed for *wh*- and alternative questions also captures the pattern of intervention effects in declaratives strongly supports its validity as a general approach to intervention. Nevertheless, it is important to explicitly rule out alternative syntactic and semantic approaches; the next subsection is devoted to this task.

⁸² Evidence for the non-topic status of the subject in a *there*-construction is provided by its inability to license backward anaphora, as noted by Zubizarreta (1998):

(i) *Because he_i is hungry, there is a dangerous tiger_i in my garden. (Zubizarreta 1998:9)

The observation that the antecedent of a backward anaphor must be a topic was made by Reinhart (1986), based on the data in (ii). The subject or object of an active sentence can function as a topic and therefore both are possible antecedents (iia), but the *by*-phrase of a passive resists serving as a topic (iib); (iic) is unacceptable because the anaphor matches the gender of *Kora*, which is not a possible antecedent.

(ii) a. When he_{i/j} entered the room, Max_i greeted Bill_j.
 b. When he_{i/*j} entered the room, Max_i was greeted by Bill_j.
 c. #When she entered the room, Max was greeted by Kora. (Reinhart 1986:139)

3.6.3 Non-Information Structural Analyses

Three classes of non-information structural analyses are examined in this subsection: syntactic and semantic analyses, which were reviewed in section 3.2.1 in the context of questions, and theories of focus realization. Although the latter are not intended as analyses of intervention, they are relevant because the sentences at issue all involve foci marked by prominence. Thus, one could imagine a proposal whereby the effects discussed here actually reflect patterns of focus realization which are illicit because they violate prosodic well-formedness constraints.

The fact that intervention effects turn up outside of questions is surprising for some analyses of intervention but not for others. It is an obvious problem for analyses which reduce intervention to the blocking of a necessary syntactic relation in questions, whether this relation is realized via movement of *wh*-phrases (Beck 1996, Beck & Kim 1997), of *wh*-features (Pesetsky 2000), or of the question particle (Hagstrom 1998). Intervention is not a property of questions per se; rather, *wh*-questions and alternative questions are a subclass of constructions in which intervention effects may surface, due to their IS characteristics. Theories appealing to focus movement at LF are also at a disadvantage, since the idea of covert focus movement (Chomsky 1976) has been largely discredited: it is semantically unnecessary (Rooth 1996a, Wold 1998) and derives the incorrect syntactic prediction that foci should not be possible in islands (Jackendoff 1972; see Newmeyer 2004 and chapter 5 for a range of arguments against LF focus movement). If there is no covert focus movement, the answers repeated below in (271)-(272) are syntactically identical, and should therefore yield identical speaker judgments under a syntactic theory, contrary to fact.

- (271) a. What did only John drink? (=238)
 b. *Only *John* drank only *BEER*.
- (272) a. Who drank only beer? (=240)
 b. Only *JOHN* drank only *beer*.

The evidence from declaratives in (271)-(272) is clearer than that provided by questions, since in the latter case, acceptable sentences differ in their surface word order from unacceptable ones, making a syntactic theory at least conceivable.

One could attempt to salvage feature-based syntactic analyses by appealing to focus features, rather than *wh*-features, given that focushood is clearly relevant to all the intervention contexts described above. Consider one such feature-based approach, Kim (2005), mentioned in section 3.2.1. According to Kim, intervention effects reflect the inability to establish an Agree relation between a *wh*-phrase, with uninterpretable Q(uestion) and F(ocus) features, and an interrogative C^0 . C^0 is supposed to check these features, but cannot do so due to the presence of an interfering interpretable F feature. This is schematized in (273).

- (273) *[CP $C_{[iQ, iF]}$ [... Foc_[iF] ... [... *wh*_[uQ, uF] ...]]]

Although it is possible to adapt the representation in (273) to fit the declarative examples, replacing the *wh*-phrase with a focused phrase and interrogative C^0 with a relevant complementizer, it is unclear how this would contribute to or diverge from the proposed IS analysis. The well-formed and ill-formed representations of declaratives, assuming such a feature-based approach, are given in (274). The necessary distinction

between IS foci and non-IS foci is translated here into the featural notion of interpretability, for the sake of simplicity (IS focus = uninterpretable and needs to be checked; non-IS focus = interpretable and is not checked).

(274) a. $*[_{CP} C_{[iF]} [\dots Foc_{[iF]} \dots [\dots Foc_{[uF]} \dots]]]$ (cf. (271b))

b. $[_{CP} C_{[iF]} [\dots Foc_{[uF]} \dots [\dots Foc_{[iF]} \dots]]]$ (cf. (272b))

This seems to be nothing more than a schematic representation of the facts, which are ultimately rooted in IS notions. Even at a purely descriptive level, however, the representation is inadequate, since it necessarily makes many unsupported assumptions: both semantic and IS focus bear focus features, but only the features of the latter need to be checked, while the features of the former block this checking. Furthermore, while the IS approach is able to predict both the ill-formedness of (274a) and the well-formedness of (274b) from independently motivated generalizations, the feature-based analysis makes no such predictions of its own.

There is also a class of syntactic theories of intervention effects which do not invoke movement, but rather view the effects as a mismatch between properties of the intervener and its position in the tree (Simpson & Bhattacharya 2003, Grohmann 2006). These theories, which were overlooked in section 3.2.1, are closer to the IS approach in that the syntactic positions they refer to encode IS notions; Grohmann (2006), for example, who only deals with German multiple *wh*-questions, claims that interveners are unable to occupy the topic positions available between the two *wh*-phrases in such structures. However, because these theories adhere to a hierarchical view of intervention, they generate the same kind of incorrect structural predictions as other syntactic analyses. They posit, for instance, that *c*-command is relevant to intervention, a hypothesis which was refuted in section 3.3. Both for the question and the declarative examples, these syntactic theories would be forced to syntacticize generalizations which are properly information structural, such as the referentiality constraint on topics. This additional layer of analysis is gratuitous, if not utterly wrong-headed; subjects in English, for instance, would have to generally occupy a topic position in the C domain, which is inaccessible to *only*-phrases. I am not aware of evidence that subjects are higher than SpecIP in standard English sentences.

Having concluded that syntactic analyses cannot account for the declarative data in a non-stipulative manner, we are left with Beck's (2006) semantic approach, as well as theories of focus realization. Beck proffers a semantic analysis of intervention in *wh*-questions, which she reduces to a problem with the semantic mechanism of evaluation of alternatives, as summarized in section 3.2.1. The approach is then extended to all phenomena involving the evaluation of alternatives in the semantics, including alternative questions, NPIs, and question/answer focus (see also Beck 2007, Beck and Kim 2006, Beck and Vasisht 2009). The basic idea applicable to all these cases is that a focus operator blindly evaluates alternatives in its scope; thus, if such an operator comes between a higher operator and its intended argument, the higher operator is unable to evaluate the alternatives which the argument introduces. Consequently, interpretations which depend on the higher operator evaluating the alternatives are unavailable, and when this is the only interpretation possible (e.g. in *wh*-questions), the result is ungrammatical. The generalization capturing all these cases is given in (275), where the operator (Op) can be the operator found in questions, the operator evaluating

question/answer congruence, or the operator associated with an item like *only*. The intervening operator is any element that can give rise to a focus-affected reading, i.e. that comes with the \sim operator.

(275) General Minimality Effect MIN: The evaluation of alternatives introduced by an XP cannot skip an intervening \sim operator.

*[Op [$\sim C$ [ϕ ... XP ...]]] (Beck 2007:268)

The LF representation in (277) shows how the General Minimality Effect applies to a sentence involving multiple foci like (276), from Rooth (1996a): it is predicted that *also* cannot associate with *Bob Kennedy*, since *only* interferes (subscript F here indicates LF focus marking).

(276) We only introduced [Marilyn]_F to John Kennedy.

We also only introduced [Marilyn]_F to [Bob Kennedy]_F.

'Another person who we introduced only Marilyn to is Bob Kennedy.'

(277) [_{alsoC} [_{onlyD} [_X introduced Marilyn_{F2} to [Bob Kennedy]_{F1}]]]

The interpretation of sentences like (276) is a matter of debate in the literature, but Beck and Vasishth (2009) claim to have found empirical evidence supporting Beck's prediction that the indicated association is impossible. Specifically, they report that speakers disprefer such sentences compared to paired controls which do not involve this association.

Regardless of how the debate regarding (276) is resolved, the semantic approach espoused by Beck fails to account for the types of configurations described in this section. The approach does not make the distinction between semantic and IS focus, which is needed to tell apart acceptable vs. unacceptable configurations involving *only*-type operators, and takes into consideration only the semantic properties of these operators. In fact, the focus structures described here refute the constraint in (275). I will describe two attempts to incorporate the declarative intervention data into Beck's semantic theory, and show how both fail to cover the entire range of data and at the same time establish that there is no General Minimality Effect as formulated in (275).

First, let us use the LF representation Beck posits for the basic example of an intervention configuration in a *wh*-question (278), given in (279).

(278) *Minsu-man nuku-lûl po-ass-ni? (=116a)
Minsu-only who-ACC see-PAST-Q
'Who did only Minsu see?'

(279) [_{CP} Q₂ [_{IP3} only_C [_{IP2} $\sim C$ [_{IP1} Minsu_{F1} saw who₂]]]]]

This LF is based on two assumptions Beck makes, which are crucial for her theory. The first is that focus-sensitive operators, as she calls *only*-type operators, always attach to verbal projections and clausal nodes, even in cases of apparent DP adjunction. This assumption is indispensable: if focus-sensitive operators could attach locally to DP subjects, they would be expected to evaluate the alternatives introduced by the DP rather than the *wh*-phrase in *wh*-questions. Accordingly, these operators would not interfere with the relation between the higher question operator and *wh*-phrase, and intervention

effects would not be predicted. The second assumption is that focus association is not selective, and so coindexing does not determine which foci are evaluated.⁸³ This is necessary to get the semantic theory off the ground, since if association were selective, there would be no reason for a focus operator to evaluate the *wh*-phrase rather than its DP associate.

Strictly following the LF representation in (279), with focus-sensitive operators attached at the highest node, yields the representations in (281) and (283) for the unacceptable and acceptable declarative sentences in (280) and (282), respectively (Q/A in these representations is the operator evaluating question/answer congruence).

(280) *Only *John* drank only *BEER*.

(281) [Q/A_C [~C [only_D [~D [only_E [~E [John_{F2} drank beer_{F1}]]]]]]]]

(282) Only *JOHN* drank only *beer*.

(283) [Q/A_C [~C [only_D [~D [only_E [~E [John_{F2} drank beer_{F1}]]]]]]]]

The representations in (281) and (283) are identical, leaving Beck's theory no obvious way to predict the well-formedness of (282).⁸⁴ Thus, the same assumptions needed to rule out the original examples of intervention in *wh*-questions, as well as the unacceptable declaratives, also mark the acceptable declaratives as ill-formed, contrary to fact.

A second strategy to capture the declarative intervention examples under Beck's semantic theory postulates different LF representations for the unacceptable and acceptable examples. This allows us to distinguish them in terms of well-formedness.^{85,86}

(284) *Only *John* drank only *BEER*.

(285) [IP [Q/A_C+only_E [only_D [John_{F2} [VP drank beer_{F1}]]]]]
└──────────────────┘
X

(286) Only *JOHN* drank only *beer*.

(287) [IP [Q/A_C+only_D [John_{F2} [only_E [VP drank beer_{F1}]]]]]
└────────┘ └──────────────────┘

The distinction between the representations is made possible by the assumption that IS focus, including question/answer focus, is evaluated by a clausal operator, whereas non-IS focus, such as the associate of *only*, is evaluated locally. Thus, in (287), the operator associated with the object *beer* adjoins to the VP, so that it can evaluate *beer* locally and does not interfere with the evaluation of the subject *John*. However, in (285) the operator associated with *beer* adjoins to the clausal node, because it must evaluate

⁸³ The assumption that focus association is not selective is debatable; it is explicitly argued against in Wold (1996) and is not adopted in a theory to be discussed below, Büring (2008).

⁸⁴ The LF representations in (281) and (283) involve a crossing dependency, while the example of multiple foci in (277) includes a nested dependency. However, this distinction does not matter for Beck, since both types of dependencies are supposed to violate (275) (see also Beck and Vasisht 2009, who subsume crossing dependencies under the semantic theory).

⁸⁵ I thank Hubert Truckenbrodt for suggesting this analysis.

⁸⁶ In order to avoid irrelevant theoretical complications, I represent the operator associated with *only* and the operator evaluating question/answer congruence as a single operator. According to Beck (2006), her theory can handle cases in which both types of operators evaluate the same phrase.

question/answer congruence; the operator associated with the subject *John* then gets in the way and the result is an intervention effect.

The problem with this strategy is that it cannot explain the status of the acceptable examples in which the IS focus follows the *only*-phrase that is not the IS focus, such as (288). The LF representation for the sentence, in (289), is identical to the ill-formed (285) in relevant respects, and yet the sentence is not judged as deviant.

(288) There are only *skyscrapers* only in *TOKYO*.

(289) [_{IP} Q/A_C+only_E [there are [only_D [skyscrapers_{F2} [in Tokyo_{F1}]]]]]
└──────────────────────────────────┘
X

Since linear order or hierarchical relations alone do not correctly predict the (un)acceptability of intervention effects in declaratives, a generalization of the sort Beck proposes in the General Minimality Effect cannot be correct.

All in all, Beck's theory seems to be on very shaky ground. In addition to the observations regarding declaratives, we have already encountered evidence that the basic rationale behind the semantic theory is misguided: in Chinese, an *only*-type operator can associate with a *wh*-phrase, which goes against the idea that the former cannot evaluate the latter (see section 3.3).

A final type of theory worth considering is one which attempts to predict prosodic patterns of focus realization, given the prosodic difference between the licit vs. illicit declarative sentences under consideration. Büring (2008) and Rooth (2010) are two theories of this sort. Büring undertakes to explain the differences in prosodic realization between first occurrence foci and second occurrence foci (SOF) without directly referring to these notions. To this end, he claims that every focus comes with a domain independently determined by the syntax or phonology, and that it is this domain which determines how a focus will be realized.⁸⁷ A focus with a larger domain has primacy over one with a smaller domain: see (290) and (291), where O can be the operator associated with any type of focus (focus-sensitive particles, question/answer focus, etc.).

(290) Domain Theory of Primacy: Among two foci in a sentence, the primary focus is the focus whose domain contains the domain of the other.

(291) FOCUSPROMINENCE: If P is the domain of a focus-sensitive operator O, the most prominent element in P is a focus of O.

Domain size depends on the type of focus; free focus, which includes question/answer focus, corrective, and contrastive focus (i.e. IS focus in our terms) has the entire sentence as its domain, while the domain of associated foci (=phrases involving an *only*-type operator) is smaller, generally either a VP or DP.

Büring's theory can be illustrated with the example in (292), which involves two associated foci, one of which—*John*—is also a free focus, and the other, *juice*, is an SOF.⁸⁸

(292) Many people only drank juice at John's party.
 Even *JOHN* only drank *juice* at his party.

⁸⁷ Büring explores both syntactically and phonologically defined domains; the distinction is not relevant here.

⁸⁸ Büring provides independent justification for the claim that *John* is a free focus.

The LF representation of (292) is given in (293), where foci are indexed and *CC* is the constant *CONTEXTCONNECT*, requiring a salient antecedent in the context whose meaning is an element of the set of propositions introduced by \sim .⁸⁹

(293) Many people only drank juice at John's party.
 [[Even₁ John_{F1,F3}] [only₂ drank juice_{F2} at his party]]_{~3} *CC*

In accordance with (291), both foci, *John* and *juice*, are prominent within their domains, that is, receive phrase level stress.⁹⁰ However, the free focus *John* must be the more prominent of the two foci, i.e. bear the nuclear pitch accent, since its domain is the entire sentence. The metrical structure in (294) represents these two levels of prominence, and the nuclear pitch accent (PA) on *John* is derived via the rule in (295).



(294) [[Even₁ John_{F1,F3}] [only₂ drank juice_{F2}]]_{~3} *CC*

(295) Stress-to-Accent Rule: Assign a pitch accent to the strongest/nuclear stress and to every metrically strong syllable preceding it.

Given this rough sketch of Büring's theory, it is possible to evaluate whether it has anything to say about the intervention configurations in declaratives. It does not: both the acceptable and unacceptable configurations are predicted to be well-formed, since neither violates *FOCUSPROMINENCE*. The LF and accent pattern for an acceptable sentence, which is identical to (294), is provided in (296), while an unacceptable sentence is schematized in (297).



(296) [[Only₁ John_{F1,F3}] drank [only₂ beer_{F2}]]_{~3} *CC*



(297) [[Only₁ John_{F1}] drank [only₂ beer_{F2,F3}]]_{~3} *CC*

Thus, irrespective of the ability of Büring's theory to generate correct prominence patterns, it does not make any relevant predictions concerning intervention effects. Of course, since it is ultimately a phonological theory, while the effects are information structural in nature, this is not surprising.

⁸⁹ Büring's theory differs from Beck (2006) in employing indexed foci (see fn. 83) and in the assumption that the domain of a focus operator may be a DP alone (*John* in (293)), for which he provides motivation.

⁹⁰ In assuming that *juice* bears phrasal stress, Büring relies on the findings of Beaver et al. (2007) regarding prominence on SOF (see section 2.3).

A rival theory of focus realization is put forward in Rooth (2010). Like Büring's domain-based theory, this is an attempt to correctly predict various patterns of focus realization, in particular cases of SOF and multiple focus particles in a sentence. The details of the theory are not important for our purposes, since, on a par with Büring, it does not prohibit ill-formed intervention configurations. Nonetheless, there is one observation Rooth makes which is relevant here. Rooth discusses the answers to the question in (298), repeated from section 2.3, which were originally brought up by Schwarzschild (1997, 2004) to corroborate the distinction between association with *only* and the focus-ground partition. One suggestion Rooth puts forward to explain the assumed unacceptability of these answers is that they violate a phonological constraint on metrical configurations.

- (298) a. What food will Renee only eat in PARIS? (=49)
 b. #She'll only eat CREPES in Paris.
 c. #She'll only eat crepes in PARIS.

To support his idea, Rooth presents the unacceptable answer in (299), analogous to the examples I have analyzed as reflecting a focus intervention effect, and proposes that its status stems from the same phonological constraint as that underlying (298b-c).

- (299) a. Who does only John like?
 b. ??Only *John* likes MARY.

Although Rooth does not spell out the details of the putative phonological constraint he is referring to, what he has in mind is a prohibition on adjacent accents. I dispute this hypothesis regarding the cause of intervention effects, and intend to show that it cannot be correct; phonology plays a role in intervention effects only indirectly, as one possible surface manifestation of IS labels.

The single piece of evidence Rooth provides for his hypothesis is the judgment in (300), where increasing the phonological distance between the two accents supposedly yields an acceptable sentence.

- (300) a. Who does only Abernathy like?
 b. (??)Only *Abernathy* likes MARY.

However, this judgment is highly questionable: neither I nor any other native speaker I have consulted find (300b) to be a noticeable improvement over (299b). Similarly, pulling apart the alleged accents in (299b) by adding material to the VP, rather than manipulating the subject, does not yield a more acceptable sentence in (301b).

- (301) a. Who does only John often visit?
 b. ??Only *John* often visits MARY.

In any case, it seems that the constraint Rooth is invoking does not exist in the format he requires. That is, while there is a constraint on adjacent accents in English, it is not relevant to (299)-(300). This constraint—the Clash Avoidance Requirement—is discussed in detail from both a diachronic and synchronic perspective in Speyer (2008), who provides the descriptive formulation in (302) and the technical one in (303).

- (302) The Clash Avoidance Requirement: If there is more than one focused element in a clause, at least one non-focused element must intervene. (Speyer 2008:161)

- (303) The Clash Avoidance Requirement: On any level of rhythmic representation, strong and weak beats must alternate such that there is at least one weak beat between two strong beats. (Speyer 2008:164)

The Clash Avoidance Requirement forces focused elements in the phonological sense, or strong beats, to have a non-focused element, or weak beat, between them. Examples like (299b) do not have two phonologically focused elements of equal status: the *only*-phrase is an SOF, not comparable to the IS focus answering the question. From our perspective, any sort of prominence on the *only*-phrase, if such prominence were to be found, would be due to a low-level effect of phonetic copying or motor planning, stemming from the prominence assigned to the *only*-phrase in its first occurrence (see section 2.3). Neither its motivation nor its phonetic implementation would be on a par with that of the prominence on the element answering the question, *Mary*. Even phonetic studies which claim to have found phonetic focus marking on SOF expressions, such as Beaver et al. (2007) and Féry and Ishihara (2009), do not equate them with first occurrence foci; notice that Büring (2008) also differentiates the two types of focus in his theory described above. In fact, if Rooth were right in his description of the phonological cause underlying (299b), an SOF should never be able to be adjacent to an IS focus. However, this is exactly what we observed in examples like (304), repeated from above, which is acceptable despite the SOF *John* flanking the IS focus *a book*.

- (304) a. What did Mary only give John? (=264)
 b. Mary only gave *John* (only) *A BOOK*.

An additional problem with trying to apply a constraint on adjacent accents to declarative examples of intervention is that the elements are not actually adjacent. There is an element intervening between the two that allegedly clash with each other; namely, the verb. Indeed, this is precisely the configuration which Middle English speakers used, according to Speyer (2008), to avoid a clash: they placed an unstressed verb between two foci, in accordance with the V2 syntax of Middle English, and thus precluded a violation of the Clash Avoidance Requirement. Accordingly, no such violation is expected in examples like (299b). To sum up, there is no reason to believe that (299b), or any of the other instances of intervention, are ruled out on phonological grounds.

Three types of potential non-information structural explanations for intervention in declaratives have been assessed here. All were found to be inadequate, whether because they do not apply to declarative sentences to begin with (e.g. Pesetsky 2000), are unable to correctly discriminate between ill-formed and well-formed structures (Beck 2006), or restrict themselves to the intonational phonology (Büring 2008). The acceptable and unacceptable sentences do not seem to differ in any relevant syntactic or semantic property. Rather, it is only their informational articulation, created by different preceding contexts and structures and reflected in the prosody, which tells them apart. Accordingly, only an IS approach of the type first proposed to account for intervention effects in questions is able to cover this data.⁹¹ The final section of this chapter summarizes the

⁹¹ It has recently come to my attention that the ill-formed intervention configuration in declaratives is also noted in Toosarvandani (2010), who claims that the unacceptability of answers like (ib) follows from the absence of a focus in the constituent to which *only* is adjoined, i.e. the subject. He ultimately derives the need for such a focus from a discourse-oriented account of focus association.

(i) a. What has only *MAX* made?

findings regarding intervention in questions and declaratives, and considers them from a general theoretical perspective: what they tell us about the representation of IS and its position in the grammar, and about its relations with other components of the grammar.

3.7 Summary and Implications

In this chapter, I made the case for viewing focus intervention effects as an IS phenomenon, following a proposal made in Tomioka (2007a,b). Intervention effects have often been treated as a syntactic phenomenon, in which the syntactic relation between a *wh*-phrase and its licensing Q operator in C^0 is blocked by an element, the intervener, sharing features with the *wh*-phrase and/or the Q operator. I argued, however, that syntactic analyses, such as Beck (1996) and Pesetsky (2000), fall short in their attempts to capture the relevant data. Among other things, they fail to provide a basic description of the relevant class of interveners, and run into problems given their reliance on covert movement.

The difficulties for syntactic analyses are also noted in Beck (2006), who maintains that because interveners are classified based on their semantic properties—all are focus-sensitive operators—a semantic approach to intervention should be pursued. The basic idea is that focus-sensitive operators interfere with the semantic relation between the Q operator and the *wh*-phrase, because they take the place of the Q operator in evaluating the alternatives introduced by the *wh*-phrase. Since these alternatives must be evaluated by Q, the semantic derivation breaks down.

The semantic approach overcomes the abovementioned weaknesses of syntactic analyses, and unlike the latter, it also covers intervention effects in questions with a disjunction, whose existence has been acknowledged only recently. However, it shares with syntactic analyses the inability to explain a number of observations reported in Tomioka (2007a,b). These include a great deal of interspeaker variability in judgments, which is unexpected under any syntactic or semantic account, and the amelioration of intervention effects when the intervener is an embedded subject or not a subject. These observations, Tomioka argues, point to an IS explanation of intervention. Specifically, there is no IS category with which the intervener is compatible in the informational articulation of the sentence.

Taking Tomioka's proposal as its starting point, this chapter has sought to spell out the details of the IS approach and to provide further support for the approach through a wide variety of data. First and foremost, this support consists of examples in which the predictions of syntactic and semantic analyses vs. the IS approach unmistakably diverge. Contra syntactic and semantic analyses, intervention effects respond to changes in the context, are not read off the hierarchical structure, and take into account the element with which the potential intervener associates. These observations are all expected under the

b. ??Only *Max* has made *SUSHI*.

(Toosarvandani 2010:102)

There are a couple of problems with Toosarvandani's explanation. For one thing, it is self-contradictory: if an SOF is a focus marked by some measure of stress, as Toosarvandani assumes, his claim that *only* in (ib) has no focused associate is false. In addition, the explanation predicts that the well-formed declarative examples discussed here should be unacceptable, since they also involve an *only*-type operator lacking a prominent associate; thus, *sushi* in (iib) has the same status as *Max* in (ib).

(ii) a. Who has made only *sushi*?

b. Only *MAX* has made only *sushi*.

IS approach. In addition, the IS approach is corroborated by its ability to capture different types of variation reported in the literature with respect to intervention effects. Differences between languages, between interveners in a given language, and between speakers of the same language reduce to lexical properties of the interveners, which may bear on the informational articulation. Syntactic and semantic analyses of intervention have either ignored these differences or attributed them to syntactic features which have no independent justification.

Having reviewed the basic predictions, which are inherent to the theoretical framework of syntactic and semantic analyses and thus particularly detrimental to their case, I proceeded to tackle two additional sets of data. The absence of intervention effects in certain types of questions and in a particular language, Amharic, was shown to follow directly from IS properties, as well as properties relevant to IS, whether phonological or pragmatic. Possible syntactic alternatives to the IS approach were also evaluated, and, despite constituting plausible explanations, were argued to suffer from insurmountable difficulties.

Lastly, the IS approach receives strong support from the occurrence of intervention effects in declarative sentences, which pattern in a way hitherto unnoticed in the literature. In order to detect this phenomenon in declaratives, it is necessary to set up a lead-in context which forces a particular informational articulation on the declarative sentence. Each element of the sentence is then mapped onto a specific IS category, and any mismatch between properties of these elements and their IS category gives rise to degradedness, i.e. intervention effects. Since there is no syntactic or semantic difference between the unacceptable declaratives involving such a mismatch and their acceptable counterparts, it is not surprising that syntactic and semantic analyses are unable to cover this data. They end up either too strong—predicting ungrammaticality for perfectly acceptable sentences—or overly weak, unable to rule out illicit configurations.

By appealing to the IS approach to intervention, it is possible to account for the entire range of data presented here. The specific IS well-formedness conditions which preclude the intervener from fitting in the informational articulation, first introduced in section 2.5, are repeated below.

- (305) A clause contains one and only one IS focus.
- (306) Aboutness topics must be referential.
- (307) Tails must lack prosodic prominence.
- (308) Prenuclear subjects resist serving as (part of) the tail.

The first condition restricts the IS categories available for a potential intervener when the unique IS focus is fixed on some other element, due to the particular construction being used or the context. Constructions with an invariable IS focus include *wh*-questions in *wh*-in-situ languages and alternative questions, where the IS focus is the *wh*-phrase and the disjunctive phrase, respectively. In these environments, the focus is not contextually determined and cannot be altered. Thus, even in cases where intervention effects could be ameliorated by providing a backgrounding context or moving the *wh*-phrase/disjunction, it was not the IS status of the latter which changed, but rather that of other elements in the sentence. In constructions where the informational articulation is not predetermined and rigid, such as English *wh*-questions, a potential intervener can function as the IS focus

and does not clash with other foci, avoiding a violation of (305). Although the status of this restriction on foci has been debated in the literature, its existence is corroborated by the role it plays in accounting for intervention effects and in making sense of the environments in which they occur.

The remaining constraints exclude the two other possible IS categories, topic and tail. The second constraint, following from the established view of topics adopted here, explains why potential interveners cannot be topics. This constraint is typically invoked in the literature to account for the unavailability of topic marking—topicalization, topic particles, etc.—on various expressions. However, intervention effects demonstrate that the incompatibility between non-referential elements and topichood is purely information structural; there does not need to be any overt morphosyntactic correlate of topichood. The third constraint, in (307), is a defining property of tails, and was appealed to in explaining why differences in the intonational phonology may underlie differences in the IS status of potential interveners. This ultimately determines whether or not they can be accommodated in the informational articulation. The fourth and final constraint is most clearly observed in languages which have prenuclear vs. postnuclear subject positions, since they require a subject tail to occur in the latter. As expected, modifying the structure so as to make a subject intervener postnuclear has an effect on the well-formedness of the sentence.

The IS approach is not only able to explain the unacceptable examples of intervention, but also helps us to understand why changes to these examples prevent intervention effects. Insofar as a potential intervener can be labeled a topic or a tail, it will be innocuous. Various strategies can be employed to this end; although they may include syntactic and phonological manipulations of the base structure, their import for intervention effects is in the changes they bring about to the informational articulation.

Given that the effects under discussion are not caused by interference in the relation between two elements, "intervention effects" is something of a misnomer; a more appropriate label would be information structural mismatch or misplacement effects. Of course, this does not mean that all phenomena categorized in the literature as cases of "intervention" should be subsumed under such a label. Beck and Kim (2006) note that syntactic minimality effects in the sense of Rizzi (1990) are of an entirely different nature than the focus-related phenomenon discussed here. An example of such an effect is the ungrammaticality induced by A-movement of one DP across another (e.g. Pak 2008); whether other cases labeled "intervention" are of a similar sort or fall under the IS account is an empirical question which should be looked into in future work.

The findings of this case study have considerable implications for two general issues: the conception of IS in the grammar, and the ontological status of focus in language, i.e. the question of whether focus is a single, uniform entity, aligned in the semantics and IS. I begin by discussing the former.

Over the past fifty-odd years, research within generative linguistics has uncovered a range of well-formedness conditions applying to the syntactic, semantic, and phonological levels of representation in the grammar. These include, for instance, locality constraints on syntactic movement, licensing requirements on polarity items in the semantic domain, and phonological guidelines for proper metrical structure. Clearly, any attempt to produce a model of linguistic competence must include an accurate formulation of these conditions.

The analysis of intervention effects put forward here shows that syntactic, semantic, and phonological constraints do not exhaust the types of well-formedness conditions which a model of linguistic competence must incorporate. Rather, there exist IS well-formedness conditions, which mark certain configurations as illicit, indirectly motivate structural choices, and influence the truth conditions assigned to sentences. By establishing that IS is responsible for the phenomenon of intervention, via these well-formedness conditions, this chapter has brought its significance to light. Furthermore, the results of the current study underscore the need to take into consideration the potential role of IS in a host of other phenomena. Examples which come to mind are the unavailability of clefted multiple *wh*-questions in certain languages (Lambrecht 1994), which was left unresolved in section 2.5, the infelicity of focusing the subject in specificational copular clauses (Mikkelsen 2009), and weak crossover effects, whose sensitivity to the IS notions of focus and topichood has long been known (see Erteschik-Shir 1997, a.o.). Given its centrality in the linguistic literature and its possible relevance for exploring the relations between IS and other levels of representation, the latter phenomenon is taken up as a case study in the following chapter.

Despite the fact that the IS patterns discussed in this chapter often go together with syntactic and/or phonological changes to the sentence, we have managed to differentiate between effects emanating from these other levels and those reflecting the IS well-formedness conditions. For instance, although intervention effects in declaratives correlate with certain prosodic contours, they do not stem from constraints on these contours. Thus, we can conclude that the well-formedness conditions under discussion are exclusively information structural in nature.

The existence of IS well-formedness conditions, which can only be stated in IS terms and have the range of effects described in this chapter, constitutes robust evidence for the claim that IS is an autonomous level of organization of linguistic information (cf. Vallduví 1990, Erteschik-Shir 1997). As an autonomous component of the grammar, IS has primitives of its own, which combine to generate IS representations in accordance with a set of conventionalized guidelines. Interacting with the other parts of the linguistic system, the IS component is essential in determining whether a given output of the system is licit or not. In order to understand how this conclusion regarding IS bears on the architecture of the grammar, it is necessary to consider how existing theories view this architecture.

As noted in chapter 1, generative theories typically identify four components in the grammar: a lexicon, a core computational system, and the interface levels PF and LF. In such an architecture, there is no independent representation of IS. Consequently, existing theories which assume this architecture either encode IS categories directly in the phrase structure or attribute what seem to be effects of IS to another established level of representation. Alternatively, some theories acknowledge the existence of an independent IS level of representation, whether implicitly or explicitly.

The first type of approach is represented by the cartographic research program initiated in Rizzi (1997), where IS notions are encoded in formal features. These features are associated with particular functional projections, whose specifiers serve as sites for licensing the formal features. In this approach, a topic will undergo feature-driven movement to check its [topic] feature in the specifier of a topic phrase, TopP, while a focus is assumed to move to the specifier of a focus phrase, FocP. These projections

constitute a fixed set, ordered amongst themselves, and situated in the C domain, or the left periphery.⁹² To the extent that it is not diluted to mimic another kind of approach, the cartographic theory makes strong predictions. There should be a one-to-one relation between IS categories and syntactic positions; foci, for example, should universally appear in a left peripheral focus position, whether overtly or at LF. In addition, IS categories are expected to preserve a fixed ordering, as described by Rizzi, and to exhibit sensitivity to syntactic locality constraints. Finally, and crucially for our purposes, this theory does not allow IS to impose requirements of its own on the linguistic output, without the involvement of the syntax.

A second strategy for handling IS-related phenomena in the grammar, like the first, does not recognize IS as an independent level of representation. However, rather than appealing to IS categories and features encoded in the syntactic tree, it explains IS effects by attributing them to the work of another established level of representation.⁹³ In particular, they are often viewed as products of the syntax-phonology interface. The most well-known representative of this strategy is the class of focus-to-stress mapping theories (Reinhart 1995, 2006, Neeleman & Reinhart 1998, Zubizarreta 1998, Arregi 2002, Szendrői 2003), according to which certain types of movement are justified because they result in alignment between a focused element and nuclear stress. Since stress is assumed to be independently assigned by an algorithm of the computational system, this interface-driven movement is favored over uneconomical stress shifting operations. Furthermore, it exhibits properties which distinguish it from purely syntactic movement, rooted in feature checking requirements (see Horvath 2010). Focus-to-stress analyses do away with the syntactic encoding of focus, as advocated *inter alia* in Jackendoff (1972) and Horvath (1986), whatever its formal implementation.

A general shortcoming of the latter class of theories is their limited coverage; at best, they can only capture phenomena in which the phonology acts as a mediator, and only if the phenomenon is reflected in word order. Thus, the data presented here regarding intervention effects fall outside the scope of these theories. This is not to say that the general idea of deriving IS-related phenomena by appealing to the interfaces is incorrect; to do so, however, would require considering not just the interface with the phonology. One would also have to handle the question of where exactly to encode IS notions, so that they are outside the syntax but legible at the interfaces.

Lastly, there is a growing body of analyses which include IS as an independent level of representation, linked to an autonomous module which guides the production and interpretation of IS representations. In some cases this approach is explicitly argued for, usually in the context of a general discussion of IS (Vallduví 1990, Lambrecht 1994, Erteschik-Shir 1997, 2007), and in others it is implicitly assumed, as part of an analysis of a specific phenomenon (e.g. Neeleman & van de Koot 2008, Horvath 2010). For instance, Neeleman and van de Koot propose that restrictions on scrambling in Dutch follow from the need to adhere to "discourse templates", i.e. rules for mapping syntactic structures to IS representations. In making reference to the latter kind of representation, they implicitly acknowledge that there must be an IS component responsible for it.

Clearly, only the last of the three existing perspectives on IS fits in with our

⁹² See Belletti (2004) for the existence of lower, IP-internal topic and focus positions.

⁹³ Cf., for instance, Szendrői (2003), who maintains that "pragmatic" considerations drive syntactic operations only if they are formally encoded in LF or PF notions.

conclusion that Vallduví's (1990) "autonomy-of-informatics" hypothesis is correct. The informational articulation of a sentence cannot be conflated with other levels of representation, though it may have access to the information they encode. This, in turn, casts serious doubt on the cartographic theory of Rizzi (1997). A theory which postulates a one-to-one relation between structure and interpretation, and does not allow IS ill-formedness independently of the syntax, is incompatible with the finding that intervention effects are not linked to specific positions in the syntactic tree. How, for example, would one capture the fact that non-referential expressions are barred from topichood, and that the number of IS foci per clause is restricted, regardless of the surface position of topics and foci? Presumably, one could attempt to derive a structural representation which accords with the cartographic viewpoint, through covert movement to topic and focus projections. However, given the lack of independent evidence for this movement, the fact that it replicates and unnecessarily complicates an existing IS analysis, and causes a range of difficulties for other, more established parts of syntactic theory, this seems like an unattractive solution, to say the least.

The abandonment of a trivial mapping between IS and syntax, as exists in the cartographic approach, and the adoption of an IS level of representation in its place raises a number of theoretical questions. First, there is the matter of the internal composition of IS, about which the intervention effect data provides us some information. In terms of the primitives making up the IS articulation of a sentence, we have found that the tripartite division proposed in Vallduví (1990) is both necessary and sufficient to explain intervention effects. The existence of the IS categories of focus, topic, and tail is corroborated by differences in the sensitivity they display to semantic, phonological, and syntactic properties. Non-referential phrases, for example, are unsuited to be topics, tails must lack prosodic prominence, and there can only be one focus in a sentence. Another feature of IS representations is the format in which their primitives are arranged. Unfortunately, the IS well-formedness conditions observed in action here are not couched in linear or hierarchical terms. Thus, intervention effects do not provide evidence for a particular conception—linear or hierarchical—of the 'structural' aspect of information structure.

As for the relations between IS and other components of the grammar, the study of intervention effects sheds some light on the interfaces with the phonology and semantics. Beginning with the phonology-IS interface, we identified an indirect connection between prosodic prominence and IS focus. Though it is by and large true that IS foci need to be prosodically prominent, a noteworthy and crosslinguistically variable exception is *wh*-phrases. These tend to be prominent in *wh*-in-situ languages, but not in other languages, while their status as IS foci does not vary in the same way. Nonetheless, the difference in the phonological status of *wh*-phrases is correlated with another distinction: the group of languages whose *wh*-phrases are mandatorily accented is the same as the group of languages that exhibit intervention effects in *wh*-questions.

In section 3.2.2, I suggested that the correlation between prominence and intervention effects is no coincidence. Rather, the mechanism which allows *wh*-indefinites to function as question words in certain languages results in their prominence marking and their fixed focus status. Thus, when an element that typically functions as the IS focus and is independently barred from other IS categories (e.g. an *only*-phrase) appears in a *wh*-question, the result is unacceptable, i.e. an intervention effect. This problem does not

come up in languages lacking a question word licenser, where the *wh*-phrase is not a fixed IS focus, and an *only*-phrase can hence be accommodated as the focus in a *wh*-question. The same generalization regarding phonology and IS is reflected, albeit without crosslinguistic variation, in alternative questions. In these constructions, the disjuncts must bear prominence and are necessarily the IS focus; like *wh*-phrases in *wh*-in-situ languages, they preclude another IS focus from surfacing in the question.

The phonology-IS correlation predicts that *only*-phrases should be incompatible with *wh*-questions in any language in which the sentential prominence is obligatorily on the *wh*-phrase, regardless of the position of the *only*-phrase vis-à-vis the *wh*-phrase.⁹⁴ This prediction is borne out: in Greek *wh*-questions, where *wh*-phrases move to the clause-initial position and invariably carry sentential prominence, *only*-phrases are prohibited (Tsimpli 1995). Most languages which have been studied in the context of intervention effects are *wh*-in-situ languages, because as a class they are more likely to exhibit these effects. Given the tendency of *wh*-phrases in *wh*-in-situ languages to be *wh*-indefinites and thus necessarily function as IS foci, unlike fronted *wh*-phrases, they exclude other potential IS foci in the sentence. This creates the illusion that syntactic structure—i.e. a c-command relation between the intervener and *wh*-phrase—is involved in intervention effects. What remains to be seen is whether there exists an effective diagnostic for *wh*-indefinites beyond the descriptions available in the literature, so that languages like Greek can be tested independently of their prosody.

There is one exception to the generalization concerning mandatory accentuation of the *wh*-phrase as a predictor of intervention effects, namely, Amharic. In Amharic, *wh*-phrases bear obligatorily prominence, on a par with other *wh*-in-situ languages, and yet intervention effects are by and large absent. As shown in section 3.5, however, this finding does not undermine the proposed connection between phonology and IS. Rather, it sheds light on the phonology-IS interface from another angle: if a language allows direct manipulation of the phonology of potential interveners, they can serve as tails in the informational articulation. Manipulation mediated by the context and/or syntax is then unnecessary to evade intervention effects. Furthermore, languages may vary in this respect, just like they vary in other features of their intonational phonology.

The analysis of intervention effects also contributes to the debate surrounding the relations between the IS and semantics, as they pertain to focus. This debate was addressed in detail in section 2.3, pitting the semantic/weak set of approaches to focus (Rooth 1985, Krifka 1992) against the pragmatic/strong set of approaches (Vallduví 1990, Dryer 1994, a.o.). The former view the focus-sensitivity of certain semantic operators, such as *only*, as part of their lexical meaning, requiring focus marking of the associates of such operators. This focus marking should be realized in the phonology as some form of prominence. Conversely, pragmatic approaches do not allow for lexical rules specific to so-called focus-sensitive operators, and instead reduce the link between an operator and its associate to pragmatic factors. Accordingly, prominence need not accompany the associate of an operator like *only*. In terms of the IS and semantics, semantic approaches identify the associate of a focus-sensitive operator with the IS focus, either explicitly or implicitly, while pragmatic approaches keep them apart.

The conclusion of section 2.3, based primarily on a critical review of the existing literature, was that there is no compelling evidence for the semantic camp, despite recent

⁹⁴ Ignoring, of course, the possibility of backgrounding the *only*-phrase via context, prosody, etc.

claims to the contrary. Quite the opposite is true: there exist a range of observations in the literature which favor the pragmatic camp and have yet to be addressed by advocates of semantic approaches. What intervention effects contribute to this debate is further evidence for the pragmatic take on focus, because it alone makes the necessary distinction between the associates of semantic operators, which we have labeled semantic foci, and the IS category of focus. A semantic approach, which does not acknowledge such a distinction, is incapable of analyzing two significant observations made regarding intervention effects. First, we noted that an alternative question involving an *only*-phrase differs in acceptability depending on whether or not the *only*-phrase is new information or backgrounded. When backgrounded, this sort of phrase is also known as a second occurrence focus, SOF, and is phonologically distinct from its first occurrence. Crucially, the fact that speakers find a sentence with such a backgrounded *only*-phrase acceptable indicates that they do not equate the *only*-phrase with an IS focus. A second data point which is a mystery for semantic approaches to focus was observed in declarative sentences involving two *only*-phrases. As in the case of alternative questions, speakers report different judgments for these sentences based on the IS status of the *only*-phrases, which is reflected in their prosody. If the *only*-phrases were both IS foci, as follows from semantic approaches, no such difference should be found.

Thus, the problems for semantic approaches to focus are not limited to the structural and interpretive data summarized in section 2.3. Rather, the strongest evidence against them comes from intervention effects, which show that hearers do not treat a recurring *only*-phrase as an IS focus in online speech processing. This natural, indirect test of perception is the best possible window into the grammar of focus, avoiding the problems inherent in interpreting phonetic experiments, such as Beaver et al. (2007). While Beaver et al. acknowledge that the alleged focus marking on SOF is not consistently produced and perceived, they claim that this is due to performance factors. However, such a claim becomes incoherent if applied to the intervention effect data. Speaker judgments are a primary source of evidence for the workings of the competence grammar; if judgments are not sufficient to reject a competence claim, the theory is not falsifiable. Moreover, in evaluating the intervention effect data, speakers are consistent in failing to retrieve the alleged focus marking, as indicated in their judgments. Surely, 100% failure to perceive this marking, across speakers and items, cannot be attributed to performance.

Another factor said to influence the realization of focus marking on SOF is the phonology. Specifically, Féry and Ishihara (2009) argue that the phonetic implementation of focus marking differs in prenuclear vs. postnuclear positions because of an independent phonological process applying to the latter, reducing the pitch accent triggered by the IS. Thus, SOF expressions always bear some form of focus marking, but it is partially masked by the phonology in postnuclear position. This hypothesis, however, does not stand up to the intervention effect data. First, the fact that postnuclear *only*-phrases in the relevant declarative configurations are uniformly perceived as non-foci means that the hypothesis is not falsifiable. If the alleged focus marking is never reflected in speaker judgments, how can one confirm or disconfirm its existence? Second, alternative questions including a backgrounded *only*-phrase are considered acceptable despite the prenuclear position of the *only*-phrase. This refutes the hypothesis: the putative focus marking does not show up in judgments even when the phonology should not interfere with its realization. I conclude that although there is a process of

deaccenting, which plays a role in ameliorating intervention effects, it does not conceal focus marking on SOF expressions. There is nothing to conceal, since such marking does not exist to begin with.

Intervention effects do not tell us much about the syntax-IS interface, since the well-formedness conditions underlying them disregard hierarchical relations and do not make reference to syntactic notions. Nevertheless, the putative existence of an IS level of representation does bring to the fore the issue of the architecture of the grammar, and with it the question of syntax-IS relations. In particular, we need an architecture which allows for interaction between IS and the other levels, assigning correct sentential prominence, generating IS-sensitive scope relations (see section 2.2 and chapter 4), and allowing syntactic movement related to IS. Movement of the latter sort should not be directly driven by IS (i.e. the "look ahead" problem), but, for reasons of redundancy, we should probably also avoid encoding any IS notions in the syntax, unless there is strong evidence to the contrary. In addition, the grammatical architecture must be able to mark as unacceptable derivations which violate the IS well-formedness conditions.

There may be more than one way to meet these various, possibly conflicting demands. Here I only briefly consider two options; in depth discussion is deferred to chapter 5. One could, for example, imagine a system in which multiple structures are compiled (cf. Richards 2006), and only later fed into the IS, which would include a type of filter to rule out derivations with IS violations. This filter might be comparable to the kinds of phonological filters often appealed to in work on clitic placement (e.g. Fontana 1993 on Old Spanish, Bošković 1995, 2001 on Serbo-Croatian) or in focus-to-stress mapping theories. In the latter case, a derivation which does not align the focused phrase with nuclear stress is filtered out at PF (see Neeleman and Reinhart 1998). However, unlike a PF filter, the IS filter must be sensitive to different types of information, in accordance with the different ways in which IS can be encoded, and the different kinds of information which the IS well-formedness conditions refer to. In other words, the structures to be evaluated must include all these types of information. As a result, the system has to countenance a rather large, even if finite, set of derivations to compare and select from. Whether this is plausible and how exactly the selection process would work (an OT-style model, for instance?) are questions to be considered.

Another possibility is that the IS component feeds, rather than is fed by, other components of the grammar. It could then instruct other components to assemble derivations in accordance with its constraints, precluding the generation of ill-formed strings from the start. Such a model also avoids the need to compile and compare multiple derivations. It may come, however, at the price of drastically modifying currently accepted models of the grammar, depending on the precise position of IS in the architecture. In addition, it is unclear whether the grammar fails to generate derivations that are marked as ill-formed only by the IS, as this model predicts.

Existing theories postulating a level of IS have addressed the issue of the grammatical architecture to some extent and have staked out different positions. Vallduví (1990), for example, treats IS as a level comparable to LF and PF, fed by the computational system and interfacing with external systems, while Erteschik-Shir (1997) places it at an initial stage in the derivation, feeding other levels, similar to the second proposal above. These theories are taken up again in chapter 5, in the context of a general discussion of the architecture of the grammar and the position of IS in it.

Chapter 4

Weak Crossover and Variable Binding

Crossover effects—i.e. failure to establish a binding relation between an operator and pronoun under certain conditions—are a model example of the type of empirical discovery made possible by the framework of generative linguistics, where both sentences considered acceptable and those judged as deviant are objects of inquiry. Since their discovery in Postal (1971), these effects have been subject to a wide range of analyses, primarily rooted in syntactic generalizations, and have subsequently been adopted as a fairly standard diagnostic for particular structural phenomena. All of the analyses, however, have been found to be lacking in one respect or another, leading Postal himself to comment, more than twenty years after first documenting crossover, that "WCO [weak crossover; see below] effects are even more mysterious than they might have seemed previously" (Postal 1993:554).

Focusing in this chapter on the subclass of crossover effects known as weak crossover, I maintain that the reason for the inadequacy of existing accounts is their reliance on syntactic notions in defining when a variable binding relation between operator and pronoun may hold. At a descriptive level, the specific type of relation which is excluded is inverse binding, that is, when a quantifier or trace of a *wh*-phrase does not c-command the intended bindee pronoun in the surface structure.¹ The result is a WCO effect. I claim that variable binding requires scope, in the sense that the operator has to c-command the pronoun at LF. Crucially, inverse scope depends on a particular informational articulation: an operator must be a topic in order to scope higher than its surface structure position. This articulation is absent from examples of WCO, explaining why the operator does not scope over, and hence does not bind, the pronoun. However, it is possible to create the informational articulation in question by providing a proper context and/or by including cues associated with certain IS categories in the sentence. As a result, WCO effects may be obviated; though this outcome is expected under the IS approach I propose here, it is a mystery for syntactic analyses of WCO. An additional observation which the latter analyses fail to account for, the "weak" status of WCO effects, follows naturally from the IS approach. Some speakers are able to contextualize examples of WCO given to them out of the blue, and thus to impose the informational articulation required for inverse binding, while others are not. This variation could also be located within the speaker, so that on some occasions he is able to conjure up the necessary articulation and on other occasions he is not.

The import of IS considerations in WCO has long been known in the literature, and

¹ The empirical basis for this generalization and the reason for invoking the *wh*-trace, rather than the *wh*-phrase itself, will become clear below. The distinction between quantifiers and *wh*-phrases made in the generalization is needed for descriptive purposes, and does not amount to a claim about their semantics. They are jointly identified as operators when possible.

has been either directly identified (Erteschik-Shir 1997) or alluded to, via mention of factors which ultimately reduce to IS (e.g. Wasow 1972, 1979). Nonetheless, many analyses have ignored these considerations, and even those which have taken note of IS factors do not provide a uniform and comprehensive IS-based explanation. This state of affairs may at least partially stem from a failure to appreciate the significant role which IS plays in the grammar, and from the absence of a fully developed and independently supported model of IS. Given the results of previous chapters of this dissertation, in which such a model was proposed and shown to enable an accurate explanation of focus intervention effects, it is fitting to pursue an IS analysis of WCO. We will see that such an analysis not only overcomes many of the shortcomings of other approaches, capturing a variety of observations left unaccounted for until now, but also provides important insight into the properties of the IS level of representation postulated in previous chapters. In particular, the IS analysis helps us understand how IS representations interact with other levels of representation, LF and PF.

The structure of this chapter is as follows. Section 4.1 introduces the basic paradigm of WCO effects to be accounted for, and section 4.2 surveys existing analyses, most of which view variable binding as a relation determined by structural considerations, whether instantiated at the surface or covertly, at a post-syntactic level of LF. The strong points and shortcomings of each analysis are noted, moving roughly in chronological order from early work which posited an actual constraint on movement, to recent semantic approaches, which often retain the syntactic generalizations proposed elsewhere. Section 4.3 then presents a variety of observations, some novel and some taken from the literature, which cast doubt on the hypothesis that only syntactic factors play a role in determining variable binding possibilities. These include the amelioration or elimination of WCO effects with d-linked *wh*-phrases, focus particles, question/answer focus, and in cases of topicalization. We will also encounter languages like German, which lack WCO effects in certain configurations, among them basic *wh*-questions. Some of these observations are arguably not amenable to a syntactic explanation; others have been analyzed within syntactic theories, but the proposed analyses are stipulative in that they do not follow from independently motivated observations, and fail to cover the entire range of data.

In light of the difficulties facing syntax-based analyses of WCO, in section 4.4 I put forward an alternative, IS approach to variable binding, which also provides an explanation for the phenomenon of WCO. The basic idea is that WCO effects reflect noncompliance with an IS condition on inverse binding, requiring the binding operator to be a topic. This condition reduces, in turn, to an IS constraint on inverse scope: the operator must be a topic because this allows it to take wide scope. If an operator does not scope over a pronoun at LF, it cannot bind it. In support of the relation between inverse scope and IS, I present evidence from crosslinguistic variation in scopal interpretations and language-internal distinctions in the ability of different quantifiers to take inverse scope. Both types of differences are shown to stem from the same IS generalization: the scope rigidity of languages like Italian is a function of their rigid information structure, prohibiting clause-final elements from being topics, while the failure of negative quantifiers in English to take inverse scope stems from their incompatibility with topichood.

In section 4.4 I also address the ramifications of the IS model of scope and binding

for our conception of LF, both in terms of the position of operators and the nature of movement at this level. Though originally conceived as a purely syntactic level of representation, I conclude that such an idea is untenable in light of the findings reported here. Rather, the placement of a phrase at LF is sensitive to its IS category. The advantages of this novel perspective extend beyond its empirical motivation and coverage to considerations of crosslinguistic variation and learnability. Because it is anchored in a level of representation which is transparently manifested at the surface via syntactic, morphological, and phonological cues, the IS model renders acquisition a relatively manageable task. Once the child has learned the mapping to IS categories and the scopal positions that such categories indicate, both of which need to be recovered independently of variable binding, generalizations regarding binding and WCO fall out "for free". The IS model thus replaces opaque constraints specific to WCO and particular languages, as proposed under existing theories, with a simple, well-motivated, and explanatorily adequate account.

Section 4.5 recaps the findings of this chapter and explores their implications with respect to the general outlook of the dissertation: what they mean for the IS component of the grammar and the way in which it interfaces with other components.

4.1 Introduction

The possibility of interpreting a pronoun as a bound variable, so that its referential value varies with the value assignment of the quantificational antecedent, is restricted in non-trivial ways. Constraints on bound variable readings were first identified and analyzed by Postal (1971), who gave the name "crossover" to a configuration in which such a reading is obstructed. At the time, the choice of this label for the phenomenon seemed to capture a descriptively adequate generalization: movement of an operator across a pronoun precludes the operator from binding the pronoun. This is demonstrated in the (b) sentences of (309)-(310), in which a pronoun c-commands the operator trace (specifically, a *wh*-trace), and in the (b) sentences of (311)-(313), where the pronoun is embedded in a complex nominal structure—either as a possessive modifier or in a relative clause—and hence does not c-command the trace.² In the (a) versions of these examples there is no "crossover", since the operator starts out higher than the pronoun, and the result is fully acceptable under a bound variable interpretation.

- (309) a. *Who_i t_i* thinks (that) [*he* won the game]?
 b. **Who_i* does *he* think [*t_i* won the game]?
- (310) a. *Who_i t_i* thinks (that) [*you* saw *him*]?
 b. **Who_i* does *he* think [*you* saw *t_i*]?
- (311) a. *Who_i t_i* dislikes *his* children?
 b. ??*Who_i* do *his* children dislike *t_i*?
- (312) a. *Who_i* did you say [*t_i* admires [*his* boss]]?
 b. ??*Who_i* did you say [[*his* boss] admires *t_i*]?

² Following the conventional notation in studies of anaphora, intended anaphoric relations are indicated via italics, while movement is represented by subscripting. Judgments refer to the sentences under the indicated anaphoric relation.

- (313) a. *Who_i t_i betrayed the woman he loved?*
 b. *??Who_i did the woman he loved betray t_i?*

Since Wasow (1972), the unacceptable examples in (309)-(310) have been known as cases of strong crossover (SCO), while those in (311)-(313) are labeled weak crossover (WCO). Beyond the distinction in the structural relation between the pronoun and the operator trace, the two types of crossover differ in a number of other respects. First, SCO is associated with a greater degree of deviance in speaker judgments than WCO, as indicated by '*' vs. '??' in the above examples, whence their labels of strong and weak. To put it differently, speakers sometimes allow a bound variable reading when the pronoun is embedded. Second, only WCO effects may be ameliorated under certain conditions to be described in section 4.3. Finally, there is crosslinguistic variation with respect to WCO, as shown in section 4.3.4, but not SCO. Given these differences, most current analyses treat the two as separate phenomena, and subsume SCO effects under the Binding Theory. The latter are specifically regarded as a violation of Condition C, following Chomsky (1981): a trace left by A'-movement, which constitutes an R-expression, is illicitly A-bound by a pronoun.³ Since this analysis cannot apply to WCO, where the trace is not A-bound, alternative explanations must be sought. This study is restricted to WCO; whether or not SCO is amenable to an IS analysis of the type put forward here is a question I leave for future research.

Returning to the WCO examples presented above, we can schematically represent the relevant configuration as in (314); (315) illustrates how (311a) does not, and (311b) does, realize this configuration. Thus, (315a) has the bound variable reading 'for which person *x*, *x* dislikes *x*'s children', while (315b) often lacks a bound reading, which would be 'for which person *x*, *x*'s children dislike *x*'. Notice that there is nothing semantically or pragmatically wrong with the latter interpretation, which can be expressed via other structures, exemplified in (315c) and (315d).

- (314) The WCO/Inverse Binding Configuration: *??Op_i ... pron ... t_i*
 (where *pron* and *t_i* do not c-command each other, and *Op_i* c-commands both)
- (315) a. *Who_i t_i dislikes his children?* ✓ *Op_i ... t_i ... pron*
 b. *??Who_i do his children dislike t_i?* ?? *Op_i ... pron ... t_i*
 c. *Who_i t_i is disliked by his children?* ✓ *Op_i ... t_i ... pron*
 d. *[Whose children]_i t_i dislike him?* ✓ *Op_i ... t_i ... pron*

If the relevant configuration for WCO effects is as described in (314) and related to *wh*-movement of an operator, we expect them to turn up in an additional environment, namely, relative clauses. Indeed, (316) shows that this prediction is confirmed, at least for restrictive relative clauses; nonrestrictive relatives are introduced in section 4.3.3.⁴

- (316) a. The man [*who_i t_i killed [his mother]*] was denied parole.
 b. *??The man [who_i [his mother] killed t_i] was put to rest.*

³ See Postal (1971) and Reinhart (1983) for unified analyses of WCO and SCO, and Buring (2005) for problems with accounts of SCO which rely on Condition C.

⁴ Chomsky (1982) regards WCO configurations in restrictive relatives as fully acceptable. Though this judgment has not been adopted in the literature, and in fact contradicts Chomsky's own judgments a few years earlier (cf. Chomsky 1976), it is a good indication of the degree of variability speakers exhibit in judging WCO examples.

Two additional environments for WCO effects, or failure to obtain inverse binding, involve quantifier phrases (QPs) and in situ *wh*-phrases: (317) is an acceptable sentence in which a QP binds a pronoun, and (318) its unacceptable counterpart, while (319)-(320) illustrate the same pattern for an in situ *wh*-phrase.

(317) *Every boy* loves *his* mother.

(318) a. ??*His* mother loves *every boy*.

b. LF: [*every boy*]_i *his* mother loves *t_i*

(319) *Who_i t_i* gave what_j *t_j* to *his* advisor?

(320) a. ??What_i did *his* advisor give *t_i* to *whom*?

b. LF: *whom_j* what_i did *his* advisor give *t_i* to *t_j*

These sentences are an example of the configuration in (314) under the assumption that this configuration may be created via LF movement, i.e. quantifier raising (QR) or movement of a *wh*-phrase. Like its overt counterpart, covert movement raises the QP/*wh*-phrase and crosses the pronoun in the process, as shown in the LF representations above.^{5,6}

At first glance, we seem have to come upon a neatly behaved set of data, which allows a single, uniform description within a framework assuming that all QPs and *wh*-phrases undergo movement either overtly or at LF (see May 1977, 1985, Huang 1982, a.o.). Indeed, the motivation for positing LF as an independent level of syntactic representation first came from this type of WCO data presented in Chomsky (1976), which purportedly shows that the conditions governing the use of pronouns as bound variables are defined at the level of LF.

It is not obvious, however, how the abovementioned description is to be translated into a theoretical analysis. The main difficulty is that the structural relation between the operator and pronoun, arguably the most reasonable place to seek an explanation, does not distinguish between the acceptable and unacceptable examples; in both cases, the operator c-commands, and thus scopes over, the pronoun. In fact, a c-command relation between an operator and pronoun is precisely what we expect as a precondition for binding to hold, since such a requirement exists independently of WCO configurations (see below).

In the following section we consider the ways in which existing approaches to WCO have dealt with the discrepancy between the assumed LF representation and the lack of binding in one set of examples. Most approaches have turned to structural features of the unacceptable examples which do set them apart; in particular, the observation that the operator does not c-command the pronoun in the base, or in terms of the surface structure, the trace of the operator does not c-command the pronoun.⁷ Drawing on the

⁵ The LF representations provided here are in accordance with traditional models of LF, assumed by most approaches to WCO. I will eventually propose to revise these representations.

⁶ Focused NPs also disallow inverse binding, as illustrated in (i). This led Chomsky (1976) to subsume them under the class of elements which undergo covert movement and thus instantiate the same configuration as QPs and *wh*-phrases at LF. See section 4.4 for further discussion.

(i) a. ??*His* mother loves *JOHN*.

b. LF: *JOHN_i* *his* mother loves *t_i*

⁷ Given just the examples above, one could appeal to the surface linear order and claim that WCO effects arise when the operator does not *precede* the pronoun in the base. However, I assume that a hierarchical

latter generalization, current syntactic approaches to WCO essentially separate variable binding from scope, claiming that binding is determined by a syntactic relation at a level of surface structure, while scope is established at LF. Since such a strategy is unattractive on grounds of simplicity and parsimony, alternative analyses have been proposed, appealing to scope alone.

Crucially, both types of analyses do not force one to adopt the conception of LF originating in Chomsky (1976) and developed in May (1977, 1985). That is, WCO effects do not constitute evidence for the claim that QPs and in situ *wh*-phrases necessarily raise at LF, and fronted *wh*-phrases stay high at LF. Syntax-based analyses assign variable binding at the surface structure, so that binding data cannot serve as evidence for the LF position of *wh*-phrases and QPs. Scopal analyses require modifications to the idea that both the specifier and the restrictor of *wh*-phrases/QPs in WCO configurations are above the pronoun at LF; otherwise, scope by itself would predict variable binding to be possible. Fortunately, modifications to LF have been proposed independently of WCO in Chomsky (1995) and Reinhart (1998), among others. I emphasize this point about LF because we will discover that the placement of *wh*-phrases and QPs at LF is not determined exclusively by syntactic rule, motivating a model which differs from the traditional one assumed in the literature. Before getting to the alternative model of LF, however, let us explore current analyses of WCO and consider to what extent they explain the observations they were intended to.

4.2 Existing Approaches to Weak Crossover

This section is devoted to a thorough review of existing approaches to WCO. Most of these approaches make reference to syntactic relations in order to derive the relevant generalization. They differ significantly, however, in the details of the generalization proposed; for example, in whether it is formulated as a positive condition, allowing variable binding under certain circumstances, or a negative constraint, ruling out illicit binding configurations. As we go through the approaches put forward in the literature, it is important to remember the bigger picture: whatever their specifics, these approaches all overlook a large set of data which I describe in later sections of the chapter, and which can be captured only by referring to IS properties.

As discussed in the previous section, WCO effects are somewhat surprising from the perspective of any approach assuming LF movement, since they make the simplest generalization regarding variable binding insufficient. This generalization is that an operator can bind a pronoun only if the pronoun is in its scope at LF, where the domain of scope is usually taken to be the c-command domain (cf. May 1985). Slightly different formulations of the generalization, commonly known as the Scope Condition, exist in the literature; one is given in (321) (see also Koopman and Sportiche 1983, Safir 1984, and the constraints on semantic—i.e. variable—binding in Büring 2005).

- (321) A pronoun *P* may be bound by a quantified antecedent *Q* only if *Q* c-commands *P* at LF.
(Huang 1995:141)

structure is needed to capture binding relations, in light of the evidence presented in Reinhart (1983).

The need for such a condition is illustrated by the examples in (322)-(323): the pronouns *his* in (322b) and *he* in (323b) are not c-commanded by the QPs *no student* and *every soldier*, respectively, and thus cannot be bound by them.

(322) a. *No student* likes *his* teacher.

b. **No student* is happy. *His* grades have gotten worse this semester.

(323) a. *Every soldier* has *his* orders.

b. ??*Every soldier* is armed, but will *he* shoot? (Chomsky 1976:336)

The Scope Condition is also reflected in the interpretations available for the sentence in (324): although object QPs in English can normally take scope over subject QPs (i.e. inverse scope), this sentence does not allow a wide scope reading for the object. This reading is blocked because if the object QP took scope over the subject, the pronoun *him* in the object would not be in the c-command domain of the subject at LF and hence left unbound. The well-formed LF representation is provided in (324b) and the ill-formed representation in (324c).

(324) a. [*Some musician*] will play [every piece you want *him* to].

b. LF: ✓[*some musician*]_i [every piece you want *him* to]_j [_{t_i} will play _{t_j}]

c. LF: *[every piece you want *him* to]_j [*some musician*]_i [_{t_i} will play _{t_j}]

(Higginbotham 1980:687)

The existence of a c-command condition on variable binding is thought to distinguish this anaphoric relation from coreference, where the pronoun acts as a referring expression rather than a variable. In coreference, c-command between the NP and pronoun is not a prerequisite; this can be seen by comparing the coreference relation in (325a) and (326a) with the failed attempts at establishing variable binding in (325b) and (326b). Notice that the status of (325b) is not due to a violation of Condition C—*he* does not c-command *each of the tenors*—and therefore such a violation does not arise in (325a) as well.

(325) a. The secretary *he* hired thinks that *Siegfried* is despotic.

b. *The secretary *he* hired thinks that *each of the tenors* is despotic.

(Büiring 2005:90)

(326) a. The woman who loved *John* decided to leave *him*.

b. *The woman who loved *every man* decided to leave *him*. (Huang 1995:140)

In (325) the antecedent and pronoun are separated by a clause boundary, which prevents the quantificational antecedent, but not the non-quantificational one, from establishing an anaphoric relation with the pronoun.⁸ Conversely, in (326) the antecedent is embedded in a relative clause. Subjacency is thus said to prevent the QP in (326b) from raising at LF to a position from which it c-commands the pronoun, while the same configuration does not preclude a coreference relation in (326a).

In examples of WCO, traditional models of LF assume that the operator does c-command its potential bindee, both in the surface string and at LF (fronted *wh*-phrases) or only at LF (in situ *wh*-phrases and QPs). (327)-(328) repeat the basic WCO paradigm, showing this relation.

⁸ What is important here is the putative distinction between coreference and variable binding. The precise locality restriction at stake is unclear; see also section 4.4.4.

(327) ??*Who_i* do *his* children dislike *t_i*? (=311b)

(328) a. ??*His* mother loves *every boy*. (=318)

b. LF: [*every boy*]_i *his* mother loves *t_i*

Accordingly, the Scope Condition or an equivalent thereof needs to be supplemented by an additional constraint. The formulation of this constraint is a main concern of binding-theoretic approaches to WCO.

Before getting to the constraint posited in binding-theoretic approaches, we will first describe earlier approaches: those that appeal to movement in subsection 4.2.1 and linear approaches in subsection 4.2.2. Subsection 4.2.3 discusses the currently predominant binding-theoretic analyses, which refer to the hierarchical relations between operator and pronoun. Subsection 4.2.4 addresses analyses that rely exclusively on a version of the Scope Condition, in an attempt to do without a constraint specific to variable binding, while subsection 4.2.5 briefly reviews semantic approaches to WCO, which frequently borrow a structural generalization from the syntactic analyses.

4.2.1 Movement-based Approaches

Postal (1971) was the first to identify the phenomenon of crossover, taking into account *wh*-phrase antecedents in questions and relative clauses. However, he did not distinguish between weak and strong crossover, and subsumed both under a Crossover Principle, which blocks the application of a movement transformation if the movement crosses one nominal over a coreferential nominal. This principle is couched in terms not compatible with current linguistic work, and was meant to cover a range of data which has long since been thought to reflect phenomena unrelated to crossover (e.g. Binding Theory violations, as in *himself was shaved by Jeff*).

In Postal (1972), Postal himself rejects the Crossover Principle as being overly broad in its coverage, noting that it subsumes sentences which greatly differ in their acceptability status, and that WCO violations, although not explicitly identified as such, are particularly variable among speakers. In place of the Crossover Principle, Postal proposes the constraint in (329). This constraint specifically targets *wh*-movement constructions and takes into account the position of the *wh*-phrase both prior to and following movement. Basically, it says that WCO effects appear when a *wh*-phrase antecedent is to the right of a pronoun in the base and ends up overtly to its left.

(329) *Wh*-Constraint: Mark as ill-formed any derivation in which:

- (i) there are two nominal constituents, A and B, in the input structure of a *wh*-movement rule, where:
 - a. A is a pronoun
 - b. B is a *wh*-form
 - c. A is to the left of B; and
- (ii) the corresponding constituents of A and B in the output structure of the *wh*-movement rule, call them A' and B', respectively, are aligned such that B' is to the left of A'; and
- (iii) in the semantic representation, A and B (or more precisely, their corresponding elements) are marked as stipulated coreferents [=anaphorically related NPs].

(Postal 1972:48)

While the underlying position of the *wh*-phrase in configurations of variable binding is indeed crucial in determining their acceptability, as mentioned in previous sections, its surface position does not play the role Postal attributes to it. The cause of Postal's erroneous generalization is his choice of data: rather than using basic in situ *wh*-questions to support his constraint, Postal appeals to exceptional types of in situ questions. Thus, he claims that the questions in (330)-(333) show that if the *wh*-phrase is to the right of the pronoun in the surface representation, WCO effects do not arise.

- (330) The newsman who criticized *him* later belted *what/which official?*
 (331) Remembering you are under oath, the witness who claimed he had never seen *it* was walking towards *what/which building?*
 (332) Mr. Jones, for \$100,000, the man who appointed *him* later said *what/which Secretary of State* was an imbecile?
 (333) Which columnist reported *her* victory to *which actress's* mother?
 (Postal 1972:47-48)

These questions include an incredulity question in (330), a legalistic question (331), a quizmaster question in (332), and a question with a d-linked *which*-phrase in (333). Without going into the details of the meaning and use of such questions, which I come back to in sections 4.3.1 and 4.3.2, they do not pattern like other in situ *wh*-questions with respect to WCO, as Postal himself notices: consider the non-d-linked variant of (333) in (334) and the similar multiple *wh*-question we have already encountered, repeated in (335). These sentences are deviant in a way in which (330)-(333) are not.⁹

- (334) ??Which columnist reported *her* victory to *who?* (Postal 1972:48)
 (335) ??What_i did *his* advisor give *t_i* to *whom?* (=320)

Thus, the *Wh*-Constraint in (329) does not provide a descriptively adequate explanation for the phenomenon of WCO. Nor is the *Wh*-Constraint particularly explanatory, since it is unclear why a derivation involving movement of a *wh*-phrase across an anaphorically related pronoun is marked as ill-formed. Another general problem of such a movement-based approach to WCO is its reliance on movement per se. Though in situ *wh*-phrases in *wh*-movement languages and *wh*-in-situ languages trigger WCO effects, LF movement of these phrases has been convincingly rejected in recent work, as noted in chapter 3. Accordingly, it is perhaps unsurprising that movement-based approaches to WCO are not adopted in the current literature. We are justified in moving to the next type of WCO analysis, which also tends to be avoided nowadays due to both empirical difficulties and general theoretical considerations.

4.2.2 Linear Approaches

In an attempt to provide a descriptively correct generalization for WCO effects in *wh*-questions, relative clauses, and QP contexts, Chomsky (1976) put forward a linear constraint on operator-pronoun relations (336), together with its variant in (337).

⁹ (333) adds an irrelevant complication by embedding the binder inside a DP. See section 4.2.2 for details.

(336) The Leftness Condition: A variable cannot be the antecedent of a pronoun to its left. (Chomsky 1976:342)

(337) A pronoun P within the scope of a quantifier may be rewritten as the variable bound by this quantifier unless P is to the left of an occurrence of a variable already bound by this quantifier. (Chomsky 1976: 343)

The Leftness Condition covers the examples discussed thus far, where the pronoun is to the left of the trace left by the operator; this is easily identified in the basic paradigm repeated in (338)-(339).

(338) ??*Who_i* do *his* children dislike *t_i*? (=311b)

(339) a. ??*His* mother loves *every boy*. (=318)
b. LF: [*every boy*]_i *his* mother loves *t_i*

The formulation in (336) works under the assumption that the variable interpreting the trace is the actual antecedent to the pronoun, rather than the operator itself. This is not necessary under (337), which also differs in that it subsumes the Scope Condition.

Various objections—empirical and conceptual—have been raised against the Leftness Condition. The former type of objection is based on examples like (340), repeated from above, where movement of a phrase containing a bound pronoun (*him*) at LF results in the pronoun preceding the trace. As pointed out by Higginbotham (1980), this sentence should be ruled out, and yet it is perfectly acceptable.

(340) a. [*Some musician*] will play [every piece you want *him* to]. (=324)
b. LF: ✓[*some musician*]_i [every piece you want *him* to]_j [*t_i* will play *t_j*]

Other cases where the Leftness Condition seems too strong, incorrectly excluding acceptable sentences in which a pronoun precedes a QP trace at LF, include (341) and (342).¹⁰

(341) For *his* birthday, *each of the employees* got a Mercedes. (Reinhart 1983:129)

(342) Seeing *his* father pleased *every boy*. (Higginbotham 1980:688)

A statement regarding linear order at LF falls short in the other direction as well, being too weak to proscribe unacceptable sentences. To show this, we will need to introduce the phenomenon of indirect binding, also known as binding out of DP (Büring 2004, 2005) or transitivity effects (Ruys 2000), where an operator binds a pronoun despite being embedded inside a DP, whether as a possessive modifier (genitive binding) or within a complement (inverse linking). Standard examples of indirect binding are given in (343)-(344), the former illustrating genitive binding and the latter inverse linking.

(343) a. [*Whose* mother]_i *t_i* loves *him*?
b. [[*Every boy*]'s mother] loves *him*.

(344) a. [Which picture of [*which man*]]_i *t_i* pleases *him*?
b. [Someone from [*every city*]] despises *it*.

¹⁰ (342) involves an object-experiencer verb, whose relevance for WCO is taken up in section 4.3.5.

position at LF, these accounts cannot rely on the LF c-command relation between the QP/*wh*-phrase and pronoun. Binding-theoretic accounts, then, posit one of two types of constraints specific to variable binding, and we can divide the accounts into two camps along these lines.

The first kind of binding-theoretic account seeks to *prohibit* a relation of variable binding given certain structural properties, while the second *licenses* the relation under specific conditions. We will first consider "exclusionary" analyses, Koopman and Sportiche (1983) and Safir (1984), and then examine Reinhart's (1983) "inclusionary" licensing principle, which continues to be widely accepted in both syntactic and semantic treatments of WCO.

Koopman and Sportiche (1983) argue that there exists a condition requiring operators and variables to be in a one-to-one, or bijective, relation with each other (348).

(348) The Bijection Principle: There is a bijective correspondence between variables and A'-positions. (Koopman & Sportiche 1983:146)

This condition states that every variable can be locally bound by one and only one (operator in an) A'-position, and every (operator in an) A'-position locally binds one and only one variable. It is trivially satisfied when a *wh*-phrase, for example, moves from its base position and binds the trace which remains there. Furthermore, the Bijection Principle is relevant to WCO configurations insofar as all locally A'-bound elements, whether traces or pronouns, constitute variables; this definition of variables, assumed in the Government and Binding framework, is given in (349).

(349) α is a variable iff α is in an A-position and locally A'-bound. (Koopman & Sportiche 1983:147)

Let us see how the Bijection Principle handles basic examples of WCO effects and their acceptable counterparts. In the WCO example (350), the pronoun and the *wh*-trace count as variables according to the definition in (349), but they cannot both be bound given the Bijection Principle. Accordingly, one variable remains unbound, and a bound variable reading of the sentence is unavailable. The same explanation applies to WCO configurations in which the operator raises at LF rather than overtly.

(350) ??*Who_i do his children dislike t_i?* (=311b)

Conversely, in (351) the pronoun is not a variable, since it is locally A-bound by the trace of the *wh*-phrase, while the *wh*-phrase itself only A'-binds its trace. Thus, the sentence does not violate the Bijection Principle and is correctly predicted to allow a bound variable reading.

(351) *Who_i t_i dislikes his children?* (=311a)

Critiques of the Bijection Principle have identified a number of empirical problems with this well-formedness condition. First, there are unmistakable cases of operators binding multiple variables: in long distance *wh*-questions (352), across-the-board (ATB) movement (353), and parasitic gaps (354).

(352) *Who_i do you think t_i Pete will meet t_i?*

(353) *I know who_i [[John likes t_i] and [Mary hates t_i]].*

(354) *[Which report]_i [did you [file t_i] [without reading t_i]]?* (Safir 1984:609)

The Bijection Principle leads us to expect these sentences to be unacceptable, which they are not. This empirical problem is tied to a more general skepticism regarding the idea of a bijective relation between operators and variables. For Koopman and Sportiche, the impetus behind a constraint which treats traces and pronouns alike is their discovery that in Vata, resumptive pronouns exhibit the WCO characteristics of variables: when locally A'-bound, they give rise to WCO effects. It seems misguided, however, to generalize from this one language, given that many languages do not pattern similarly. As noted in Safir (1996), resumptive pronouns in languages like Irish and Hebrew actually alleviate WCO effects. Moreover, the widely accepted notion of unselective binding (Heim 1982) specifically utilizes the possibility of multiple binding by a single operator.

Another empirical difficulty for the Bijection Principle is posed by examples of indirect binding. As illustrated in (355), these examples differ from sentences like (351) in that the operator trace does not c-command the pronoun, and so the latter is not A-bound. Rather, the pronoun is A'-bound by the operator together with the trace of the operator, thus violating the Bijection Principle and deriving the incorrect prediction that the sentence should be deviant.

- (355) a. [*Whose* mother]_i t_i loves *him*? (=343a)
 b. LF: *whose_j* [t_j mother]_i t_i loves *him*

This means that Koopman and Sportiche's account, like the Leftness Condition, cannot make the necessary distinction between the acceptable sentence (356) and the sentence exhibiting a secondary WCO effect in (357), repeated from above.

- (356) Everybody in *some city* hates *its* climate. (=345)
 (357) ??*Its* climate is hated by everybody in *some city*. (=346)

Later work in the vein of Koopman and Sportiche suggested various mechanisms to circumvent the problem of indirect binding, typically weakening the condition on binding so that it does not refer to c-command by the operator itself, but rather to its container DP, i.e. *whose mother* in (355) and *everybody in some city* in (356)-(357). However, Koopman and Sportiche note that such a strategy is stipulative and runs counter to the logic of the Bijection Principle; furthermore, it creates problems in other domains of the theory regulating anaphoric relations.¹² For example, extending the index of the binder to the container DP, as proposed in Safir (1984), raises the question why the same mechanism is necessarily inoperative from the perspective of the conditions of the Binding Theory. As noted in Ruys (2000), if the container DP were a proxy for the binder in (358), (358a) should be grammatical, adhering to Condition A, while (358b) should be ungrammatical, since it violates Condition B.

¹² Instead of adopting a binding mechanism specific to indirect binding, Koopman and Sportiche claim that the sentences under discussion are "ungrammatical in the unmarked case, even if somewhat acceptable to some speakers" (p. 155). This judgment has not been accepted in the literature, and in any case appears to be at least partly based on a skewed dataset: by using a quantifier like *everyone* in (i), which does not readily allow a distributive reading (see section 4.3.1), Koopman and Sportiche unnecessarily add a confound to the data, as shown by a comparison with (ii).

(i) ??*Everyone's* mother likes *him*. (Koopman & Sportiche 1983:154)
 (ii) *Every boy's* mother likes *him*.

(358) a. *[*Every boy's mother*] loves *himself*.

b. [*Every boy's mother*] loves *him*.

The point, then, is not that it is impossible to devise an appropriate mechanism for indirect binding within a binding-theoretic approach, but rather that this mechanism would have to be overly specific (see Ruys 2000 for further discussion).

Continuing with binding-theoretic approaches which proscribe particular binding configurations, Safir (1984) retains Koopman and Sportiche's idea that the operator-variable relation is constrained, albeit in a different manner than they proposed. Rather than a limitation on the number of variables an operator in an A'-position can bind, what accounts for WCO effects according to Safir is a constraint referring to properties of the bound variables. Specifically, variables bound by a single operator must all be of the same type, either traces or pronominal; this is expressed in The Parallelism Constraint on Operator Binding (PCOB) in (359).

(359) The Parallelism Constraint on Operator Binding: If O is an operator and x is a variable bound by O, then for any y, y a variable bound by O, x and y are [α lexical].
(Safir 1984:607)

The motivation for preferring the PCOB over the Bijection Principle comes from distinctions such as that between (360a) and (360b). The former consists of two different types of variables, a bound trace and pronoun, and the result is unacceptable, but replacing the trace with a resumptive pronoun yields a well-formed sentence in the latter.

(360) a. *Do you remember that guy *who_i* everyone who knew *t_i* hated *his* attitude?

b. Do you remember that guy *who* everyone who knew *him* hated *his* attitude?

(Safir 1984:608)

The rather complicated set of examples in (360) is necessary to establish the relevance of variable type in English because the language generally only allows resumptive pronouns in positions from which extraction is prohibited (i.e. islands). In a language where resumptive pronouns are a productive part of the grammar, such as Hebrew, it is simpler to demonstrate the effect. Thus, the unacceptable (361a) consists of a mix of trace and pronoun bound by the null *wh*-operator, while in (361b) the operator is able to bind the possessive pronoun and resumptive pronoun.^{13,14}

(361) a. ??ha-iš *OP_i* še-im-o ohevet *t_i*
 the-man that-mother-his loves

b. ha-iš *OP_i* še-im-o ohevet *oto_i*
 the-man that-mother-his loves him
 'the man who his mother loves'

(Safir 1996:319)

The advantage of the PCOB over the Bijection Principle extends beyond configurations like (360)-(361) to the multiple variable constructions given again in

¹³ These examples are brought up in the context of a revision to the PCOB put forward in Safir (1996). I do not go into the details of this revision here.

¹⁴ Safir's use of the behavior of resumptive pronouns to support the PCOB is open to the same criticism I mentioned in the context of the Bijection Principle. That is, the empirical picture regarding the relation between resumptive pronouns and WCO effects is mixed and therefore difficult to rely on: in some languages resumptives obviate WCO effects and in others they trigger such effects.

(362)-(364), in which the variables are of the same category; these are erroneously marked as ill-formed by the Bijection Principle.

(362) Who_i do you think t_i Pete will meet t_i? (=352)

(363) I know who_i [[John likes t_i] and [Mary hates t_i]]. (=353)

(364) [Which report]_i [did you [file t_i] [without reading t_i]]? (=354)

However, the PCOB shares with the Bijection Principle the problem of straightforwardly licensing acceptable cases of indirect binding and telling them apart from unacceptable cases. In addition, there are some well-formed examples of an operator binding variables of different types, which are unexpected according to the PCOB. One such example is provided in (365): the QP *each shirt* binds both a trace and a pronoun.

(365) a. John removed *each shirt* and Mary then folded *it*.

b. LF: [*each shirt*]_i John removed t_i and Mary then folded *it*

To sum up, the first class of binding-theoretic accounts defines a negative condition under which operator-variable relations are not allowed. The Bijection Principle and the PCOB mark as ill-formed sentences in which a pronoun is locally A'-bound by an operator that also binds its own trace. An alternative to these analyses is to formulate a positive condition, which licenses variable binding under certain circumstances.

Reinhart (1983) proposes this sort of licensing principle in the form of the Bound Anaphora Condition (BAC) in (366).

(366) Bound Anaphora Condition: Quantified NPs and *wh*-traces can have anaphoric relations only with pronouns in their c-command syntactic domain.

(Reinhart 1983:122)

There are two important components to the BAC, one explicit and one assumed by Reinhart in her original work on binding, though not expressed in the BAC. First, the condition refers to *wh*-traces, rather than *wh*-phrases, so that what is relevant to binding of a pronoun by a *wh*-expression is ultimately the base position of the *wh*-expression. Second, Reinhart does not adopt the idea of QR applying freely to QPs; therefore, whether or not a QP can bind a pronoun is determined by its c-command relation with the pronoun in the surface structure.¹⁵

In current studies of variable binding, where QR is assumed, the BAC has been translated into the A-command Requirement in (367).

(367) The A-command Requirement on Pronoun Binding: Pronoun binding can only take place from a c-commanding A-position. (Büring 2004:24)

WCO configurations do not satisfy this requirement, since the *wh*-phrase or QP does not c-command the pronoun from an A-position at any point in the derivation. Conversely, in acceptable examples of variable binding, the pronoun is A-bound by the trace of the *wh*-phrase or by the QP, and thus complies with the A-command Requirement.

In addition to correctly ruling in cases where the *wh*-phrase or QP is generated higher than the pronoun, the A-command Requirement captures the acceptability of sentences in

¹⁵ Reinhart (1983) allows QR for the purpose of inverse scope, but considers this a marked and contextually dependent option.

which the *wh*-phrase/QP A-moves to a position from which it c-commands the pronoun, such as the examples of raising in (368).

(368) a. *Who_i* [*t_i* seems to *his* mother [*t_i* to be intelligent]]?

b. [*Every boy_i*]_{*i*} seems to *his* mother [*t_i* to be intelligent].

The finding in (368) has been taken in the syntactic literature to indicate that A-movement can license variable binding, unlike A'-movement, and successful variable binding has consequently become a common diagnostic for A-movement.

Like other binding-theoretic approaches to WCO, the A-command Requirement faces difficulties in analyzing examples of indirect binding, where the operator does not c-command the pronoun from an A-position, and hence is not expected to be able to bind it. Reinhart tentatively suggests that binding can be achieved not only through direct c-command, but also via the specifier of a non-c-commanding operator. As discussed above, such an extension of binding would have to be made irrelevant to the conditions of the Binding Theory by means of a stipulation; otherwise, the system would both overgenerate and undergenerate. In addition, allowing specifiers to constitute proxy binders means that in WCO configurations the possessive pronoun should be able to bind the operator trace. As a result, these configurations turn out to be identical to SCO, which we regarded as a violation of Condition C in section 4.1. This equivalence is undesirable, given the differences between the two types of crossover.

A second empirical problem with the A-command Requirement is posed by the example in (369).¹⁶ Here, the *wh*-phrase has no A-position from which it can bind the pronoun; the SpecIP position that houses the *wh*-trace or raised QP in (368) and allows it to A-bind the pronoun is filled in (369) by expletive *there*. Nevertheless, the sentence is acceptable.

(369) *Who_i* do [_{IP} *there* seem to *his* mother to be too many unflattering pictures of *t_i*]?

This kind of sentence is a problem for other binding-theoretic approaches, but also more generally, for any account which refers to A-positions.

Finally, a conceptual question one could raise with respect to the A-command Requirement concerns its appeal to the A-/A'-distinction. That is, why should bound pronoun variables require their binding operator to be in an argument slot, and in this sense differ from operator-trace dependencies, where the binder has to be in an A'-position? Although it is possible to formalize this distinction and incorporate it in a general theory of binding, this does not in and of itself amount to an explanation. Buring (2004, 2005), for instance, posits different binding operators for pronouns vs. traces, and excludes the pronoun-binding operator from derived positions. At the same time, he acknowledges that the way in which each operator is restricted lacks principled motivation.

Despite the reservations raised about the A-command Requirement, it has been adopted, in some form or other, by much of the current literature, whether explicitly dealing with WCO or exploiting the A-command Requirement as a structural diagnostic for another phenomenon. Thus, Richards (1997) uses WCO data as part of a line of argumentation for a general syntactic principle, assuming that pronouns bound by a *wh*-

¹⁶ I thank Dave Embick for suggesting this example.

phrase must also be bound by a trace of the *wh*-phrase in an A-position. Ruys (2000) puts forward a scope-based approach to WCO, to be reviewed in the next subsection, which relies on c-command from an A-position, and Buring (2004) appeals to the same constraint in a semantic analysis of WCO.

If the A-command Requirement were an accurate generalization, its stipulated status would be something we might have to accept. However, the relevance of the A-/A'-distinction for WCO is called into serious doubt not only by (369), but also by a variety of observations brought forward in the next section. Why the distinction nonetheless correlates to a large degree with the presence vs. absence of WCO effects is an issue I take up in section 4.4, in the context of a general assessment of existing approaches to WCO.

To conclude this subsection, binding-theoretic approaches to WCO were proposed in light of particular developments in linguistic theory in the early 1980s, as well as assumptions prevailing at the time. These approaches constituted a rejection of the idea that linear precedence figures in grammatical constraints, as suggested specifically for variable binding relations in Chomsky's (1976) Leftness Condition. Following Reinhart's (1983) detailed argumentation for the role of c-command in binding, hierarchical structure was assumed to be the form of representation in which constraints are stated. In essence, the hypothesis that quantifiers and in situ *wh*-phrases raise at LF, which was becoming widely accepted among researchers, together with the assumption that fronted *wh*-phrases are interpreted in their surface position, made binding-theoretic approaches inevitable. The presumed high position of quantifiers and *wh*-phrases at LF could not explain why these operators sometimes fail to bind pronouns, and hence additional machinery was needed in the theory. The next subsection attends to approaches which do away with this machinery by reducing variable binding to scope alone. As a result, they are forced to address the question of whether or not the set of assumptions about LF made by binding-theoretic approaches is justified.

4.2.4 Scope-based Approaches

As noted at the beginning of this section, some form of scope condition is postulated by all analyses of WCO, since such a condition is needed to capture when variable binding is possible independently of WCO configurations. Basically, in order for an operator to bind a pronoun, it has to be able to scope over the pronoun. The question, then, is whether a scope condition is not only necessary for an analysis of WCO, but also sufficient. The impetus for looking into this possibility is clear: it allows a simpler explanation of WCO than an analysis invoking additional constraints. However, there is also an obstacle to a scope-based approach, namely, the alleged existence of a distinction between judgments regarding inverse binding and those regarding inverse scope.

The disparity between scope and binding judgments is demonstrated in the pair of sentences (370)-(371): (370) exhibits the standard WCO effect, reflecting the difficulty to obtain inverse binding, while (371) allows inverse scope, that is, the object QP does not have to be interpreted in its surface position and can scope over the subject. Logical forms for the two readings of (371), surface scope and inverse scope, are given in (372a) and (372b), respectively.

(370) ??*His* mother loves *every* boy. (=318)

(371) Some girl loves every boy. $(\exists > \forall, \forall > \exists)$

(372) a. $\exists x[\text{girl}(x) \wedge \forall y[\text{boy}(y) \rightarrow \text{love}(y)(x)]]$

Read as: There is a girl x such that for every boy y , x loves y

b. $\forall y[\text{boy}(y) \rightarrow \exists x[\text{girl}(x) \wedge \text{love}(y)(x)]]$

Read as: For every boy y , there is a girl x such that x loves y

Although speakers show a clear preference for the surface scope reading of doubly quantified sentences like (371), as borne out in multiple psycholinguistic studies (Kurtzman & MacDonald 1993, Anderson 2004, a.o.), the inverse scope reading is nonetheless generally possible. In fact, the possibility of inverse scope was one of the original motivations for the LF model developed in May (1977, 1985), according to which the object QP in (371) undergoes QR to a position c-commanding the subject. Inverse binding as in (370) is thought not to be accessible to the same extent (though see below for objections to this claim); in an acquisition study of Dutch, for instance, van der Ziel (2008) found that none of the adult control subjects accepted sentences similar to (370).¹⁷

The scope-binding distinction has also been reported in sentences combining two QPs with a pronoun embedded in the higher QP. Thus, even though the object QP in (373) can scope over the indefinite subject, with the pronoun being interpreted deictically, some have claimed that it cannot bind the pronoun in the subject.

(373) ??A student of *his* called *every professor*. $(\exists > \forall, \forall > \exists)$ (Shan & Barker 2006:92)

The disparity between scope and binding will figure both in the review of scope-based approaches to WCO in this subsection and in the discussion of the novel WCO analysis proposed in section 4.4.

The first of the two scope-based approaches we will consider is Pica and Snyder (1995), who take as their starting point a correlation between the acceptability of inverse scope and inverse binding. In an experimental study of naïve speakers, Pica and Snyder found that the acceptability of a WCO configuration is directly proportional to the acceptability of a wide scope reading of the lower QP in a parallel example involving two quantifiers. For example, with a monotransitive verb (374), wide scope for the universal quantifier is very difficult to obtain (374a), though not impossible, and corresponding sentences involving a WCO configuration (374b-c) are judged relatively unacceptable. Conversely, with a prepositional dative (375), only a marginal degree of unacceptability is found across the three sentence types. The markings used below, from Pica and Snyder, are meant to reflect these judgments; the judgments in (374a) and (375a) refer only to the inverse scope reading.

(374) a. ??Someone likes everyone.

b. ??*His* mother likes *everyone*.

c. ??*Who_i* does *his* mother like t_i ?

¹⁷ I do not think this finding should be taken to show that WCO configurations have the status of strong grammaticality violations, given the evidence for variation among speakers reported since Postal (1972) (see section 4.2.1 and below). Unfortunately, I know of only two experimental studies on the subject other than the Dutch study mentioned in the body of the text, one on English-speaking children (see fn. 21) and the other on German adults, to be described in section 4.3.4.

- (375) a. Mary gave something to everyone.
 b. ?Mary gave *his* paycheck to *everyone*.
 c. ?[To *whom*]_i did Mary give *his* paycheck *t_i*?

Based on these findings, Pica and Snyder reduce variable binding to scope, and develop a theory of scope preferences to explain surface vs. inverse scope. They claim that NPs are preferably interpreted in the position in which their Case is checked, and that this is an agreement (Agr) position. This derives surface scope and binding: if the subject is interpreted in SpecAgrSP and the object in SpecAgrOP, the former c-commands the latter. Inverse scope readings are nevertheless possible because NPs may be interpreted in their theta-position, albeit as a marked option. Thus, if the subject selects the disfavored option of being interpreted in its theta-position, SpecVP, it is c-commanded by the object in SpecAgrOP and therefore scopes under the object. In effect, Pica and Snyder replace the idea of an independent system for quantifier interpretation, via LF adjunction, with a system in which there are no movements or positions specific to quantifier interpretation. They also take on variable binding in *wh*-questions and relative clauses, roughly stating that *wh*-phrases and relative pronouns are interpreted like QPs, and in this way derive the parallelism between the different WCO environments.

Regardless of the ability of Pica and Snyder's system to capture attested interpretations, motivation for its mechanics is lacking, particularly the alleged connection between Case checking and scope. Moreover, no justification is given for the possibility of interpreting NPs, including quantifiers, in theta-positions, which should leave their Case unchecked, nor do Pica and Snyder spell out the conditions under which such interpretations are possible. As for the relation between binding and scope, it seems hasty to regard the correlation that Pica and Snyder report as evidence for an equivalence between sentences like (374a) and (374b), which is at odds with the received view in the literature. What the correlation shows is that a given speaker is more likely to judge a WCO configuration as acceptable if he allows wide scope for the lower quantifier; it does not prove that he attributes to the two sentences the same status. It seems unlikely that the many linguists who have described similar examples are reporting a nonexistent distinction when they judge (374b) to be degraded in a way in which (374a) is not, particularly since the distinction is backed up by psycholinguistic findings. Indeed, the fact that Pica and Snyder mark some of their quantifier scope examples as fully acceptable, such as (375a), but not their corresponding variable binding examples (cf. (375b-c)), suggests that they too are aware of a distinction.

A second scope-based approach to WCO is presented in Ruys (2000), whose primary motivation comes from a number of configurations which exhibit sensitivity to WCO, contra the predictions of binding-theoretic approaches.¹⁸ In these cases, which include donkey anaphora, pronouns of laziness, and dependencies in which the bindee is not an NP, the presence of WCO effects appears to hinge on the relations between pairs of constituents that are not connected to one another from a binding-theoretic perspective. However, the constituents are related by scope, according to Ruys, and therefore their

¹⁸ Ruys' approach is no less "semantic" than approaches which I later describe as semantic; it is nonetheless classified as scope-based because this is its main selling point.

behavior can be captured by a scope-based approach. The specific scope licensing principle Ruys invokes is given in (376).

- (376) A is syntactically licensed to take scope over B iff
- a. A c-commands B, B an operator; or
 - b. A c-commands B from an A-position. (Ruys 2000:516)

(376a) is a widely accepted component of theories of quantifier scope (cf. May 1977). Its import is demonstrated in basic doubly quantified sentences like (377), where it licenses the surface scope and inverse scope readings. The surface reading has the LF representation in (377b), in which *someone* c-commands *everyone*, and the inverse reading is represented by (377c), where the c-command relations are reversed.

- (377) a. Someone likes everyone.
- b. LF: [_{IP} someone_i [_{IP} everyone_j [_{IP} t_i loves t_j]]]
 - c. LF: [_{IP} everyone_j [_{IP} someone_i [_{IP} t_i loves t_j]]]

The second part of the scope licensing principle, (376b), is akin to Reinhart's (1983) Bound Anaphora Condition, or the A-command Requirement, discussed in section 4.2.3, but is posited by Ruys as a constraint on scope rather than variable binding. This constraint is meant to capture the basic paradigm of WCO effects, where the operator does not c-command the pronoun from an A-position (at any point in the derivation), thus does not scope over it and cannot bind it.

A phenomenon central to Ruys' account is indirect binding, or transitivity, already mentioned a number of times in this section. The entire paradigm of indirect binding is provided in (378)-(381): (378) and (379) involve genitive binding, the former by a *wh*-phrase and the latter by a QP, while (380) and (381) are cases of inverse linking, with a *wh*-phrase and QP, respectively. Within each set of sentences, (a) is the baseline example, in (b) the bound pronoun is embedded in a DP, and in (c) a WCO effect arises when the DP containing the operator, or its trace in the case of *wh*-questions, does not c-command the pronoun (i.e. secondary crossover).

- (378) a. [*Whose* mother]_i t_i loves *him*? (=343a)
- b. [*Whose* mother]_i t_i has never met *his* teacher?
 - c. ??[*Whose* mother]_i has *his* teacher never met t_i?
- (379) a. [[*Every boy*]'s mother] loves *him*. (=343b)
- b. [[*Every boy*]'s mother] has met *his* teacher.
 - c. ??*His* teacher has met [[*every boy*]'s mother].
- (380) a. [Which picture of [*which man*]]_i t_i pleases *him*? (=344a)
- b. [Which picture of [*which man*]]_i t_i pleases *his* wife?
 - c. ??[Which picture of [*which man*]]_i did *his* agent sell t_i?
- (381) a. [Someone from [*every city*]] despises *it*. (=344b)
- b. [Someone from [*every city*]] despises *its* mayor.
 - c. ??*Its* mayor despises [someone from [*every city*]].

As noted above and emphasized by Ruys, indirect binding is a problem for any binding-theoretic treatment of WCO. Though the licenser of the indirect binding relation is the container DP, since its position is what determines whether or not the relation will go through (cf. the (b) vs. (c) sentences above), the container is not the element actually binding the pronoun. Consequently, the only way binding-theoretic approaches can handle this data is by making the container DP a proxy binder, while simultaneously ruling this option out for the conditions of the Binding Theory (cf. (358)). This is an unattractive solution, whose status is best summed up by Ruys (2000:519): "... if the transitivity effect observed above is a distinctive property of bound variable licensing, then we are unlikely to be successful in attempting to reduce bound variable licensing to binding theory, which predicts that this effect will not obtain".

Ruys deals with indirect binding by exploiting both parts of his scope licensing principle, as well as ostensibly general properties of scope. First, in accordance with (376b), the container DP in an A-position takes scope over the pronoun. Second, the operator within the DP raises at LF and scopes over the DP, assuming that the latter is considered an operator, in line with (376a). Since scope is transitive according to Ruys, the operator can then scope over the pronoun and consequently bind it. If the container DP is not in an A-position, it does not scope over the pronoun and so the operator is unable to take scope as well, deriving secondary WCO effects.

Another phenomenon which Ruys' scope-based approach can explain is the correlation between exceptional wide scope and exceptional variable binding. Operators that can take wide scope without regard for locality constraints, such as *each*, are also able to bind pronouns within this scope. Consider (382)-(383): in (382a), *each soldier* takes scope over the entire sentence, deriving the reading whereby for each soldier a different flag was hoisted and a different gun went off, while this reading is not possible with *every soldier* in (382b). The corresponding variable binding configuration in (383) lines up as expected under Ruys' approach: *each soldier* can bind a pronoun outside the adjunct clause (383a), but *every soldier* cannot (383b).

(382) a. As each soldier appeared on the platform, a flag was hoisted and a gun went off.

b. As every soldier appeared on the platform, a flag was hoisted and a gun went off.

(383) a. As *each soldier* came into the room, *he* was given a gun.

b. ??As *every soldier* came into the room, *he* was given a gun. (Ruys 2000:525)

The scope-based approach put forward by Ruys is an elegant and sensible attempt to simplify the explanation of WCO effects by removing any constraints referring specifically to binding. It does so, however, at the price of making the definition of scope more complicated, supplementing the standard c-command constraint with another structure-sensitive clause. The scope licensing principle is then disjunctive, one clause basically regulating the relations between operators and the other responsible for the relations between an operator and pronoun. Moreover, by specifically appealing to A-positions in the second clause, Ruys' approach suffers from the same arbitrariness which characterizes binding-theoretic approaches.

Ruys recognizes the drawback of invoking A-positions, and hence proposes to make the second clause in (376) less stipulative by deriving it from the behavior of *wh*-phrases and QPs. In doing so, he also attempts to provide a principled explanation for the

distinction between inverse scope and binding, manifested in the separation of the scope licensing principle into two clauses. Specifically, QR and *wh*-movement are claimed not to affect variable binding options because they do not carry along the element relevant for binding.

In the case of *wh*-questions, Ruys extends the framework of Reinhart (1998), whereby in situ *wh*-expressions are interpreted through existential quantification over choice functions, to all *wh*-expressions, whether moved overtly or not. This forces the restrictor of the *wh*-expression to reconstruct to its base position, where the choice function can apply to it, while the *wh*-operator remains in SpecCP, as schematized in the LF in (384b).¹⁹

- (384) a. ?[*Which man*]_i do *his* children dislike *t_i*?
 b. LF: *which_i* do *his* children dislike [*t_i man*]

The operator in (384b) is unable to bind a pronoun because it is a choice function operator; pronouns may only be interpreted as individual variables. This problem does not arise when the *wh*-expression is generated higher than the pronoun because the restrictor remains above the pronoun following reconstruction, and can therefore bind it. The bottom line is that the condition restricting variable binding to A-positions falls out from the way in which *wh*-expressions are represented at LF.

A similar logic applies to QPs, where only the quantificational specifier, and not the restrictor, undergoes QR at LF (cf. Chomsky 1993). Though this allows surface and inverse scope readings, bound readings are ruled out since quantificational specifiers, like *wh*-specifiers, range over choice functions; pronouns, as noted above, cannot have a choice function-type reading. Furthermore, as in the case of *wh*-questions, if the restrictor of the QP ends up higher than the pronoun at LF, because the QP was generated higher, the bound reading will go through.

Ruys argues that his theory is not only empirically superior to binding-theoretic approaches, but also conceptually preferable within Minimalism. It requires a minimal set of notions which are independently needed (scope, c-command), and no conditions specific to variable binding. Furthermore, the scope-based approach fits well with recent proposals regarding LF, while binding-theoretic approaches are rooted in the original LF model. In this model, QPs and *wh*-expressions are necessarily higher than their base position at LF, and no distinction is made between the specifier of the expression and its restrictor. The data to be presented in section 4.3 reveals further problems in appealing to a syntactic generalization regarding inverse binding, as in binding-theoretic approaches, which will eventually lead us to a scope-based theory of WCO. The applicability of some of Ruys' ideas to this theory is an issue we will revisit in section 4.4.

4.2.5 Semantic Approaches

In this subsection I briefly consider two semantic theories of WCO, one hinging on a syntactic constraint and the other appealing to a linear, processing-based generalization. The first—Büring (2004)—was already mentioned in subsection 4.2.3, due to its use of the A-command Requirement. This requirement is Büring's starting point, forcing

¹⁹ For convenience, I follow Ruys in using a *which*-phrase with an overt restrictor for the purpose of illustration. However, the choice of this *which*-phrase bears on the acceptability of the question, as we will see in section 4.3.1.

operators to be in an A-position in order to bind a pronoun. He formalizes the distinction between pronoun binding of this sort and trace binding by positing different binding operators, and limiting the adjunction sites of the pronoun-binding operator to non-derived, A-positions. Conversely, the trace-binding operator adjoins next to derived positions. Buring also tackles indirect binding, whether genitive binding or inverse linking, and analyzes the bound pronoun in such configurations as an e-type pronoun. This allows him to treat the container DP as the binder and thus reduce the presence vs. absence of WCO effects in these configurations to whether or not the container is in an A-position.

The details of Buring's theory are not of particular importance here, because its ability to capture the data rests on the validity of the A-command Requirement. This requirement, in turn, assumes a connection between A-positions and pronoun binding which is not grounded in some deep understanding of the pronoun-binding system, but rather is meant just as a correct descriptive generalization. Since, as mentioned above and detailed below, the requirement does not hold up to close scrutiny of the full range of relevant data, Buring's theory is seriously undermined.

A rather different semantic take on WCO effects is Shan and Barker's (2006) left-to-right processing-based model. In this model, semantic rules conform to a linear generalization which is said to guide language processing: natural language expressions are evaluated from left to right. With regard to scope, the left-to-right bias is reflected in a type-shifting scope rule that derives linear scope in a simpler manner than inverse scope, because the latter requires additional type-shifting rules. The costly type-shifting mechanism available for inverse scope cannot be applied to pronoun binding, meaning that a derivation in which a pronoun precedes a potential QP binder will not have a bound variable reading (barring reconstruction).²⁰ Nevertheless, under certain conditions the scope rule can be replaced with an alternative scope rule which works from right to left, and thus allows inverse binding.

The advantage of Shan and Barker's model over the prevailing class of WCO analyses is that it does not postulate a constraint specific to variable binding, but instead uses a putative processing bias, translated into the algorithm for semantic interpretation. Shan and Barker also claim that the existence of a right-to-left evaluation rule, which speakers may resort to as a non-default option, allows their model to explain why WCO violations are "weak". Herein, however, lies the weakness of the model: there is no account of the conditions under which right-to-left evaluation, which licenses inverse binding, is possible. Shan and Barker remain extremely vague about the use of the right-to-left scope rule, stating that speakers may make use of it "with enough mental effort" and given "sufficient motivation" (p. 128). In fact, earlier in the same discussion Shan and Barker assert that the grammar does not contain a right-to-left scope rule: do they mean that such a rule is somehow extra-grammatical, or are they simply being inconsistent? The circumstances that make inverse binding possible, lacking in Shan and Barker's theory, are spelled out in this chapter and claimed to derive from a grammatical IS-based rule regulating inverse scope relations. This rule will later be represented in a non-linear formalism, in accordance with my assumption that binding relations are represented in a hierarchical structure (see fn. 7). However, since none of the findings presented here

²⁰ I do not go into the semantic machinery which distinguishes inverse scope from inverse binding; readers are referred to Shan and Barker for these details.

speak directly to the issue of linear order vs. c-command, one could attempt to incorporate them into a linear model; I leave this as an exercise for the reader.

Let us summarize this section. The phenomenon of WCO has been the subject of a great deal of research, which I have attempted to outline in broad terms and consider primarily in light of the core set of *wh*-question and QP examples. I have also evaluated existing approaches with respect to secondary crossover—i.e. failure of indirect binding—as well as general considerations of empirical motivation and parsimony. Almost from the beginning, studies of WCO have sought to derive this phenomenon from general principles, such as conditions on variable binding, scope, or language processing. A crucial component of any such endeavor is the delimitation of the empirical domain, that is, settling on the class of judgments which we want to account for. In the next section I catalog a long list of examples which lie outside the coverage of existing theories, but are essential for a truly comprehensive theory of WCO. Since these examples form a well-behaved group, sharing core properties at an appropriate level of analysis, a novel approach to WCO is called for.

4.3 "Missing" Weak Crossover Effects

The fact that inverse binding is not categorically impossible was noticed already in early studies of the subject. Thus, Postal (1972) remarks that the form of the *wh*-expression in questions influences the acceptability of an inverse binding configuration, while Wasow (1972, 1979) documents a number of ways in which WCO effects can be ameliorated or eliminated. However, no uniform, well-defined picture of the conditions that allow inverse binding has been put forward in the literature, and so authors have generally not attempted to incorporate the examples of "missing" WCO effects, so to speak, into their theory. In this section I gather the relevant examples from the existing literature, supplement them with novel examples when needed, and show that the data collapses in accordance with the following IS generalization: inverse binding is possible if and only if the binder is interpreted as a topic and the bindee as (part of) an IS focus. This is just meant as a broad descriptive generalization, and it will have to be slightly revised in the subsequent section, once we understand why the data patterns this way, i.e. what the underlying cause of WCO effects is.

It is important to note that even when the IS requirement on inverse binding is met, speakers are sometimes reluctant to declare sentences that are documented in this section fully acceptable. Because judgments are subtle, it is important to compare each sentence to its baseline counterpart. The sentences may be dispreferred in light of the existence of simpler surface binding equivalents, which do not necessitate a particular IS articulation, just as inverse scope readings of doubly quantified sentences are judged less acceptable than surface scope. This dispreference should not be taken as an indication that the examples of inverse binding in question are *ungrammatical*, but rather exhibit varying degrees of *unacceptability*. The necessary distinction between ungrammaticality and unacceptability is highlighted again in section 4.5.

The structure of this section is as follows. Subsection 4.3.1 provides examples in which the interpretation of a *wh*-phrase as d-linked, whether because it is a *which*-expression or by virtue of the context, ameliorates WCO effects. A similar result is obtained when the phrase containing the bindee is marked as an IS focus, either by associating it with a focus particle or by making it the element answering a question. This

manipulation via focus applies equally to *wh*-questions and to sentences involving a QP. Furthermore, combining a d-linked *wh*-phrase and focus produces a cumulative effect, so that the sentence becomes perfectly acceptable. In subsection 4.3.2 I illustrate how WCO effects are absent from non-genuine *wh*-questions, that is, questions in which the speaker knows the answer. The following subsection, 4.3.3, discusses topicalization and nonrestrictive relative clauses, often subsumed in the literature under the label "weakest crossover". Subsection 4.3.4 is devoted to crosslinguistic variation in WCO effects, focusing on their behavior in German, and in subsection 4.3.5 I wrap up by presenting a few additional examples of relatively acceptable WCO configurations noted in the literature. Although many of these examples, like the others just mentioned, have not been explicitly identified in the literature as related to IS, one of the goals of this section is to lay out the consistent IS pattern shared by all the examples of missing WCO effects.

4.3.1 D-linking and Focus

In order to demonstrate how various modifications to a WCO configuration yield a change in its status, it is necessary to reintroduce the basic paradigm. (385) gives the relevant *wh*-question examples, both unary *wh*-questions and multiple *wh*-questions where one *wh*-phrase remains in situ.

- (385) a. ??*Who_i* do *his* children dislike *t_i*? (=311b)
 b. ??*Who_i* did you say *his* boss admires *t_i*? (=312b)
 c. ??*Who_i* did the woman *he* loved betray *t_i*? (=313b)
 d. ??*What_i* did *his* advisor give *t_i* to *whom*? (=320)

The first revision we will make to these sentences is the use of a *which*-phrase instead of the *wh*-phrase *who(m)*. This renders the sentences somewhat more acceptable, as illustrated in (386), in the sense that speakers find it to easier to allow a reading in which the *wh*-expression binds the pronoun.²¹

- (386) a. ?[*Which man*]_i do *his* children dislike *t_i*?
 b. ?[*Which employee*]_i did you say *his* boss admires *t_i*?
 c. ?[*Which famous actor*]_i did the woman *he* loved betray *t_i*?
 d. ?*What_i* did *his* advisor give *t_i* to [*which student*]?

The unique IS status of *which*-phrases was addressed in section 2.4: because these expressions are d-linked, restricting their answer to a set of discourse-given elements, they tend to function as topics. The observation that using *which*-phrases ameliorates WCO effects was first made in Wasow (1972), but has rarely been treated within traditional, syntax-based approaches to WCO. In fact, researchers often arbitrarily switch back and forth between ordinary *wh*-phrases and *which*-phrases, as in Postal (1972), mentioned in section 4.2.1. By doing so, they unnecessarily muddle the empirical picture. The few syntactic analyses which do take *which*-phrases into account, such as Falco

²¹ In fact, even four-year-old children treat *which*-phrases differently: in an experimental study, Thornton (1990) found that children rejected bound variable readings 80% of the time with *who*, but accepted them in 60% of test sentences with *which NP*.

(2007), tie their import to their IS status as topics, but translate this status into syntactic features which the mechanism underlying binding is said to be sensitive to. Without going into the question whether this syntacticization of IS categories is justified, the main weakness of such an analysis is its restriction to d-linked *which*-phrases. Only a comprehensive IS approach manages to connect the behavior of *which*-phrases to a range of other observations presented in this section.

We have used *which*-phrases as a convenient way to force a d-linked interpretation. However, as noted in previous work on d-linking (e.g. Pesetsky 1987), this interpretation can be arrived at even with plain *wh*-phrases, provided that a context is provided in which the answer set is restricted. We predict that WCO effects should be alleviated under such conditions, and this prediction is at least partially borne out. Thus, speakers find it somewhat difficult to get a bound variable reading for the sentence in (387), but this reading becomes much more accessible following the context in (388).

(387) ??*Who_i* did the police return *his* wallet to *t_i*?

(388) Context: John, Bill, and Peter were walking along Main St. last week when an unidentified man came up to them and demanded their possessions at gunpoint. They all give him their wallets, and later reported the incident to the police. Yesterday they were summoned to the police station to hear about a development in their case. It turns out that one of the wallets was found near the site of the robbery.

(389) ??*Who_i* did the police return *his* wallet to *t_i*?

The sentence chosen here has the bindee pronoun in the direct object position, making it different from the WCO configurations examined thus far, where the pronoun is embedded in the subject. Attempts to make bound variable readings more accessible via the context alone in WCO examples of the latter type are largely unsuccessful, as shown in (390)-(392).²² Why this might be the case is a question I return to in section 4.4.

(390) ??*Who_i* did *his* wife return the gift to *t_i*?

(391) Context: John, Bill, and Peter took their wives on a Caribbean cruise to celebrate their wedding anniversaries. In addition, each of them bought his wife an expensive gift. John bought his wife a necklace, Bill bought his wife a bottle of perfume, and Peter bought a lingerie set. It turns out, however, that one of the wives wasn't particularly pleased with the gift she had received.

(392) ??*Who_i* did *his* wife return the gift to *t_i*?

A second manipulation of the basic WCO paradigm involves the introduction of a focus particle (in the parlance of chapters 2 and 3, an *only*-type operator), associated with the phrase containing the bindee pronoun. That focus particles influence WCO judgments has been repeatedly noted in the literature (Wasow 1972, 1979, Postal 1993, Simpson 2000), and is exemplified in (393) with the elements *X's own*, *only*, and *even*, marked in

²² Recall from section 4.2.4 that Pica and Snyder (1995) also found a distinction in judgments of WCO effects with a subject vs. direct object bindee, though they did not frame the distinction in these terms.

bold (recall that small caps indicate the pitch accent on the IS focus). These sentences allow a bound variable reading much more easily than their counterparts in (385).²³

- (393) a. ?*Who_i* do *his* **own** CHILDREN dislike *t_i*?
 b. ?*Who_i* did you say **only** *his* BOSS admires *t_i*?
 c. ?*Who_i* did **even** the woman *he* LOVED betray *t_i*?
 d. ?*What_i* did **only** *his* ADVISOR give *t_i* to *whom*?

The use of a focus particle works equally well in relative clauses: consider the rather unacceptable example in (394a) compared to (394b).

- (394) a. ??The man *who_i* *his* mother killed *t_i* was put to rest. (=316b)
 b. ?The man *who_i* *his* **own** MOTHER killed *t_i* was put to rest.

Simultaneously employing a d-linked *which*-phrase and a focus particle in a *wh*-question combines the amelioration effects of both elements, so to speak, resulting in a completely acceptable sentence. This can be seen in (395), where variable binding is readily allowed; in these sentences I have also explicitly indicated the categories of topic and focus, showing that the former is filled by the binding *wh*-expression and the latter by the phrase containing the bindee.

- (395) a. [_{TOP} *Which man*]_i do [_{FOC} *his* **own** CHILDREN] dislike *t_i*?
 b. [_{TOP} *Which employee*]_i did you say [_{FOC} **only** *his* BOSS] admires *t_i*?
 c. [_{TOP} *Which famous actor*]_i did [_{FOC} **even** the woman *he* LOVED] betray *t_i*?
 d. *What_i* did [_{FOC} **only** *his* ADVISOR] give *t_i* to [_{TOP} *which student*]?

Moving beyond *wh*-questions and relative clauses, the amelioration of WCO effects is also detectable in sentences involving a QP binder. The QP examples are informative not only because they establish the existence of a consistent pattern running through all WCO configurations, but also because they convincingly show that the pattern is a function of IS focus. That is, we find that particles like *only* or *even* need not be present in order to bring about a change in the status of WCO sentences, and therefore it cannot be the semantics of these particles which is responsible for the change.²⁴ Rather, what the sentences have in common is the IS focus status of the bindee, which may be triggered via focus particles or a preceding question.

Let us begin with examples of question/answer focus, first noticed by Zubizarreta (1998). (396) exhibits the typical WCO effect created when a QP fails to c-command a pronoun in the surface representation, while (397) shows the result of prefacing the same kind of sentence with a question. The indirect question in (397a) imposes IS focus status on the subject in (397b), since it is the element answering the question. The pronoun is part of the IS focus, and it can be bound by the QP object.

²³ Some speakers report a stronger amelioration effect in (393) than with d-linked *wh*-phrases in (386). This is plausibly a function of the stronger correlation between focus particles and IS focus compared to the correlation between d-linking and topichood.

²⁴ A proposal appealing to the semantic/pragmatic properties of focus particles, Authier (1998), is critiqued below.

(396) ??*His* mother loves *every boy*. (=318)

(397) a. I would like to know who will accompany *each/every boy* the first day of school.

b. *His* MOTHER will accompany *each/every boy* the first day of school.
(Zubizarreta 1998:11)

The sentence in (397b) is different from the unacceptable (396) in two respects beyond the IS focus status of the subject. First, the QP binder *each/every boy* is not the rightmost element in the sentence and hence does not bear the main pitch accent, or nuclear stress (NS). I maintain that in sentences like (396) NS is a reflex of the default IS articulation: the element bearing NS—the QP in this case—is the phrase speakers interpret as the focus in the absence of a context that tells them otherwise.²⁵ Ensuring that the QP is not interpreted as the default focus in (397b), by putting a different phrase in the rightmost position, naturally facilitates its interpretation as the topic. We will later observe an opposite case in German, where placement of the *bindee* in the position of NS, henceforth referred to as the default focus position, aids inverse binding.

A second difference between (397b) and (396) is the existence of the preceding context in (397a), which provides further support for the interpretation of *each/every boy* as the topic. The acceptability of (397b) thus stems from its IS articulation, in which the binder is a topic and the bindee a focus, on a par with the *wh*-questions in (395). (398) confirms that focushood of the phrase containing the bindee pronoun is critical, so that merely broad focus does not produce the same outcome.

(398) a. What will happen?

b. ??*His* mother will accompany *every boy* the first day of SCHOOL.

The obviation of WCO effects in QP contexts can also be achieved through the use of focus particles, as in *wh*-questions and relative clauses. Thus, unlike (396), the sentences in (399) with the particle *only*, and the QP outside the default focus position, allow the variable binding to go through. Topic and focus are marked below, showing the parallelism between these examples and the *wh*-questions in (395).

(399) a. [_{FOC} **Only** *his* MOTHER] can give [_{TOP} *every boy*] a proper education.

b. [_{FOC} **Only** *his* COACH] will send [_{TOP} *every player*] the team roster.

The possibility of eliminating WCO effects in QP contexts with the help of focus particles has been overlooked in the literature until now, because of a misunderstanding about the data that needs to be taken into consideration. That is, both Postal (1993) and Simpson (2000) take examples like (400) to show that focus particles do not enable inverse binding in sentences involving a QP binder. Given that these examples behave differently from the earlier *wh*-questions, Postal is led to the erroneous conclusion that WCO effects in *wh*-questions do not reflect the same phenomenon as those observed with QP binders.

(400) a. ***Even/only** *his* CHILDREN dislike *every man*.

b. **His own* CHILDREN dislike *every man*. (Simpson 2000:33)

²⁵ This take on NS is discussed further in chapter 5.

There is a crucial distinction between the acceptable sentences in (399) and the examples in (400): the potential QP binder is in the default focus position in the latter case, making it difficult to construe as a topic. If both topic and focus interpretation are necessary to obtain inverse binding, it is not surprising that the examples in (400) are considered ill-formed. Moreover, I am not convinced that the judgments indicated above reflect the status of all examples of this type. (401), for example, seems to be partially acceptable and certainly better than the original (396); an explanation for the difference between (401) and (400) must await further research.

(401) ?**Only** *his* FATHER can provide for *every boy*.

In any case, simply removing the QP from the default focus position, as in (402), also improves the status of inverse binding examples (see also (398b)).²⁶

(402) a. ?*His* mother can give *every boy* a proper education.

b. ?*His* coach will send *every player* the team roster.

The sentences (399), (401), and (402) indicate that QP contexts are analogous to *wh*-questions with respect to the amelioration of WCO effects: partial acceptability is achieved with one of two IS-related manipulations, driving topic or focus interpretation, while full acceptability is contingent on the binder being interpreted as the topic and the bindee as the focus. Interestingly, we find the same kind of cumulative amelioration with secondary WCO, modulo some processing difficulty which is also present in surface indirect binding structures (and which may have contributed to the classification of these structures as ungrammatical by Koopman and Sportiche (1983); see fn. 12). For example, we move from a relatively strong WCO effect in (403a), with no facilitatory IS cues, through a weaker effect if a d-linked *wh*-phrase is used, as in (403b), to full acceptability in (403c), when both a d-linked *wh*-phrase and focus particle are included.

(403) a. ??[*Whose* mother]_i has *his* teacher never met *t_i*? (=378c)

b. ?[[*Which boy*]'s mother]_i has *his* teacher never met *t_i*?

c. [[*Which boy*]'s mother]_i has **even** *his* TEACHER never met *t_i*?

The following sentences show that obviation of secondary WCO effects is not limited to genitive binding from within a *wh*-expression, as in (403): (404) is a case of genitive binding from within a QP, while (405) and (406) illustrate that obviation is possible in inverse linking structures involving a *wh*-phrase and QP, respectively.

(404) a. ??*His* teacher has met [[*every boy*]'s mother]. (=379c)

b. **Only** *his* MOTHER can teach [[*every boy*]'s dog] to fetch.

(405) a. ??[Which picture of [*which man*]]_i did *his* agent sell *t_i*?²⁷ (=380c)

b. [Which picture of [*which man*]]_i did **even** *his* AGENT fail to sell *t_i*?

²⁶ The relative acceptability of examples akin to (402), where the QP is not final in the sentence, has been noticed in the literature before but gone unexplained:

(i) ?*His* mother gave *every soldier* a good luck charm to wear into battle. (Ruys 2000:535)

²⁷ This baseline example of inverse linking from within a *wh*-phrase includes a d-linked *wh*-phrase as binder, meaning that our IS generalization predicts that it should be partially acceptable. The precise status of this example needs to be examined further.

- (406) a. ??*Its* mayor despises [someone from [*every city*]]. (=381c)
 b. **Even** *his* diehard SUPPORTERS will find [some flaw in [*every candidate for office*]].

The connection between the manipulations used above and IS can be corroborated by applying them to passive sentences. Unlike what we have observed with active sentences, the introduction of d-linked *which*-phrases, focus particles, and question/answer focus into a passive does not alleviate WCO effects. (407) is the baseline WCO configuration in a *wh*-question with a passive verb, and does not allow a bound variable reading ('for which person *x*, *x*'s mother was hit by *x*'), as expected. In (408), the bound reading continues to be unavailable, despite the presence of both the d-linked *which inmate* and focus particle *even*; the status of the sentence is no better than (407).

(407) ??*Who_i* was *his* mother hit by *t_i*?

(408) ??[*Which inmate*]_{*i*} was **even** *his* MOTHER hit by *t_i*?

(409)-(411) provide the corresponding data from QP contexts. (409) exhibits the basic WCO effect in a passive sentence, and (410) shows that question/answer focus and an accommodating context do not improve the acceptability of the sentence. Finally, (411) is a failed attempt to make the bound variable interpretation available by using a focus particle and placing material other than the binder in the default focus position.

(409) ??*His* advisor will be escorted by *every student*.

- (410) a. I would like to know who will be escorted by every student at the ceremony.
 b. ??*His* ADVISOR will be escorted by *every student* at the ceremony.

(411) ??**Only** *his* ADVISOR will be escorted by *every student* at the ceremony.

I argue that passive sentences are not affected by these modifications because of the particular IS articulation associated with passives. The amelioration of WCO effects hinges on interpreting the potential binder, whether a *wh*-phrase or QP, as a topic. However, recall from chapters 2 and 3 that the *by*-phrase of a passive is difficult to construe as a topic, explaining, for instance, why it fails Reinhart's (1986) backward anaphora diagnostic (see section 3.6.2). Consequently, if the potential binder is placed in a *by*-phrase, and hence largely excluded from topichood, a sentence with a WCO configuration cannot be repaired. This would amount to overturning one of the functions of the passive, to designate that the agent is not the topic, which the linguistic system apparently does not allow.²⁸ The IS articulation of passives may also explain why the baseline examples in (407) and (409) seem more degraded than their active counterparts. An object *wh*-phrase or QP in an active sentence can potentially be interpreted as a topic, even without overt marking of its intended topic status, yielding the variation attested in judging WCO effects. However, this is much more difficult in the case of a *wh*-phrase/QP in a *by*-phrase.

A second potential piece of evidence for a connection between the manipulations described in this subsection and IS is put forward by Zubizarreta (1998). Though I believe that Zubizarreta's analysis of this data is incomplete, it is worth examining, if for

²⁸ Cf. Brunetti (2009b:279): "... the function of the passive voice is precisely that of reducing the importance of the volitional agent in the description of the event. In this perspective, it does not make sense that the volitional agent be chosen to express 'what the sentence is about'."

nothing else than methodological reasons. The sentences in question are identical to the examples above, except for the substitution of the QP *everybody/everyone* for the QP *every NP*; crucially, the result is that WCO effects do not go away. Thus, in (412) we find the standard WCO effect, in (413) question/answer focus does not make the sentence more acceptable, and similarly for (414), where a focus particle is used. (413) should be compared with its well-formed counterpart (397) and (414) with (399).

(412) ??*His* mother loves *everybody*.

(413) a. I would like to know who will accompany *everybody* the first day of school.
 b. ??*His* MOTHER will accompany *everybody* the first day of school.

(Zubizarreta 1998:13)

(414) ??**Only** *his* MOTHER can give *everybody* a proper education.

Zubizarreta suggests that WCO effects cannot be alleviated with the QP *everybody*, despite the use of facilitatory IS cues, because it is incompatible with topichood. This, she maintains, derives from *everybody* not being as descriptively rich as *every NP*. If true, the behavior of *everybody* would substantiate the claim that topichood of the potential binder is necessary to obviate WCO effects. However, *everybody* introduces a confounding factor which Zubizarreta does not consider and which plays a role in deriving the pattern seen in (413)-(414); moreover, the idea that *everybody* cannot be a topic is inconsistent with what we know about topics in general and with the behavior of similar quantificational expressions in other languages.

Universal quantifiers are possible topics, as noted in Reinhart (1981), provided that they can be construed as sets which contain all elements of the quantifier's restrictor and which can be understood referentially. As a topic, the quantifier allows either a collective reading, where predication is applied to the entire set, or a distributive reading, in which predication applies to each member of the set (cf. Erteschik-Shir 1997). Universal quantifiers of the subclass *everybody* belongs to, in which the restriction is left vague, do not pattern differently in this regard, and hence can bear morphosyntactic topic marking; cf. Japanese *minna-wa* 'everybody-top'. Therefore, the failure to alleviate WCO effects with *everybody* cannot be exclusively a function of incompatibility with topichood, as Zubizarreta assumes. It is nevertheless true that this kind of quantifier is more difficult to interpret as a topic than *every NP*, due to what Zubizarreta informally labels low "descriptive richness". The relation between this notion and topichood is addressed in more detail below.

The confounding factor which *everybody* brings into the picture, hindering variable binding in (413)-(414), is resistance to distributivity. Distributivity is a prerequisite for variable binding, separate from topichood, but *everybody* often excludes a distributive interpretation. This is demonstrated in the distinction noted in fn. 12 between surface binding of a pronoun by *everybody* vs. *every boy*, where topichood is not at issue:

(415) a. ??*Everybody's* mother likes *him*.

b. *Every boy's* mother likes *him*.

The same distinction is reflected in the pair of left-dislocated sentences Zubizarreta calls attention to in (416). While Zubizarreta takes (416a) to establish that *everybody* cannot be a topic, I claim that its deviance is caused partly or wholly by failure to distribute the QP

over the pronoun. This claim is supported by the observation that replacing the singular pronoun *him* with the plural *them*, which does not require the QP to distribute over the individual members of the set, yields a more acceptable sentence in (417).

(416) a. **Everybody*, the doctor examined *him*.

b. (?)*Each/every boy*, the doctor examined *him*. (Zubizarreta 1998:164)

(417) (?)*Everybody*, the doctor examined *them*.

That *everybody* can be used without distributive force is corroborated by (418), where it binds a plural pronoun, unlike *every NP*. At the same time, it would be wrong to state that *everybody* categorically prohibits distributive readings, given sentences like (419a).

(418) a. *Everybody* helps *themselves*.

b. **Every boy* helps *themselves*.

(419) a. *Everybody* helps *himself*.

b. *Every boy* helps *himself*.

The bottom line is that *everybody* exhibits a dispreference for distributivity, which distinguishes it from *every NP* and which may be more pronounced in certain environments, such as inverse binding (413)-(414), indirect binding (415a), and left-dislocation (416a). Since we want to control for this property when exploring variable binding, *everybody* should be avoided.

Overall, a coherent picture emerges from this subsection, indicating that IS categories are a crucial factor in determining whether or not an operator—*wh*-phrase or QP—can bind a pronoun in WCO configurations. This conclusion has for the most part eluded existing approaches to WCO, which ignore observations of the sort made above or describe them as inexplicable. Why, for example, would the labeling of the phrase containing the bindee as an IS focus be relevant to a generalization like the A-command Requirement, which refers only to the structural position of the binder? To the best of my knowledge, there is only one analysis in the literature which attempts to account for the amelioration data involving focus particles, without invoking IS considerations. Let us consider this possibility before proceeding to the next subsection.

Authier (1998) claims that sentences containing focus particles like *only* and *even* circumvent constraints on anaphoric relations, such as the A-command Requirement, as well as Conditions B and C of the Binding Theory, because these constraints refer not just to the structural relation between NPs, but also to semantic/pragmatic information. In particular, they take into account both the assertion of the sentence and any implicatures associated with it. Accordingly, Authier proposes the requirement on variable binding in (420), whose violation leads to WCO effects; the crucial addition to the conventional A-command Requirement in this definition is what follows *unless*.

(420) In a structural configuration where a pronoun P and the trace of a quantifier are both bound by that quantifier, the trace must c-command the pronoun unless either the implicature expression or the extension expression of the sentence containing P excludes the binding relation thus prohibited. (Authier 1998:261)

To illustrate how this reformulation of the standardly assumed variable binding constraint works, take *only* as an example. Given the sentence (421), the meaning

components of *only* are spelled out in (422); a negative component (422a) and a positive one (422b).

(421) Only John drank beer.

(422) a. No one other than John drank beer.

b. John drank beer.

When *only* is added to a sentence with the relevant binding relation, the extension expression of the sentence will include the negative meaning component contributed by *only*, as shown in (424) for the sentence in (423).

(423) [*Which lawyer*]_i do only *his* clients hate *t_i*?²⁹

(424) [[which x] [$\neg \exists y$ (y \neq x's clients) [y hate x]]]

The idea, then, is that the expression in (424) excludes precisely the anaphoric relation which would otherwise be prohibited by the basic condition on variable binding. In accordance with the definition in (420), this relation is allowed.

Alert readers will notice that the question in (423) simultaneously violates (420), since the positive meaning component of *only* (*Which lawyer do his clients hate*) includes the anaphoric relation between *which lawyer* and *his clients*. It is unclear how Authier gets around this problem, and in any event, there are two further empirical problems with his proposal. First, it does not extend to cases where WCO effects are ameliorated simply by virtue of question/answer focus. To account for the fact that focused NPs not associated with a focus particle may also avert the various constraints he discusses, Authier hypothesizes that focal stress carries an existential conventional implicature, whereby the proposition holds of some alternative to the focused element. This would make focal stress equivalent to *even* and *also*, and yield a representation excluding the otherwise prohibited binding relation. However, it has been repeatedly shown in the literature that focal stress is not associated with any existential implication, and is not analogous to focus particles in this respect. To establish this, we can use the examples in (425) and (426); the latter should be considered in a context in which people have bet on the outcome of football games.

(425) a. Who saw John?

b. NOBODY saw John.

(Dryer 1996:487)

(426) a. Did anyone win the football pool this week?

b. Probably not, because it's unlikely that MARY won it, and she's the only person who ever wins.

(Rooth 1999:241)

The answer in (425) asserts that no one saw John, and in (426) focus on *Mary* does not trigger the implication that someone won the football pool; if it did, the sentence would be contradictory. Although these examples are said to show that focus is not associated with an existential *presupposition*, the same conclusion applies to Authier's notion of conventional implicature, given that it is identical in all relevant respects; in particular, conventional implicatures are non-cancellable, as Authier himself mentions. Since

²⁹ Like other authors, Authier uses *which*-phrases without taking note of their special status. I retain his example for convenience sake.

question/answer focus lacks the meaning components Authier's theory appeals to, the theory cannot account for its role in obviating WCO effects.

The second problem with Authier's theory is similarly a result of its appeal to the semantics/pragmatics of focus particles. The theory predicts that one should be able to eliminate WCO effects by setting up sentences with the same meaning as the examples involving a focus particle, regardless of whether focus is actually involved. (427) shows that the prediction fails: WCO effects persist, despite the fact that the meaning of the question is identical to the acceptable example in (423).

(427) ?[Which lawyer]_i does no one other than *his* clients hate *t_i*?

Analyzing the entire range of data leads to the conclusion that the semantic/pragmatic ingredients Authier invokes are simply not related to the phenomenon at hand. Rather, what all the examples in this and following subsections share are IS properties, and therefore an adequate account must refer to these properties.

4.3.2 Non-genuine *Wh*-Questions

Throughout the discussion of *wh*-topics both in this chapter and in previous chapters, we have focused on d-linked *which*-phrases, establishing that their IS status influences speaker judgments regarding intervention effects and WCO effects. There is, however, a subtype of questions which merits particular attention in the context of WCO. I am referring to the class of non-genuine *wh*-questions, which includes incredulity questions, legalistic questions, and quizmaster questions. The first type expresses incredulity or indignation about a statement just uttered, the second is employed in courtrooms and police investigations in order to verify a speaker's knowledge of some fact, and the third type is used in games or shows meant to test a speaker's knowledge. These questions are not genuine in the sense that they do not request information that the questioner lacks; on the contrary, a person can use them only if he knows the answer. Non-genuine *wh*-questions are also distinct in their prosodic properties, the details of which are not important here, and in allowing a single *wh*-phrase to remain in situ in *wh*-movement languages like English.

As reported in Postal (1972), Wasow (1972, 1979) and Authier (1993), and noted in section 4.2.1, non-genuine *wh*-questions do not exhibit WCO effects. The relevant examples of an incredulity, legalistic, and quizmaster question are repeated below, in this order.

(428) The newsman who criticized *him* later belted *what/which official*? (=330)

(429) Remembering you are under oath, the witness who claimed he had never seen *it* was walking towards *what/which building*? (=331)

(430) Mr. Jones, for \$100,000, the man who appointed *him* later said *what/which Secretary of State* was an imbecile? (=332)

The acceptability of these kinds of questions cannot be attributed to the fact that the *wh*-phrase is in situ. We have already determined that multiple *wh*-questions involving an in situ *wh*-phrase pattern on a par with unary *wh*-questions, in which the *wh*-phrase has fronted, with respect to WCO. That is, whether or not binding by a *wh*-phrase is possible is determined by the *base* position of this specific *wh*-phrase vis-à-vis the pronoun, while

its surface position (as well as the presence of additional *wh*-phrases) is immaterial. This is what distinguishes the acceptable multiple *wh*-question in (431) from its unacceptable counterpart in (432); crucially, non-genuine *wh*-questions are structurally akin to (432) but nevertheless fully acceptable.

(431) *Who_i t_i gave what_j t_j to his advisor?* (=319)

(432) ??*What_i did his advisor give t_i to whom?* (=320)

Furthermore, the acceptability of non-genuine *wh*-questions is not merely a function of using a d-linked *which*-phrase. Despite the fact that *which*-phrases improve the status of WCO configurations, as discussed in the previous subsection, they do not yield the type of full acceptability found in (428)-(430). Thus, if we convert the incredulity question in (428) or the legalistic question in (429) into a genuine *wh*-question by fronting the *wh*-phrase and removing any context indicating a non-genuine interpretation, while retaining the use of a *which*-phrase, the status of the question also changes. Though judgments are subtle, the sentences in (433)-(434) seem to be less acceptable than (428)-(429), albeit still an improvement over their counterparts with a non-d-linked *wh*-phrase.

(433) ?*[Which official]_i did the newsman who criticized him later belt t_i?*

(434) ?*[What building]_i was the witness who claimed he had never seen it walking towards t_i?*

Quizmaster questions behave differently in this regard because they allow the *wh*-phrase to front. Insofar as the non-genuine interpretation is maintained, the question is immune to WCO effects, as observed in Authier (1993) and illustrated in (435). Note that (435) also constitutes further evidence for the claim that the status of non-genuine *wh*-questions does not stem from the in situ position of the *wh*-phrase.

(435) Mr. Jones, for \$100,000, *[which Secretary of State]_i did the man who appointed him later say t_i was an imbecile?*

We have discovered a three-way classification of *wh*-questions in terms of their status vis-à-vis WCO effects, as summarized in table 5.

Question type	Status	Examples
Genuine <i>wh</i> -questions with a non-d-linked <i>wh</i> -phrase	Most degraded	(432)
Genuine <i>wh</i> -questions with a d-linked <i>wh</i> -phrase	Slightly degraded	(433)-(434)
Non-genuine <i>wh</i> -questions: <i>wh</i> -phrase must be in situ (incredulity and legalistic questions) or can be fronted (quizmaster questions)	Acceptable	(428)-(430), (435)

Table 5: The Status of Different *Wh*-question Types with respect to WCO

This classification is understandable from the point of view of IS, proceeding from non-d-linked *wh*-expressions, which are the most unlikely to be construed as topics, through d-linked expressions, often construed as topics, to the *wh*-phrases of non-genuine *wh*-questions, which are always topics.

In order to make the claim regarding non-genuine *wh*-questions clear, a few words about their IS articulation are in order. In using this type of question, the questioner requests that the answerer explicitly state the address under which the propositional content of the question is stored. Since this propositional content is given to the questioner in its entirety, the *wh*-phrase does not mark the part of the sentence which the questioner lacks knowledge of and is not the complement to what is given in the question, as in genuine *wh*-questions; that is, it is not the IS focus. Rather, the *wh*-phrase of non-genuine *wh*-questions is necessarily the topic.

Non-genuine *wh*-questions may also be unique in lacking an IS focus, as they contain no part fitting the definition of this IS category. From the perspective of the IS generalization regarding inverse binding, which calls for a topic binder and focus bindee to reach full acceptability, this appears puzzling at first sight. How can non-genuine *wh*-questions be completely acceptable if they have no focus? The answer to this question rests on two claims: first, that the *wh*-phrase of this type of question must be the topic, unlike genuine *wh*-questions, and second, that topic interpretation of the binder is all that the grammatical constraint regulating inverse binding actually requires. Focus marking in genuine *wh*-questions, then, is just a way to facilitate the satisfaction of this constraint, since it precludes the bindee, which would otherwise compete with the binder for topic status, from being assigned this status. It is not needed in non-genuine *wh*-questions, where there is no such competition. The details of the constraint underlying WCO will be spelled out in section 4.4; for now we will continue working with the proposed IS generalization, which is descriptively accurate for the most part.

All but two analyses of WCO have failed to deal with the behavior of non-genuine *wh*-questions. Wasow (1979) reports some of the relevant data, and attributes its acceptability to what he calls the "determinateness" of the *wh*-phrase; however, an explanation for the connection between determinateness and the absence of WCO effects is missing from his analysis, and IS is not taken into consideration. Wasow's observations and notion of determinateness are commented on in more detail in section 4.3.5.

The only recent analysis of WCO effects to tackle non-genuine *wh*-questions, particularly quizmaster questions, is Authier (1993), which is further developed in Authier (1998). On a par with his claim regarding missing WCO effects resulting from the use of focus particles, Authier maintains that their absence from quizmaster questions is a function of the meaning of these questions. Specifically, quizmaster questions are said to be associated with a conventional implicature whereby the questioner knows the answer to the question. This implicature is represented at LF by a constant denoting the answer, e.g. *John Doe* in the LF representation (436) for the question in (430).

(436) Mr. Jones, for \$100,000, (tell me that) the man who appointed *him* later said *John Doe* was an imbecile.

The representation in (436) does not include a bound variable, and therefore no WCO effect is triggered, according to Authier. In his analysis, Authier in effect converts the variable binding relation of a WCO configuration into one of coreference between an NP and pronoun; since different rules apply to a coreference relation, the desired result is obtained. Beyond the questionable attempt to incorporate implicatures into LF, Authier's approach is inadequate because it is extremely limited in its coverage, and cannot explain missing WCO effects where there is no semantic/pragmatic distinction of the type he invokes. We have seen this above in the case of question/answer focus, and this is

similarly true of crosslinguistic variation in WCO effects, to be addressed below. One would be hard-pressed to claim that German *wh*-questions, for example, have a different meaning than their equivalents in English.

This subsection has identified fine-grained distinctions in the pragmatic meaning of *wh*-questions which correlate with judgments of variable binding. I have argued that the pragmatic distinctions affect the IS articulation, which ultimately determines whether or not variable binding is possible. While such subtle distinctions straightforwardly fall out of an IS approach to WCO, it is difficult to see how they could be accommodated in a purely syntactic approach.

4.3.3 Weakest Crossover

"Weakest crossover" is a label chosen by Lasnik and Stowell (1991) to describe a class of environments in which WCO effects are not found despite the fact that a pronoun is locally A'-bound. In this class, Lasnik and Stowell include the following: *tough* constructions (437a), *too*-movement (437b), parasitic gaps (437c), topicalization (437d), and appositive or nonrestrictive relative clauses (437e); these examples are taken from Lasnik and Stowell.

- (437) a. *Who_i t_i will be easy for us [NO_i to get [*his* mother] to talk to e_i]?
 b. *This book* was too obscene [NO_i to have [*its* author] publicize e_i].
 c. *Who_i* did you stay with t_i [NO_i before [*his* wife] had spoken to e_i]?
 d. *This book*, NO_i I expect [*its* author] to buy e_i.
 e. Gerald, *who_i his* mother loves e_i, is a nice guy.*

The pronoun is locally A'-bound in these sentences by either a null operator, labeled NO in (437a-d), or a relative pronoun, as in (437e). In this subsection I address the behavior of topicalization constructions and nonrestrictive relatives; the other environments are left for future research.³⁰ I begin by describing Lasnik and Stowell's syntactic analysis, and then argue for an alternative explanation, which is compatible with the general perspective of this chapter and with the findings presented until now. The discussion will extend beyond English to Chinese, where *wh*-phrases may undergo topicalization and then obviate WCO effects. A comprehensive explanation of this observation, it will be argued, requires considering the IS properties of the sentence.

In order to distinguish weakest crossover from weak crossover, Lasnik and Stowell put forward the claim that the binder in the former case is not truly quantificational, quantifying over a possibly non-singleton set, but rather a semantically vacuous null operator or referring NP. This, in turn, means that the operator trace is a null epithet (i.e. the covert counterpart of an expression like *the bastard*) and not a variable, and hence immune to the structural condition which prohibits WCO. To support the claim that the trace of a non-QP is an epithet, Lasnik and Stowell show that the trace is akin to overt epithets in giving rise to SCO effects (438)-(439) and in failing to trigger WCO effects, like pronouns and names (cf. (437) and (440)).

³⁰ The full range of weakest crossover contexts is discussed in Postal (1993) and Ruys (2004), both of whom critique Lasnik and Stowell's analysis.

- (438) a. **John*, NO_i I think *he* told Mary to visit e_i.
 b. **John*, *who_i* I think *he* said Mary likes e_i...
- (439) a. **John*, NO_i I think *the bastard* told Mary to visit e_i.
 b. **John*, *who_i* I think *the bastard* said Mary likes e_i...
- (440) All of *Bill's* friends say *his* mother loves *him/the guy*. (Lasnik & Stowell 1991:709)

Given the behavior of overt epithets, it is clear why one would want to identify the trace in weakest crossover configurations as their null counterpart. What is lacking from Lasnik and Stowell's analysis, however, is evidence from phenomena other than crossover that this trace behaves differently from the trace of a quantificational operator. Furthermore, the exemption of null epithets from WCO does not follow in a principled way from the WCO constraint Lasnik and Stowell assume in (441), which must then be supplemented with a clause restricting its application to so-called true variables.

- (441) Generalized WCO Hypothesis: In a configuration where a pronoun P and a trace T are both bound A'-bound by a category C, T must c-command P.
 (Lasnik & Stowell 1991:691)

Notwithstanding the above criticism of Lasnik and Stowell's approach, the question is whether it is necessary to adopt an explanation of this sort for weakest crossover environments, or could the absence of WCO effects stem from something other than the type of trace involved. I argue that the latter is true, at least in the case of topicalization and nonrestrictive relatives. Specifically, the relation between the NP antecedent and pronoun in the examples that Lasnik and Stowell provide is one of coreference, rather than variable binding; since coreference is not subject to the same constraints as binding, the acceptability of these examples is expected. Moreover, in examples of QP topicalization which Lasnik and Stowell do not consider, variable binding is possible, but is not sensitive to the c-command relation between the pronoun and trace. These sentences suggest that, contra Lasnik and Stowell, the (non-)quantificational nature of the binder does not bear on the possibility of binding, and more generally, that the syntactic relations between binder and bindee do not fully predict the occurrence of WCO effects.

Beginning with nonrestrictive relative clauses, these structures consist exclusively of coreference relations. In such structures, the head NP must have independent reference, and the relative only adds information about the referent, in contrast to restrictive relatives, where the reference of the head hinges on the information provided by the relative clause. This explains why nonrestrictives differ from restrictive relatives in disallowing a QP head which does not refer (442).

- (442) a. No one who attended the party had a good time.
 b. *No one, who attended the party, had a good time.

The relative operator of a nonrestrictive relative corefers with the head NP, and so an anaphoric pronoun within the relative clause, as in (437e), is also coreferential.³¹ Accordingly, this type of example is not relevant to the issue of variable binding.³²

³¹ Whether the pronoun is coreferential with the relative operator or directly related to the head makes no difference here.

³² Lambrecht (1994) claims that the relativized element in a relative clause is necessarily a topic. If

As for topicalization, here the data is somewhat more controversial. Although Lasnik and Stowell claim that sentences containing a topicalized NP do not display WCO effects, their examples (cf. (437d)) do not include topicalized QPs; Postal (1993) thus provides the example in (443) as a supplement to their dataset.

(443) ??[*Everybody else*]_i, I told *his* wife that I had called *t_i*. (Postal 1993:542)

Postal views this sentence as corroboration of Lasnik and Stowell's distinction between true QPs and non-QPs, since the true QP *everybody else* creates WCO effects but the non-QP in (437d) does not. Ruys (2004), however, maintains that in Lasnik and Stowell's sentences the pronoun is coreferential with the topicalized NP, rather than a bound variable, and this explains the lack of WCO effects. He goes on to argue that topicalized NPs cannot variable bind in general, and so only topicalized sentences in which coreference is possible will come out as acceptable.

The description of the examples given by Lasnik and Stowell as involving coreference between a topicalized non-QP and pronoun seems correct, rendering these examples immaterial to the issue at hand. However, I dispute Postal and Ruys' claims regarding topicalized QPs: they are able to variable bind, and do not necessarily trigger WCO effects. Decisive evidence against the claims of Postal and Ruys is provided by the following sentences, where a topicalized QP successfully variable binds a pronoun in a WCO configuration.

(444) a. [*Anyone who was sick*]_i, *his* father would take care of *t_i*.

b. [*Each man who was sick*]_i, *his* doctor decided to stay with *t_i* overnight.

c. [*Each of these boys*]_i, I am sure *his* father takes time to talk to *t_i* every day.

(Marquis 1996:323)

The problem with Postal's example in (443), distinguishing it from the sentences in (444) and making it unreliable evidence for his claim, is twofold. First, it includes the QP *everybody*, which is averse to a distributive interpretation (cf. section 4.3.1), as illustrated in (445); this introduces an obstacle to variable binding which is irrelevant for our purposes.

(445) ??*Everybody's* mother likes *him*. (=415a)

Second, the use of the modifier *else* requires a context in which the NP it modifies contrasts with some other NP, but this context is missing from (443). This explains why (446) is judged just as deviant as (443) despite not involving a WCO configuration, and why adding an appropriate context results in a more acceptable sentence in (447).³³ Furthermore, entirely avoiding the problems inherent in *everybody else* by replacing it with a QP of the form *every NP*, as in (448), yields a well-formed sentence, on a par with (444).³⁴

anything, this might be true of the relative pronoun of nonrestrictive relatives, and would then help explain the possibility of inverse binding in these structures. I will not pursue this hypothesis here.

³³ I thank Dave Embick for suggesting this manipulation.

³⁴ Ruys (2004) provides the pair of sentences in (i) as evidence for the alignment of WCO effects in topicalization structures with those found in other environments. Insofar as (ib) is indeed judged by other speakers as reported, I do not know why it is different from (444) and (448); in any case, the acceptability of the latter examples, as well as (ia), is at odds with Ruys' assertion that topicalized phrases cannot

- (446) ??[*Everybody else*]_i, Mary convinced *t_i* to leave *his* job.
- (447) ?Mary failed to convince John to work things out with Sue. [*Everybody else*]_i, she dissuaded *t_i* from leaving *his* wife.
- (448) [*Every senior VP*]_i, I told *his* secretary that I had called *t_i*.

The possibility of variable binding by a topicalized QP, as in (444) and (448), conflicts with the accounts of Postal and Ruys, and with some of the basic ideas underlying syntactic analyses of WCO. Crucially, these examples show that the A-/A'-distinction is unable to predict the occurrence of WCO: although topicalization is thought to be syntactically identical to *wh*-movement, and is therefore classified as A'-movement, it does not pattern with *wh*-movement in terms of WCO. Lasnik and Stowell's solution to this conundrum—appealing to whether or not the binder is quantificational—is ruled out, because it also fails to partition the data correctly. However, the status of (444) and (448) does accord with the other findings of this section, since the binder is the topic; its surface position and quantificationality are beside the point. We have already seen that a topic interpretation is facilitated by d-linking a *wh*-phrase, setting up a proper context, and removing the potential topic from the default focus position. To these manipulations we can now add the operation of topicalization.

Attributing the status of (444) and (448) to their IS properties leaves open the issue of the IS category of the bindee. On the one hand, it is possible that topicalization guarantees the interpretation of the binder as the topic in these sentences, making them comparable to non-genuine *wh*-questions and rendering focus marking unnecessary. On the other hand, some speakers report that they must place the NS on the phrase containing the bindee in (444) and (448) in order to get the bound variable reading; in other words, interpret this phrase as the focus. For these speakers, topicalization may not be exclusively a topic-establishing device, as maintained in Prince (1997). Therefore, overtly indicating that the bindee cannot be the topic, because it is the focus, is needed to avert a WCO effect.

We can gather further information on the relation between topicalization and WCO by examining *wh*-questions in Chinese, which, unlike English, allows topicalization of *wh*-phrases. These forms prove informative for a number of reasons. First, they provide clearer judgments than the English QP topicalization examples, and unquestionably involve variable binding, since the antecedent is a *wh*-phrase. Second, the examples of *wh*-topicalization support the claim that a distinction in IS, and not in the syntax, underlies the distribution of WCO effects. The behavior of fronted *wh*-phrases in Chinese coincides with that of topics vis-à-vis a number of phenomena, including WCO, while their classification as A-moved elements—needed to correctly derive the WCO facts under a syntactic analysis—does not correlate with any independently established property. Lastly, the fact that *wh*-phrases can undergo topicalization supports the description of their IS status in section 2.4. *Wh*-phrases may function as topics, and so the ban on topicalization of *wh*-phrases in English is a language-specific syntactic restriction rather than a restriction grounded in IS considerations.

variable bind pronouns.

- (i) a. [*Every employee*]_i, the boss invited *t_i* to *his* birthday party.
 b. ??[*Every employee*]_i, *her* friend came to visit *t_i*.

(Ruys 2004:133)

A basic example of a Chinese *wh*-question is (449a), where the *wh*-phrase is in situ, and *wh*-topicalization is demonstrated in (449b).

- (449) a. Zhangsan mai-le shenme?
 Zhangsan buy-ASP what
 'What did Zhangsan buy?'
 b. shenme_i Zhangsan mai-le t_i?
 what Zhangsan buy-ASP
 'What did Zhangsan buy?' (Wu 1999:82)

Wu (1999) argues at length that the movement seen in (449b) is topicalization, rather than English-type *wh*-movement targeting SpecCP, or scrambling, as observed in Japanese *wh*-questions. A moved *wh*-phrase in Chinese differs from a scrambled *wh*-phrase in Japanese, for example, in that it cannot reconstruct to its base position, and its insensitivity to Superiority makes it unlike a fronted English *wh*-phrase. In addition, *wh*-questions in which the *wh*-phrase is topicalized have a particular pragmatic meaning; here is how Wu (1999:83) describes the conditions on the use of (449b): "If the speaker, or the hearer, or both, recommended a particular set of items to Zhangsan before he went shopping, and in addition, they have been informed that Zhangsan did buy some items from the list recommended, then it is appropriate for the speaker to ask (1b) [= (449b)], but not (1a) [= (449a)]". In other words, *wh*-topicalization is licensed if the possible answers are restricted to a previously established set, just like d-linking of *wh*-phrases in English.

There are two properties of topicalized *wh*-phrases in Chinese which make them particularly relevant here. First, while standard *wh*-questions in Chinese exhibit typical WCO effects (450a), topicalizing the *wh*-phrase removes these effects (450b).

- (450) a. *ta de muqing hen xihuan shei?
 he DE mother very like who
 'Who does his mother like?'
 b. shei_i ta de muqing hen xihuan t_i?
 who he DE mother very like (Wu 1999:91-92)

Second, topicalized *wh*-phrases differ from in situ *wh*-phrases in that they necessarily take wide scope: in (451a) the in situ *wh*-phrase may take scope over or under the universal quantifier subject, sanctioning an individual vs. pair-list answer, respectively, but when topicalized, as in (451b), it must scope over the subject. This scopal behavior shows that fronting of Chinese *wh*-phrases is not English-type *wh*-movement; in the English counterpart of the Chinese sentence, *What did everyone buy?*, the quantifier can scope over the fronted *wh*-phrase.

- (451) a. meigeren dou mai-le shenme? (what > ∀, ∀ > what)
 everyone all buy-ASP what
 'What did everyone buy?'
 b. shenme_i meigeren dou mai-le t_i? (what > ∀, *∀ > what)
 what everyone all buy-ASP
 'What did everyone buy?' (Wu 1999:88)

The behavior of topicalized *wh*-phrases in Chinese is entirely expected given the claimed relation between the IS property of topichood and inverse binding. *Wh*-topicalization allows binding because it forces the *wh*-phrase to be a topic, thereby also making overt focus marking of the bindee unnecessary. The ability of the topic *wh*-phrase to bind a pronoun reduces, in turn, to its scopal properties. Without going into the details, which will be provided in section 4.4, the correlation between the wide scope of topics and variable binding follows only from an analysis of WCO which relies on scope. Under binding-theoretic approaches, including those that adopt the A-command Requirement, topichood and scope do not distinguish between acceptable and unacceptable cases of inverse binding. Instead, these approaches are forced to invoke the A-/A'-distinction and/or quantificational status of the binder, neither of which is relevant to Chinese *wh*-topicalization.

Summarizing this subsection, we have found that nonrestrictive relative clauses do not constitute a problem for the IS generalization about inverse binding, while topicalization structures in both English and Chinese serve to corroborate this generalization. Having begun to consider WCO effects in languages other than English, it is fitting to treat this issue in a more comprehensive manner in the next subsection.

4.3.4 Crosslinguistic Variation

WCO is not a crosslinguistically uniform phenomenon: there are many languages in which WCO effects are eliminated by various manipulations, and there are languages in which WCO effects are absent from basic configurations, that is, *wh*-questions derived via the standard means for forming a *wh*-question in the given language. Georgopoulos (1991), for example, lists German, Hungarian, Lakhota, and Warlpiri as languages of the latter type.³⁵ Here I focus on German, because it is the best documented of these languages. Although the German pattern is well-known and has been subject to a range of syntactic analyses, none of these analyses are grounded in an independently motivated property of German, which distinguishes it from a language like English. It is possible, however, to provide such an analysis, and to connect German in a principled way to the other observations made in this section, by taking IS into account.

The exceptionality of German with respect to WCO is illustrated in (452): (452a) is a subject *wh*-question, which behaves just like its English counterpart, whereas the object *wh*-question in (452b) differs from the English equivalent in that it is judged as acceptable, at least by some speakers; "%" indicates variation among speakers.

- (452) a. *Wer_i t_i mag seine Mutter?*
 who.NOM likes his mother.ACC
 'Who likes his mother?'
 b. %*Wen_i mag seine Mutter t_i?*
 who.ACC likes his mother.NOM
 'Who does his mother like?'

³⁵ Although Georgopoulos is primarily concerned with Palauan, WCO effects in this language are not lacking from basic *wh*-questions, where the *wh*-phrase remains in situ, but only from questions in which the *wh*-phrase has fronted. The Palauan sentences should therefore be compared to the Chinese examples of *wh*-topicalization presented in the previous subsection.

As for QP contexts, a surface representation in which the QP is the object and does not c-command a pronoun in the subject does not allow variable binding of the pronoun ((453a), (454a)), on a par with English. Movement of the QP object above the subject, whether via scrambling (453b) or topicalization (454b), alleviates the WCO effect for some speakers.

- (453) a. **dass seine Mutter jeden mag.*
 that his mother.NOM everyone.ACC likes
 'that his mother likes everyone'
- b. %*dass jeden_i seine Mutter t_i mag.*
 that everyone.ACC his mother.NOM likes
- (454) a. **Seine Mutter mag jeden.*
 his mother.NOM likes everyone.ACC
 'His mother likes everyone.'
- b. %*Jeden_i mag seine Mutter t_i.*
 everyone.ACC likes his mother.NOM

This set of German data introduces a number of observations which require explanation. First, we would like to know why the *wh*-phrase in an object *wh*-question can bind a pronoun in the subject, despite the fact that *wh*-questions in German appear to be syntactically identical in all relevant respects to their English counterparts. Second, why does the placement of a QP object above a subject embedding a pronoun allow the QP to bind the pronoun? A third and final matter worthy of investigation is the cause for the interspeaker variability in judging the latter two cases; it is generally assumed that the same group of speakers who find (452b) acceptable—the so-called liberal dialect—also regard (453b) and (454b) as well-formed (cf. Müller 1995).^{36,37}

To the best of my knowledge, all existing attempts to address these issues have been syntactic in nature. Studies representing the liberal dialect include Webelhuth (1989), Frank, Lee and Rambow (1996), and Berman (2000), while those reflecting the conservative dialect include Reis and Rosengren (1988) and Müller and Sternefeld (1994). Much of the discussion has been framed in the context of determining the properties of scrambling in German, i.e. labeling it either as A-movement or A'-movement. The problem German poses in this regard is basically as follows. On the one hand, any movement which is insensitive to WCO should be classified as A-movement, given the widely held assumption that an operator can bind a pronoun only from an A-position (i.e. the A-command Requirement on Pronoun Binding). On the other hand, this classification would force one to analyze not only clause-internal scrambling in the German liberal dialect as A-movement, but also *wh*-movement and topicalization, which have unmistakable properties of A'-movement. This problem has yet to be clearly resolved, and multiple competing analyses exist in the theoretical literature (see Frank, Lee and Rambow 1996 for a summary). Some, for instance, have claimed that clause-

³⁶ For the sake of convenience, I follow the literature in using the terms dialect or variety to describe the pattern of interspeaker variation in German, though these terms will turn out to be inappropriate given the analysis proposed below.

³⁷ A fourth issue concerns the behavior of sentences including a subject QP binder. I put off discussion of such cases until section 4.4.

internal scrambling in German has both A- and A'-properties (Webelhuth 1989), whereas others, like Grewendorf and Sabel (1999), have asserted that WCO does not detect the A-/A'-distinction, but instead reduces to the Leftness Condition (see section 4.2.2). This allows Grewendorf and Sabel to maintain an A'-analysis of German scrambling. Let us consider one approach in some detail, Müller (1995), which attempts to provide a comprehensive explanation for the German data, including the supposed dialect split, while retaining the assumption that the A-/A'-distinction is relevant for variable binding.

Müller adopts the A-command Requirement on Pronoun Binding, which he translates into the two mechanisms in (455)-(456). The filter in (455) assesses representations in terms of δ -features, the "identification" feature for bound variable pronouns, which is allocated to pronouns at S-structure and at LF, and this allocation is regulated by (456). Specifically, the filter assigns two question marks to every representation that contains a bound variable pronoun bearing the feature $[-\delta]$; this reflects the standard WCO effect. A crucial component of δ -assignment in (456) is the distinction between S-structure and LF: an operator c-commanding a pronoun at LF needs to be in an A-position to enable assignment of $[+\delta]$, while this is not true of c-commanding operators at S-structure.

(455) Condition on Bound Variable Pronouns:

??[... bound variable pronoun $[-\delta]$...]

(456) δ -assignment:

- a. At S-structure, a pronoun receives the feature $[+\delta]$ iff it has a binder, and $[-\delta]$ otherwise.
- b. At LF, a pronoun receives the feature $[+\delta]$ iff it has an A-binder, and $[-\delta]$ otherwise.

(Müller 1995:169-170)

In order to account for the two varieties of German, Müller parameterizes (455) in terms of the level of representation at which it applies. In the conservative variety, overt movement of a binder will result in the pronoun being assigned $[+\delta]$ at S-structure, but the lack of an A-binder at LF means that it will also have a $[-\delta]$ feature, resulting in a mild violation of (455). If the pronoun lacks a binder at S-structure, it ends up with two $[-\delta]$ features, yielding strong ungrammaticality. In the liberal variety, however, the filter may apply at the level where a binder is present, at which point interpretation can take place as well. Thus, the filter can be satisfied already at S-structure, where A-binding is not required: if a pronoun is bound at S-structure, it is assigned $[+\delta]$, LF is not relevant, and no WCO effects arise. This is the pattern documented in (452b), (453b), and (454b). Without an S-structural binder, the pronoun will receive two $[-\delta]$ features in the liberal dialect and therefore induce strong ungrammaticality, as in the conservative dialect; cf. (453a) and (454a).

Müller's analysis of WCO in German appears to derive the data correctly, and it allows one to maintain the idea that scrambling is A'-movement, which is desirable given that it behaves like *wh*-movement and topicalization in both the liberal and conservative dialects. However, the analysis is devoid of any explanatory value, since the way the mechanisms in (455)-(456) are arranged has no justification other than to describe the facts regarding bound variable pronouns. Furthermore, the distinction Müller draws in his analysis between two dialects does not match speaker judgments. In an acceptability rating task of WCO configurations in German *wh*-questions, Fanselow et al. (2005) did not find a binary distribution of judgments, which would indicate two consistent

varieties.³⁸ Rather, when subjects were categorized by their mean acceptability ratings, most fell in a fairly balanced manner among the mid to high ratings.

In light of the inadequacy of existing accounts of WCO in German, I propose an IS-based explanation which builds on the observations accumulated in this section from other languages: German speakers allows inverse binding insofar as they interpret the binder as a topic and the bindee as an IS focus. Crucially, what distinguishes German from English is the fact that in object *wh*-questions and contexts where an object QP has scrambled or topicalized, the phrase containing the bindee surfaces in the position of the focus in the default IS articulation, as indicated by its prosodic status. The implication of this proposal is that WCO effects are not relevant to the A-/A'-distinction in German, just as the previous findings of this section indicate that the presence vs. absence of the effects does not correlate with the A-/A'-distinction in English and Chinese.

Consider how the IS analysis accounts for the data presented above. First, we can use the placement of NS in German as a diagnostic for the default IS articulation. As discussed in section 4.3.1, the element bearing NS is the IS focus in the default articulation. When giving judgments for sentences provided only in written form and without a context, speakers usually resort to this default IS labeling; these are precisely the conditions under which the German data in (452)-(454) needs to be considered.

In German, NS is found on the final position when this position is not occupied by a verb (457a), and on the immediately preverbal position when there is verbal material at the right edge, as in (457b) (Cinque 1993, Zubizarreta 1998, a.o.).³⁹

- (457) a. Gestern fuhren die Stadlers mit dem Auto nach MANNHEIM.
 yesterday drove the Stadlers with the car to Mannheim
 'The Stadlers went yesterday to Mannheim by car.'
- b. Gestern haben die Stadlers mit dem Auto nach MANNHEIM fahren wollen.
 yesterday have the Stadlers with the car to Mannheim drive want
 'The Stadlers wanted to go to Mannheim yesterday by car.' (Speyer 2008:209)

In the system of Cinque (1993), this pattern reflects a universal NS rule whereby sentential prominence falls on the most deeply embedded non-empty XP in the sentence, which will be the rightmost non-verbal phrase in German. From our perspective, whether or not there exists a universal NS rule is not important (but see chapter 5); what is important is that prominence falls on the same element in (457a) and (457b), as expected given a consistent default IS articulation.

The second component of the IS analysis is to test where the NS falls in the examples of WCO configurations under discussion. In accordance with the predictions of the IS analysis, speakers of the liberal dialect place the NS on the phrase containing the bindee in the sentences they judge as acceptable, i.e. object *wh*-questions and declaratives involving a raised object QP. Thus, in (458), (459b), and (460b), the phrase *seine Mutter* 'his mother' bears NS, while in (459a) and (460a) it is the QP binder which takes NS.⁴⁰

³⁸ The sentences used in the rating task were constructed so as to force a bound reading of the pronoun, thereby guaranteeing that judgments directly reflect whether or not the WCO configuration is acceptable. See Fanselow et al. for details.

³⁹ I ignore more complex patterns in which semantic weight, argument structure, etc. may play a role.

⁴⁰ German judgments and intonation patterns were provided or confirmed by Beatrice Santorini, who is a speaker of the liberal dialect.

(458) *Wen_i mag seine MUTTER t_i?* (=452b)
 who.ACC likes his mother.NOM
 'Who does his mother like?'

(459) a. **dass seine Mutter JEDEN mag.* (=453)
 that his mother.NOM everyone.ACC likes
 'that his mother likes everyone'

b. *dass jeden_i seine MUTTER t_i mag.*
 that everyone.ACC his mother.NOM likes

(460) a. **Seine Mutter mag JEDEN.* (=454)
 his mother.NOM likes everyone.ACC
 'His mother likes everyone.'

b. *Jeden_i mag seine MUTTER t_i.*
 everyone.ACC likes his mother.NOM

This pattern of NS assignment provides a uniform explanation for the first two observations noted earlier regarding WCO in German. An object *wh*-phrase can bind a pronoun in the subject and a QP object can bind a pronoun in a subject over which it has raised because the subject in both cases, and with it the embedded pronoun, is construed by speakers as the IS focus. This leaves the *wh*-phrase/QP as the only possible topic.

The IS-based explanation successfully extends beyond the basic paradigm illustrated above. First, a raised QP binds not only into a focused subject, but rather into any phrase which is assigned NS, such as the indirect object in (461b-c).

(461) a. **dass der Jörg seinem Vater JEDEN gezeigt hat.*
 that John.NOM his father.DAT everyone.ACC shown has
 'that John has shown his father everyone'

b. *dass der Jörg jeden_i seinem VATER t_i gezeigt hat.*
 that John.NOM everyone.ACC his father.DAT shown has

c. *dass jeden_i der Jörg seinem VATER t_i gezeigt hat.*
 that everyone.ACC John.NOM his father.DAT shown has

(Frank, Lee & Rambow 1996:73)

Second, if the sentence is such that NS falls on a phrase other than the one embedding the intended bindee, WCO effects emerge, precisely as expected under the IS explanation. This is illustrated in the *wh*-question in (462), where the *wh*-phrase is the indirect object; crucially, NS is on the direct object, rather than on the subject containing the pronoun.

(462) *??Wem_i hat seine mutter t_i ein BUCH geschenkt?*
 who.DAT has his mother.NOM a.ACC book gave
 'To whom did his mother give a book?'

The same pattern is found with long-distance extraction: consider the pair of *wh*-questions in (463) and QP contexts in (464). If the verb bears NS, as in the (a) versions, variable binding is not available, but when it is placed on the phrase containing the pronoun, as in the (b) sentences, variable binding is possible.⁴¹

⁴¹ Analyzing the NS patterns in (463)-(464) would take us too far afield, though the difference between the

- (463) a. **Wen_i* meinte *seine* Mutter, habe sie *t_i* GETRÖSTET?
 who.ACC said his mother.NOM has she consoled
 'Who did his mother say she consoled?'
- b. *Wen_i* sagte sie, habe *seine* MUTTER *t_i* getröstet?
 who.ACC said she has his mother.NOM consoled
 'Who did she say his mother consoled?'
- (464) a. **Jeden* meinte *seine* Mutter, habe sie *t_i* GETRÖSTET.
 everyone.ACC said his mother.NOM has she consoled
 'Everyone, his mother said she consoled.'
- b. *Jeden_i* sagte sie, habe *seine* MUTTER *t_i* getröstet.
 everyone.ACC said she has his mother.NOM consoled
 '(Of) everyone, she said his mother consoled (him).' (Berman 2000:94-96)

All in all, there is compelling evidence from German for a relation between NS on a phrase containing a pronoun, marking it as the IS focus, and variable binding of this pronoun. The relation can also be demonstrated in languages other than German, including languages with relatively free word order, which allow one to move the intended bindee without requiring changes to the rest of the structure. In Hebrew, for example, WCO effects arise when the phrase containing the bindee does not bear the NS (465a), but are ameliorated if it surfaces as the IS focus, carrying the NS (465b). (465a) corresponds in its IS articulation and acceptability status to a standard WCO configuration in English, while (465b) is like the German question in (458).

- (465) a. ??*be-mi* axot-*o* METAPELET?
 in-who sister-his takes.care
 'Who does his sister take care of?'
- b. ?*be-mi* metapelet AXOT-*O*?
 in-who takes.care sister-his

There remains one issue to be resolved under the IS analysis, namely, the alleged dialect split between speakers who find the sentences in (458), (459b), and (460b) acceptable and those that do not. To begin with, this is actually not a two-way distinction, as revealed by careful examination of speaker judgments in the experimental study of Fanselow et al. (2005) mentioned above, which includes data from 48 speakers. Fanselow et al. discovered that mean judgments are by and large distributed in a balanced manner among the mid to high ratings (between 4 and 7 on a 1-7 point scale, where 1=absolutely unacceptable and 7=perfectly well-formed), leading them to conclude that there are no distinct dialects of German with respect to variable binding.

The distributional pattern reported by Fanselow et al. fits in perfectly with an explanation of WCO rooted in IS. The unmarked IS articulation imposed on the German sentences is one in which the intended bindee is interpreted as the focus and the binding *wh*-phrase/QP as the topic, but this is by no means an obligatory articulation. Other articulations are possible, especially given the general preference for interpreting *wh*-phrases as foci, and not as topics. Overriding this preference and positing the articulation which allows binding comes at a price for some speakers; we can term the process

(a) and (b) sentences appears to hinge on whether the preverbal material is a lexical NP or pronoun.

involved in arriving at this articulation IS accommodation. IS accommodation, which will be addressed further in section 4.4, is reflected in partial acceptability within speakers and variable acceptability across speakers. We have encountered this accommodation in English examples analogous to the German ones, with only overt focus marking:

(466) ?*Who_i* do *his own* CHILDREN dislike *t_i*? (=393a)

(467) ?*Only his* FATHER can provide for *every boy*. (=401)

Furthermore, IS accommodation is less costly, if at all necessary, when a cue facilitating the interpretation of the binder as the topic is added.⁴² Thus, the following question with a partitive, d-linked *wh*-expression is more acceptable than (458) even among speakers who find the latter already quite acceptable:

(468) [*Wen von euch*]_i mag *seine* MUTTER *t_i*?
 who.ACC of you(PL).DAT likes his mother.NOM
 'Which of you does his mother like?' (Florian Schwarz, p.c.)

By appealing to the IS property of focus, indicated via sentential prominence, we have managed to come up with a simple account of WCO in German, which not only explains a variety of reported examples but also leads to interesting predictions. In addition to predictions regarding the presence or absence of WCO effects in German, which should be tested on a wider range of data in future work, the proposed account derives a crosslinguistic prediction. That is, we predict that there exist languages in which WCO effects are absent from object *wh*-questions and present in QP contexts, but not vice versa, i.e. languages where WCO effects are observed only in *wh*-questions. Such a language would have to place potential binders in QP contexts and bindees in *wh*-questions outside the default focus position; in other words, have overt QR, which is extremely rare and perhaps limited to Hungarian (see Szabolcsi 1997), but the word order of English in *wh*-questions. The prediction is borne out: though there are languages of the first type, such as German and Hungarian, there is, to my knowledge, no language of the second type, with WCO effects only in *wh*-questions. In fact, there seems to be no language where WCO effects are absent from a basic configuration of inverse binding by a QP. This is a surprising observation from the perspective of binding-theoretic analyses of WCO, given that the original inspiration for these analyses came from the supposed equivalence between QPs and *wh*-phrases at LF.

A major advantage of the IS account of WCO over existing approaches lies in the fact that it is motivated by observations from German which are independent of WCO, as well as findings from other languages regarding WCO. In other words, the account requires no stipulations, unlike syntactic analyses. In any case, the gradient pattern of speaker

⁴² While there is no overt topic marking in the *wh*-questions presented above, the IS status of the raised QPs is less clear. On the one hand, the label topicalization—applied to the QP in examples like (460b)—is thought to indicate the IS status of the QP, and scrambling in German has been argued by some to apply exclusively to topics (e.g. Meinunger 2000). Moreover, there is evidence for a fixed topic position in the German middle field (Frey 2004), which can be occupied by scrambled phrases. On the other hand, scrambling has been claimed to target contrastive foci as well (Grewendorf 2005), and there may be a contrastive focus position in the middle field (Frey 2004). Further work is needed to determine the degree of acceptability of (459b) and (460b), particularly in comparison with the question in (458): if the QPs are unambiguously marked as topics, the declarative examples should be fully acceptable for all speakers according to the IS account.

judgments documented in the study of Fanselow et al. casts serious doubt on any purely syntactic analysis, such as Müller (1995), which predicts a clear-cut split, reflecting two grammars. Even if one posited multiple grammars, it seems impossible to line up each grammar with one of the many levels of acceptability reported. The final option left for a syntactic approach, namely, assuming that the WCO configurations are generated by the syntax and leaving the acceptability judgments to be accounted for by other factors, amounts to acceptance of the IS explanation.

In light of the results of their experimental study, Fanselow et al. advocate an approach to WCO which incorporates syntactic and processing considerations. They suggest that German differs from English in allowing a derivation where the object *wh*-phrase A-scrambles into a position c-commanding the subject, followed by A'-movement to SpecCP. The two movements are innocuous with respect to WCO, since the first is A-movement and the second does not cross the possessive pronoun. Nevertheless, object *wh*-questions involving a two-step derivation are less acceptable than subject questions because they are an instance of an object-initial scrambled sentence, which is allegedly dispreferred on grounds of processing difficulty. Similar accounts, relying on the controversial assumptions that short scrambling in German is A-movement and that *wh*-phrases can undergo this kind of movement, have been previously proposed and criticized in the literature (see Müller 1995). At any rate, this account cannot explain various aspects of the data, including the distinct behavior of ditransitive questions in which the intended bindee is not in the phrase bearing NS (462), and the effect of d-linking the *wh*-phrase in (468). It is doubtful that these observations have anything to do with processing factors.

There remains much to examine in German and other languages which are said to lack WCO effects, particularly the relation between NS patterns and acceptability ratings of WCO configurations across speakers. For now, we can add another set of data to our growing body of evidence for an IS approach to WCO, and proceed to the final part of this section.

4.3.5 Additional Cases

To end section 4.3, I present two additional sets of inverse binding data which are judged as more acceptable than the baseline WCO examples. This data is interesting for a number of reasons. Some of the data has been noted before and claimed to be problematic for binding-theoretic approaches to WCO, though not necessarily described in IS terms. I will show that it is possible to subsume the relevant examples under our IS generalization, and in the process will consider a couple of non-syntactic treatments of WCO which have been put forward in the literature. Other parts of the data have been analyzed from a purely syntactic perspective, but careful examination indicates that the IS notion of topichood must figure in any account. In addition, the data exhibits patterns of intermediate acceptability, similar to what we have observed in preceding subsections when cues related to only one of the two relevant IS categories, topic or focus, are present in the sentence. This suggests that, as in previous cases, the need to impose an IS articulation that is not fully spelled out via IS cues is playing a role in speaker judgments. I begin by discussing changes to the so-called "determinateness" of the binder, a term used by Wasow (1972, 1979) which will be elucidated below, and later turn to sentences involving an object-experiencer verb.

In one of the first studies of anaphoric relations within a generative framework, Wasow (1972, 1979) called attention to a crucial property of the antecedent in such relations, which he labeled determinateness. Specifically, Wasow claimed that an NP to the right of a pronoun can serve as the antecedent to the pronoun only if it is determinate, and that a determinate NP is one which provides sufficient information to the hearer to assign it a referent. This account was meant to cover a wide range of data, and did not distinguish between non-quantificational and quantificational antecedents, including *wh*-phrases, at a time when the literature had not yet teased apart coreference vs. variable binding.⁴³ Wasow's proposal was objected to because of this, and also due to the vague nature of the notion of determinateness (cf. Chomsky 1976). It was consequently rejected by the literature, and the observations Wasow had made were generally forgotten.

In abandoning Wasow's account, it seems to me, subsequent studies have thrown the baby out with the bathwater, since his observations were never questioned. Having a well-defined model of IS, we are now in a position to understand what is going on in the sentences Wasow documented. We have already made use of this model in providing a clear, uniform account of some inverse binding patterns which Wasow identified, such as the availability of inverse binding with *which*-phrases and non-genuine *wh*-questions in sections 4.3.1 and 4.3.2, respectively. Determinateness was translated into the contemporary term specificity, or d-linking, in the sense of being in a subset relation with a set of familiar referents (Pesetsky 1987, Enç 1991).⁴⁴ The connection between specificity and inverse binding then decomposes into two separate relations; one between specificity and topichood, and the other between topichood and inverse binding.

The intuition behind the idea that specificity and topichood are related rests on the fact that a topic denotes an individual or set of individuals that is part of the universe of discourse of the interlocutors (Lambrecht 1994). In other words, it is not enough for an expression to be referential in order to function as a topic, in accordance with the referentiality constraint on topics discussed in chapters 2 and 3; it must also designate a discourse referent. Proper names and definite NPs are always specific, hence associated with entities active in the discourse, and are consequently natural topics.⁴⁵ Quantificational expressions, including *wh*-phrases, may designate a discourse referent via their domain of quantification, allowing them to serve as topics.^{46,47} I assume that in interpreting a sentence with a quantifier, whether or not a speaker will assign topic status

⁴³ Wasow's generalization regarding anaphoric relations—the Pronominal Anaphora Rule—includes additional conditions which I do not go into here. The question of whether different rules are indeed needed for coreference vs. variable binding relations, or, as Wasow claimed, both fall under the same generalization, is taken up in section 4.4.5.

⁴⁴ Enç (1991) explicitly states that specificity and d-linking are one and the same notion.

⁴⁵ Recall the observation that speakers report trying to construe interveners as proper names (section 3.6.2).

⁴⁶ An ongoing debate in the literature concerns the precise identification of the topic expression in quantifier contexts: is it the whole phrase, as Endriss (2009) argues, or just the restrictor (see Portner and Yabushita 1998, 2001)? Since there is no strong evidence in the data under discussion pointing one way or the other, I do not take a stand on this issue, but informally refer to the entire quantificational expression as the topic for the sake of convenience.

⁴⁷ One way of formalizing the idea of topic quantifiers is by invoking the notion of a minimal witness set for the quantifier, that is, a subset of the restrictor set that does not include irrelevant elements (Endriss 2009). If a minimal witness set can be selected as a representative for the quantifier, the quantifier can be a topic. Universal quantifiers provide such a set (the single set containing all relevant members of the restrictor), whereas negative quantifiers do not, since their witness set is the empty set.

to the quantifier depends on his ability to interpret its domain of quantification as specific, and I argue that both indefinite and universal quantifiers vary in terms of specificity.

That the class of indefinite quantifiers may be specific or not is undisputed, and it is similarly uncontroversial that providing more information regarding the domain of quantification facilitates the specific interpretation of an indefinite (Enç 1991, Erteschik-Shir 1997): *somebody* is less likely to be understood as specific than *some student who cheated on the exam*, with an explicit and detailed restrictor. Universal quantifiers, however, have been claimed by Enç to be inherently specific, because the set they quantify over is always contextually given. Thus, a sentence like *Sally danced with every man* is said to entail that Sally danced with every contextually relevant man, and not with every man on earth. While it is true that in most natural discourse contexts, universal quantification is over a set of individuals known to both speaker and hearer, this is not always the case. A speaker, for instance, may be overly vague in using a QP like *everybody*, preventing the hearer from delimiting the domain of quantification, and this situation can obviously arise when judgments are solicited for sentences without any context. Indeed, lack of specificity was claimed in section 4.3.1 to be responsible for the difficulty in assigning topic status to *everybody*, described by Zubizarreta (1998) as having low "descriptive richness". In addition, empirical evidence for the relevance of specificity to the topic status of *wh*-phrases was presented in section 2.4, and it was pointed out that indefinites must be specific in order to be interpretable as topics.

The second component of Wasow's generalization, namely, the connection between topichood and inverse binding, was claimed above to be part of a descriptive generalization, whereby an inverse binding relation is possible only with an IS articulation in which the binder is a topic and the bindee an IS focus. This generalization, which was illustrated through a variety of examples, will be reduced to a simpler constraint and given a precise explanation in section 4.4. What is important for this section is to show that the specificity-inverse binding connection holds for QPs just as it does for *wh*-expressions. To this end, consider (469): speakers find a clear, albeit subtle, acceptability distinction between (a) and (b), correlating with the amount of information provided by the restrictor of the quantifier. The distinction can also be found in cases of indirect binding, such as the pair of sentences involving inverse linking in (470).⁴⁸

(469) a. ??*His* mother sometimes scolds *every boy*.

b. ?*His* mother scolds *every boy who gets caught cheating*.

(470) a. ??*Its* climate is hated by someone in *every city*.

b. ?*Its* climate is hated by someone in *every city I've visited*.

Alert readers will notice that there is a possible confound in (469b) and (470b). Take (469b) as a representative example: the improved status of this sentence may be related to the fact that NS falls on *cheating*, rather than *every boy* as in (469a). Therefore, while a

⁴⁸ Wasow provides many examples of inverse anaphoric relations involving specific indefinites, as does Lappin (1982) (cf. (i)). A potential problem with using such examples is that the relation may be one of coreference, rather than variable binding; the likelihood of coreference is reduced with a universal quantifier as in (469)-(470).

(i) The woman who loved *him* kissed *some man I was talking to*.

(Lappin 1982:134)

speaker is likely to interpret the QP as the default IS focus in the latter case, precluding it from serving as a topic, this is not necessarily true of the QP in (469b), insofar as focus does not project to the level of the DP. In other words, (469b) would be on a par with the sentences in (471), repeated from above.

(471) a. ?*His* mother can give *every boy* a proper education. (=402)

b. ?*His* coach will send *every player* the team roster.

That the effect is not entirely reducible to a default IS articulation, as indicated by the placement of NS, is shown by a comparison of (469b) and (472); though judgments are delicate, the latter seems to be less acceptable.

(472) ?*His* mother scolds *every boy* from time to time.

The existence of variability in speaker judgments and the non-categorical nature of these judgments, which Wasow pointed out, is expected under the IS model. Judgments are not categorical at the level of the individual speaker, and they do not yield a binary distribution—i.e. fully grammatical vs. ungrammatical—among a group of speakers, on a par with the Fanselow et al. (2005) study on German, precisely because they are governed by IS factors. Whether or not a given speaker will construe a QP as a topic and assign focus status to a phrase containing a potential bindee often depends on IS accommodation, which varies between speakers.⁴⁹

Wasow's observations have been previously translated into IS terms by Lappin (1982) and Erteschik-Shir (1997). Lappin essentially claims that NPs which are necessarily interpreted as foci cannot be in an anaphoric relation with a pronoun, and does not distinguish between coreference and variable binding. Erteschik-Shir reformulates the claim so as to refer explicitly to topics, stating that an NP must be interpreted as the topic of a sentence in order to serve as the antecedent to a pronoun. Though I incorporate these insights into the approach to variable binding developed here, the general analyses they are embedded in are inadequate for two reasons. First, they fail to take into consideration the role that focushood of the bindee plays in inverse binding. Second, and more importantly, these analyses do not explain why topichood is connected to inverse binding; in section 4.4 this connection is broken down into a relation between topichood and scope and a separate relation between scope and variable binding, each of which is independently motivated.

A final class of relatively acceptable inverse binding sentences are those involving an object-experiencer psych predicate, which were mentioned in section 4.2.2. As noted in Reinhart (1983), there is a contrast between sentences like (473a) and (473b), stemming from the use of the object-experiencer verb *worry* in the latter.

(473) a. ??*His* doctor visited *every patient*.

b. ?*His* health worries *every patient*.

This data has been subject to a number of syntactic analyses, including Belletti and Rizzi (1988), Fujita (1993), and Pesetsky (1995), all of which reduce the status of (473b) to the existence of an A-command relation between the QP and pronoun at some stage in the

⁴⁹ Lappin (1982) states that determinateness—the interpretation of a quantifier as specific, in our terms—is context-dependent; I would agree, and add that for out-of-the-blue sentences context is speaker-dependent.

derivation. The structure these analyses posit is meant to account for a range of properties associated with object-experiencer verbs other than the relative acceptability of WCO configurations, among them the possibility of backward binding of reflexives and reciprocals, and resistance to local binding of a reflexive in direct object position. I maintain, however, that the notion of topichood is key to explaining the difference between (473a) and (473b), as in the previous datasets. Not only does consideration of IS allow us to understand this difference as a function of the IS category of the QP object, but it also sheds light on the partial, rather than full, acceptability of (473b), which remains a mystery under existing syntactic analyses.

Let us begin by briefly reviewing two older syntactic accounts of object-experiencer structures, Belletti and Rizzi (1988) and Fujita (1993), and then proceed to a more recent account, Sato and Kishida (2009). Although couched in syntactic terms, the latter makes crucial reference to topichood, thus supporting the approach advocated in this study. Belletti and Rizzi present an analysis of object-experiencer verbs which views them as unaccusatives, so that the surface subject is generated as complement to the verb and moves to SpecIP in order to receive Case. The experiencer argument is generated in SpecVP, and hence c-commands the surface subject in the base; the structure of (473b) is thus as in (474).

(474) [_{IP} [_{his health}]_i [_I [_{VP} [_V worries _{t_i}] *every patient*]]]

The structural relation in the base between the experiencer and surface subject underlies the unique traits of object-experiencer verbs noted above, including the fact that the experiencer may variable bind a pronoun in the subject.

Various problems with Belletti and Rizzi's proposal are noted in Pesetsky (1995) and Sato and Kishida (2009). For example, the exceptional properties attributed to object-experiencer verbs actually extend to a variety of structures which lack such a verb but paraphrase its meaning. Thus, using the syntactic causative verb *make* and the intransitive verb of emotion *worry*, rather than its object-experiencer counterpart, yields the sentence in (475), with the same status as the original in (473b).

(475) ?*His health makes every patient worry.*

In (475), the subject is selected by the causative verb, while the embedded verb has the experiencer as its single argument. Therefore, it is difficult to see how the subject could be generated in a position c-commanded by the experiencer, as Belletti and Rizzi require.

According to Fujita (1993), the experiencer argument need not c-command the subject itself; instead, chain binding—i.e. binding of the trace of the subject—is sufficient to yield the attested properties. This obtains in the structure that Fujita posits, in which the subject is generated internal to the VP and raises overtly to SpecAgrSP, while direct objects move to SpecAgrOP covertly for Case checking purposes (cf. Chomsky 1993). As shown in the LF representation of (473b) in (476), the trace of the subject in SpecVP is c-commanded by the direct object which has raised to SpecAgrOP, and therefore the pronoun in the subject may be bound.

(476) [_{AgrSP} [_{his health}]_i [_{IP} [_{AgrOP} [*every patient*]_j [_{VP} _{t_i} [_V worries _{t_j}]]]]]

For the periphrastic causative in (475), Fujita must assume that the experiencer moves into the matrix clause, in order for it to c-command the trace of the matrix subject. Whether or not such a tack is warranted is debatable; in any case, a more serious

difficulty with Fujita's analysis is its underlying assumption that psych verbs are a subcase of causatives, whose subject is always generated inside the VP. This assumption is unfounded: using the non-psychological secondary predicate *famous* under causative *make* in (477), rather than *worry* as in (475), triggers the unacceptability of a standard WCO effect (see Sato and Kishida 2009 for additional problems with Fujita's analysis).

(477) ??*His medical situation made every patient famous.*

Sato and Kishida put forward an analysis of object-experiencer verbs which is most similar to the approach argued for here, in the sense that they reduce the peculiar behavior of these verbs to a non-syntactic factor. This factor, according to Sato and Kishida, is the cognitive-semantic status of object-experiencer verbs as subjective predicates, which triggers covert movement of their experiencer argument into a position c-commanding the subject in SpecIP. The latter position is said to be the specifier of a "point-of-view" projection (POVP) above IP, because the experiencer functions as a pivot, representing the point of view from which an internal (change of) state is reported. This analysis covers a much broader range of data than previous accounts, since it allows one to take into account various non-syntactic considerations in determining whether a given argument functions as a pivot.

Although the need to incorporate non-syntactic factors into an explanation of WCO should be obvious by now, Sato and Kishida's specific appeal to the notion of pivot appears to be misplaced, for two reasons. First, pivothood does not play a part in any of the findings regarding WCO presented prior to this subsection; there is no necessary pivot, for instance, in d-linked *wh*-questions and German object *wh*-questions which would explain their status with respect to WCO. An analysis which makes it possible to subsume object-experiencer constructions under the same generalization covering the rest of the WCO data, rather than associating them with some other property like pivothood, is preferable. A second reason why a factor other than pivothood should be invoked in accounting for WCO in object-experiencer constructions comes from data which Sato and Kishida themselves present. This data establishes that the experiencer must be a topic in order to allow inverse binding; though Sato and Kishida attempt to integrate the data into their account, it makes reference to pivothood entirely unnecessary. Consider the Japanese sentences in (478): in (478a) inverse binding of the anaphor in the subject by the QP *daremo* 'everyone' is not possible, while this is possible in (478b) with the QP *subete-no oya* 'every parent'.⁵⁰

(478) a. *[[zibun-no kodomo-ga] [daremo-no hokori]] da.
 self-GEN child-NOM everyone-GEN pride COP
 'Everyone is proud of his son.'

b. [[zibun-no kodomo-ga] [subete-no oya-no hokori]] da.
 self-GEN child-NOM every-GEN parent-GEN pride COP
 'Every parent is proud of his son.' (Endo 2007:89)

The difference between *daremo* and *subete-no NP* is exactly as expected if topichood is a necessary condition for inverse binding; as noted in section 3.2.2, *daremo* cannot be a

⁵⁰ The anaphor *zibun* can serve as a bound variable in Japanese, and exhibits the same type of WCO effects as English bound variable pronouns, unlike the pronoun *kare* 'he' (Hoji 1986). Accordingly, the behavior of this anaphor is subsumed under existing analyses of variable binding (see also Saito and Hoji 1983).

topic in Japanese, whereas *subete-no NP* is compatible with topichood. This difference is overtly manifested in *-wa*-marking: the former cannot, while the latter can, take *-wa*.

Having ruled out purely syntactic approaches to the behavior of experiencer arguments, as well as Sato and Kishida's pivothood-based account, we are left with the question of why experiencers allow inverse binding more easily than standard theme objects, reflected in the distinction in judgments between (473a) and (473b). I submit that this distinction reduces to the ease with which speakers can interpret an experiencer, as opposed to a theme, as a topic. According to Brunetti (2009b), experiencer arguments are prototypical non-subject topics because they have proto-agent properties in the sense of Dowty (1991), and these properties figure in topic selection: "a topic is more likely to be instantiated by a participant in the event with agent-like properties than by a participant with a different role" (Brunetti 2009b:265). Proto-agent properties also determine the choice of the grammatical function of subject, resulting in the common, though not obligatory, overlap between subjects and topics. Themes, on the other hand, tend to have proto-patient properties, which make them disfavored topics. The key thematic property described by Dowty which distinguishes the two roles, characterizing experiencers but not themes, is sentience or perception.

We can see a reflex of the preference for interpreting experiencer arguments as topics in languages where word order is highly sensitive to IS considerations. In Italian, for example, the unmarked word order places experiencers in a preverbal position, normally reserved for topics, while the subject is postverbal. Thus, the sentence in (479a) is unmarked, meaning that it is not restricted to a particular context and can be uttered out of the blue. However, (479b), where the experiencer is postverbal, is only felicitous in contexts in which a set of films and individuals are given in the context and the films are compared with respect to whether or not they please each individual in the set (see Brunetti 2009b).

- (479) a. A Gianni piacciono i film dell'orrore.
 to Gianni please the movies of.the horror
 'Gianni likes horror movies.'
- b. I film dell'orrore piacciono a Gianni.
 the movies of.the horror please to Gianni (Brunetti 2009b:262, 270)

The alignment between experiencer arguments and topichood is a tendency, rather than an absolute rule. This is illustrated by the acceptability of (480), where *daremo* can be an experiencer despite its abovementioned incompatibility with topichood.

- (480) [[Taro-no kodomo-ga] [daremo-no hokori]] da.
 Taro-GEN child-NOM everyone-GEN pride COP
 'Everyone is proud of Taro's son.' (Satoshi Nambu, p.c.)

As in other WCO configurations which do not force a particular IS articulation, partial acceptability within a speaker and a scattered distribution of judgments across speakers is expected. Indeed, this is precisely what we find with WCO examples involving experiencer arguments like (473b). Conversely, syntactic analyses are once again at a loss to explain why judgments are not categorical in one direction or another.

The conclusion that the behavior of experiencer arguments with respect to inverse binding is ultimately a function of their IS status opens up a variety of questions; in

particular, it raises the possibility that topichood, and IS in general, may be relevant for other types of anaphoric relations in which experiencers pattern in an exceptional manner. This is a topic worth looking into in future research. More important for our purposes is the precise role of IS in inverse binding: why does assigning topic status to a *wh*-phrase/QP and focus status to a DP embedding a pronoun allow the *wh*-phrase/QP to bind the pronoun? This question is answered in the next section.

4.4 An Information Structural Approach

4.4.1 Assessing Existing Approaches

Having described a wide variety of existing approaches to WCO in section 4.2, and having gone through a wealth of relevant data in section 4.3, we can ask whether these approaches meet two primary demands of any linguistic explanation. First, we would like to assess their descriptive adequacy, i.e. the extent to which the full range of speaker judgments about well-formedness accords with what the analyses predict. Second, it is necessary to determine the explanatory value of these analyses. An analysis which reduces a set of data to independently motivated and interconnected observations is preferable to one that invokes arbitrary rules.⁵¹ Within linguistic theory, consistency of this sort is intimately tied to acquisition, specifically to the idea that children do not learn long lists of constraints, where each constraint applies to only a small class of linguistic expressions. Rather, leaving the possibility of innate rules aside, children formulate broad generalizations on the basis of the rather limited data they are exposed to.

I submit that existing accounts of WCO fall short on both counts, descriptive and explanatory adequacy. In terms of descriptive adequacy, these accounts suffer from two significant lacunae. First, they are unable to explain a large set of relatively well-formed sentences, many of which were documented already in the early literature on WCO. These sentences exhibit a WCO configuration under any of the existing structural generalizations, including the predominant A-command Requirement, and yet are not judged as deviant as the baseline examples of WCO effects. The sentences are simple in the sense that they involve minor changes to the baseline examples, making it difficult to justify their exclusion from the empirical coverage of WCO theories. In fact, it is sensible to deal with these missing WCO effects before considering complex sentences, where pinpointing the locus of deviance is trickier. In addition, there are languages in which even standard WCO configurations are regarded as acceptable, such as German. This sort of crosslinguistic variation is not easily incorporated into syntax-based accounts of WCO, unless one can find independent evidence for a relevant syntactic difference between the languages. It seems to me that no convincing evidence for such a difference between basic English and German object *wh*-questions has been proffered.

Alongside the class of exceptions to the A-command Requirement, there is, of course, a sizeable set of sentences which inspired the requirement in the first place. These sentences appear to justify the claim that WCO effects line up with the A-/A'-distinction: WCO effects arise when the *wh*-phrase/QP c-commands the pronoun from an A'-position, but are absent when c-command is from an A-position. The question, then, is why the effects pattern in this way; put differently, what properties misled researchers into

⁵¹ Cf. Baker (2001:31): "The best theory is not the one that brings everything into line with its one favorite fact, but the one that finds the greatest degree of harmony and convergence among all the facts."

thinking that WCO effects are a diagnostic for A- vs. A'-properties of movement. I maintain that these are IS properties of the structures tested, and that their correlation with the A-/A'-distinction is epiphenomenal. Let us consider these properties, and thereby ascertain that an explanation need not appeal to characteristics of A- vs. A'-movement, before proceeding with the assessment of existing approaches to WCO.

The principal structures used as examples of A'-movement are *wh*-questions in which the potential binder is a non-d-linked *wh*-phrase. Non-d-linked *wh*-phrases are foci by default and interpreted as topics only under specific contextual conditions, and hence fail to act as binders in the sentences considered. Moreover, in these sentences the potential bindee is embedded in the subject, further hampering the IS articulation needed for successful inverse binding.⁵² Given the strong correlation between subjects and topics, the phrase containing the bindee in WCO configurations will normally be the topic. The final result is a robustly preferred IS articulation with the potential binder as focus and bindee as topic, exactly the opposite of the articulation needed for binding.

In contrast to *wh*-questions, the prototypical representative of A-movement, raising, is usually associated with an IS articulation that maps the *wh*-phrase/QP onto the topic category and the phrase containing the bindee onto focus. Thus, in sentences like (481), the raised subject, whether a *wh*-phrase or QP, is construed as the topic, and the experiencer *his mother* as the focus; the IS requirement on inverse binding is fulfilled and the sentences are therefore acceptable.

(481) a. [_{TOP} *Who*]_i [_{t_i} seems to [_{FOC} *his mother*] [_{t_i} to be intelligent]]? (=368)

b. [_{TOP} *Every boy*]_i seems to [_{FOC} *his mother*] [_{t_i} to be intelligent].

Evidence for the topichood of raised subjects is given by Grimm (2010), who reports that in naturally occurring data they are always d-linked material, or, if novel in the discourse, function as contrastive topics. He also shows that the scopal behavior of raised subjects is as expected of topics; that is, they take wide scope. A final piece of evidence noted by Grimm is the fact that raised subjects cannot be indefinite singular generic NPs. Such NPs do not refer to kinds or individuals, and hence fail to comply with the referentiality condition on topics. Consider (482): (a) allows the definitional, or normative, reading associated with indefinite generics, meaning that a definitional property of pheasants is that they lay speckled eggs. However, the version in (b) is out, due to a mismatch between the topichood of raised subjects and the non-topic status of *a pheasant* in a generic statement with a definitional reading.⁵³

(482) a. A pheasant lays speckled eggs.

b. ?A pheasant seems to lay speckled eggs. (Grimm 2010:14)

Conversely, (483) is acceptable by virtue of the inductivist reading that bare plurals, but not indefinite singulars, enable. The inductivist statement does not designate a rule; rather, it says that sufficiently many relevant individuals (pheasants in (483)) satisfy the predicated property.

(483) Pheasants seem to lay speckled eggs.

⁵² Examples in which the bindee is not in the subject, like (387), are examined below.

⁵³ Grimm also mentions the possibility that the unacceptability of indefinite singulars as raised subjects stems from the type of evidentiality associated with raising constructions. See his paper for details.

My claim regarding the IS focus status of the experiencer argument in raising constructions is based on its prosodic properties. Specifically, speakers report an unmistakable pitch accent—i.e. phrasal or sentential prominence—on the experiencer.⁵⁴ Though I am not aware of any previous work on the prosody of raising constructions, this pattern is predictable on grounds of the mapping between syntactic constituents and phonological phrasing. The matrix finite and subordinate infinitival clause in a raising structure are plausibly separate intonational phrases, given the constraints relating syntactic and prosodic representations (e.g. Truckenbrodt 1999); furthermore, the experiencer may also be prosodically separated from surrounding material in light of its status as a syntactic adjunct. This phrasing is reflected in an optional pause following the experiencer. Within the finite clause or experiencer *qua* intonational phrase, prominence is assigned to the rightmost element, which is *mother* in (481), and on a par with German object *wh*-questions (section 4.3.4), the phrase carrying prominence is interpreted as the focus. Of course, this suprasegmental description should be verified via phonetic analysis in future work.

The proposed IS analysis of raising constructions is corroborated by the status of inverse binding in these constructions when binder and bindee in (481) are swapped; that is, when the potential binder is the experiencer and the bindee is in the raised subject, and as a byproduct, the former is mapped onto the IS category of focus and the latter onto topic. The finding that most speakers find the resulting configurations unacceptable, as indicated in (484), falls out straightforwardly from this IS articulation.

- (484) a. ??[To [FOC *whom*]]_i [do [TOP *his* parents]_j seem t_i [t_j to be very unsupportive]]?
 b. ??[TOP *Her* boy]_i seems to [FOC *every mother*] [t_i to be the most intelligent].

The judgment reported here for (484b) is attributed to similar examples elsewhere in the literature (Choi 2001), but is at odds with judgments given for equivalent sentences in Fox (1999). Indeed, there are speakers who consider (484b) partially acceptable; I argue that this judgment stems from an alternative, albeit secondary, IS articulation available for raising structures, in which the experiencer is interpreted as the topic. This articulation follows from the general tendency to assign topic status to experiencer arguments, discussed in section 4.3.5. Importantly, even those speakers who do not rule out (484b) judge it to be significantly worse than the sentences in (481), and do not confer the same status to (484a), which is uniformly judged as unacceptable. These findings are unsurprising under our IS approach, given that the bound reading of (481) lines up with the preferred IS articulation, while the fact that the experiencer in (484a) is a *wh*-phrase makes the alternative articulation more difficult to impose than in (484b). In any case, the sentences in (484) respond to the same type of IS manipulations as classic examples of WCO, rendering them fully acceptable:

- (485) a. Who seems to every mother to be the most intelligent?
 b. [FOC *Her* BOY]_i seems to [TOP *every mother*] [t_i to be the most intelligent].

The subtle yet undeniable differences between (481), (484a), and (484b), as well as the status of (485b), are problematic for syntactic theories of WCO grounded in the A-/A'-distinction. In particular, the degraded status of the examples in (484) runs counter to

⁵⁴ I thank Julie Legate for first bringing this observation to my attention.

the predictions of syntactic theories, since the *wh*-phrase or QP A-commands the pronoun in the base. Fox (1999), for instance, postulates that the raised subject in examples like (484b) reconstructs to its base position, incorrectly predicting that it should be fully acceptable and no different from (481). The analytic option of reconstruction is inappropriate for this reason, and because its necessary exclusion in the case of (481b), where the raised subject successfully binds the experiencer, seems unmotivated.

All in all, there is good reason to think that, at least in the case of basic WCO examples, the distinction between A- and A'-structures is an artifact of the relationship between elements of these structures and IS properties. Predictably, once a wider set of examples is considered, the A-/A'-distinction becomes completely useless.

Returning to the question of the descriptive adequacy of analyses of WCO, existing syntactic analyses suffer from a second shortcoming, in addition to their limited empirical coverage. This is the way in which they handle speaker judgments. Although the label of "weak" was chosen for the phenomenon at hand more than thirty years ago, little progress has been made in elucidating why this is an appropriate term for violations of the underlying constraint. Why is there interspeaker variation in judging examples of WCO, and why does such variation even appear within the same speaker, who may change his mind about the status of a WCO configuration on different occasions?⁵⁵ Though some of the approaches to WCO have labeled the specific constraint they posit as weak (e.g. Müller 1995), this does not contribute much to our understanding. Crucially, it fails to explain why this patterning of judgments differs from that found with classic examples of syntactic constraint violations, such as extraction from strong islands.

As for the second evaluation metric for linguistic explanations, explanatory adequacy, we find that proponents of existing WCO theories are wary of the need to postulate conditions specific to variable binding. These conditions are quite arbitrary in that they do not follow from something else in the grammar, and would have to be acquired by speakers above and beyond a constraint on scope, which is independently justified. Since variable binding is contingent on an operator taking scope, it would be desirable to derive WCO from a constraint on scope alone. Indeed, such an approach is advocated by the theories described in section 4.2.4, which are motivated by the objective of keeping the explanation of WCO as simple as possible.

An additional problem with restricting operator-variable relations via overly specific constraints is posed by the existence of crosslinguistic variation in WCO effects. While variation in and of itself does not constitute evidence against a particular approach to WCO, it does mean that something has to be picked up from the input; in other words, whatever creates WCO effects cannot be entirely innate. Existing WCO theories must then derive the attested variation from properties relevant to the variable binding constraint they posit, ideally in a non-stipulative manner. Claiming, for example, that the constraint responsible for WCO effects is parameterized, as Müller (1995) does for German (see section 4.3.4), does not constitute an explanation if no other property

⁵⁵ Wasow (1979) provides naturally occurring examples of weakly crossed sentences, and Postal (1972) posits idiosyncratic (i.e. non-geographical and non-social) dialects to account for his observation that not all English speakers report WCO effects. The results of this study lend credence to the possibility raised by Newmeyer (1983), whereby "all hypothesized idiosyncratic dialects are merely reflections of speakers' differing contextualizations of possible readings for sentences that are ambiguous in their grammar" (p. 57). See also fn. 29 in chapter 3 and chapter 5.

correlates with this parameterization. Moreover, the underlying reason for the presence or absence of WCO effects will have to be somewhat removed from the phenomenon itself. Direct positive evidence for the applicability of a WCO constraint is not available to the learner of English, where such a constraint is adhered to, and it seems unlikely that a German child, who learns that the constraint is not applicable in his language, would be exposed to much, if any, relevant data. Indirect negative evidence—the nonoccurrence of inverse binding structures in contexts where they would be appropriate—is similarly unavailable to the English speaker, since these structures are never obligatory (cf. (315)).

Given the outcome of our assessment of existing approaches to WCO, it is worth trying an alternative strategy to explain WCO effects. The goal of such a strategy should be to overcome the flaws of current analyses, both descriptive and explanatory, focusing on simple examples and on coming up with correct generalizations. Since this is relatively uncharted territory, complex sentences must be left for future research. Similarly, the formalisms chosen to model the generalizations are not to be taken as the final word on the matter, and eventually may have to be revised.

The strategy I put forward appeals to properties of IS. Though this strategy is novel in its treatment of WCO, it fits in perfectly with the first case study of the dissertation, regarding focus intervention effects. Having established via this case study that IS plays an important role in speaker judgments, we have no reason to think that its role is limited to intervention effects. Rather, IS should emerge as relevant in other phenomena, particularly if these phenomena seem to be sensitive to changes in the context and to the use of IS cues.

What apparently hindered progress in the analysis of WCO effects until now, at least to some extent, was the lack of compelling evidence for the import of IS. This led many researchers to overlook IS or to express skepticism about its possible relevance. Despite the fact that models in which IS is a fully integrated, central component of the grammar have been available for quite some time (e.g. Vallduví 1990), they have rarely been considered in the context of WCO. Thus, in his scopal approach to WCO, Ruys (2000) notes that:

"The abundance of WCO analyses that have been proposed in the literature over the past 30 years suggests that these analyses may all be seriously underdetermined by the empirical data (which are often confusing and seldom allow definitive generalizations). In view of this record, it may well be the case that further progress in this area will not come from the study of these particular phenomena themselves, but must await developments in related areas to provide a theoretical framework for a more principled description of conditions on bound anaphora." (Ruys 2000:536)

I maintain that the theoretical framework put forward in this dissertation, informed by earlier research on IS and by the results of the first case study, enables the principled description Ruys is after. The IS approach to be proposed below is not only able to show that the data consistently lines up as predicted, but also to connect it to independent observations regarding scope and IS. Acquisition is then a relatively easy task for English-speaking children and for German speakers; instead of being contingent on knowledge of extremely abstract rules, it amounts to applying generalizations learned elsewhere to WCO configurations. Furthermore, the variation observed in WCO effects is expected under the IS approach, given the way in which speakers assign IS categories to an utterance. The IS approach thus has a clear advantage over other accounts of WCO in

terms of descriptive and explanatory adequacy.

In the remainder of this section I present the IS approach. I begin, in subsection 4.4.2, by laying out the basic idea behind this approach, whereby inverse variable binding depends on the IS categories assigned to the intended binder and bindee. Inverse binding is unique in this respect, since surface binding—where the quantifier or *wh*-trace c-commands the bindee in the surface structure—is not influenced by the IS categories of binder and bindee. Subsection 4.4.3 provides the rationale for the sensitivity of inverse binding to IS: inverse binding relations are shaped by IS considerations because scopal relations are shaped by such considerations, and the former type of relation is contingent on the latter. In this context, I introduce the inverse scope generalization, which is an attempt to accurately formulate the IS conditions under which one element will take scope over another element which it does not c-command in the surface structure. Basically, inverse scope requires the wide-scoping element to function as a topic. Evidence from a range of languages supports this hypothesis, which improves on earlier syntactic accounts of inverse scope with respect to both empirical coverage and independent motivation. Subsection 4.4.4 puts forward a formal model in which to cast the inverse scope generalization; I propose that the level of representation in which information relevant to semantic interpretation is provided, LF, is shaped to a large degree by IS factors. Put simply, topics are high at LF, and hence scope over any other element in the sentence. Lastly, subsection 4.4.5 discusses various issues which the IS approach raises, including the disparity between judgments regarding inverse binding and those regarding inverse scope, and the question of whether anaphoric relations other than variable binding are influenced by IS.

4.4.2 The Proposal

The IS generalization regarding inverse binding originally proposed in section 4.3 is given in (486).

- (486) Inverse Binding Generalization (first version): Inverse variable binding is possible iff the intended binder is interpreted as a topic and the bindee as (part of) an IS focus.

This generalization, the IBG, accurately captures the findings regarding the behavior of inverse binding configurations in basic *wh*-questions and QP contexts, where failure to meet both requirements—topichood of the binder and focushood of the bindee—gives rise to WCO effects. I first go through the data on which the generalization is based, and then revise it in view of empirical and conceptual considerations that argue against reference to two requirements. Specifically, I hypothesize that the only thing the grammar demands in order to achieve inverse binding is the assignment of topic status to the binder. Cues promoting the interpretation of the phrase containing the bindee as the focus, such as focus particles, are needed when this phrase would otherwise be labeled the topic, due to the default IS articulation. These cues allow speakers to override the default articulation, and hence ensure that the binder, rather than bindee, is construed as the topic.

The claim that IS focus is a component of successful inverse binding configurations is rooted in the observation that this IS category is shared by phrases associated with focus particles, phrases constituting the answer to a question, and phrases marked with a pitch

accent by default. As shown in section 4.3, these types of phrases allow a pronoun contained within them to be inversely bound by a quantifier or *wh*-phrase. Moreover, in this section we ruled out the possibility that a semantic or pragmatic feature of focus particles is responsible for the status of acceptable sentences involving inverse binding.

As for the precise placement of IS focus, it cannot be assigned to just any phrase in the sentence in order to make inverse binding possible; rather, this has to be the phrase containing the bindee. (487) shows that mapping the potential binder onto the focus does not facilitate inverse binding; notice that the resultant IS articulation is exactly the same as that found in classic WCO examples. In the subsequent sentences, an element other than the bindee is assigned focus status, either because a question elicits broad focus (488) or because a focus particle is associated with a temporal adjunct (489)-(490). (488) and (489) are slight improvements over baseline WCO examples due to the removal of the binder from the default focus position, but nonetheless degraded compared to the fully acceptable (491), where the bindee is the IS focus, in accordance with (486).

(487) a. Who will be accompanied by his mother the first day of school?⁵⁶

b. ??*His* mother will accompany every BOY the first day of school.

(488) a. What will happen? (=398)

b. ?*His* mother will accompany *each/every boy* the first day of SCHOOL.

(489) ?*His* mother will accompany *every boy* **only** on the FIRST day of school.

(490) ??*Who_i* do *his* children refuse to visit *t_i* **even** during CHRISTMAS?

(491) [_{FOC} **Only** *his* MOTHER] will accompany [_{TOP} *every boy*] the first day of school.

The presence of cues related to focushood does not by itself guarantee that the resulting inverse binding configuration will be fully acceptable, as demonstrated in the declarative QP context in (492) and the *wh*-question in (493).

(492) ?**Only** *his* FATHER can provide for *every boy*. (=401)

(493) ?*Who_i* do *his* **own** CHILDREN dislike *t_i*? (=393a)

There are a few potential explanations for this finding. First, one might think that because focus particles do not force their associate to be the IS focus, as argued in section 2.3, speakers are left with the option of positing an IS articulation for (492)-(493) which is not in line with the IBG. This possibility, however, is unlikely, since speakers report that they place prominence on the associates of *only* and *X's own* in the above sentences, reflecting their focus status. Furthermore, even if this explanation were plausible in the case of focus particles, it could not be extended to examples in which focushood of the phrase embedding the pronoun is unavoidable; namely, when it is the answer to a question.

A second option, whereby the status of (492)-(493) simply indicates a dispreference for inverse binding, given the existence of paraphrases which involve surface binding, does not constitute a sufficient explanation. This would not account for the difference between (492)-(493) and sentences like (491), or fully acceptable *wh*-questions in which the *wh*-phrase is d-linked and the phrase containing the bindee is focused. This difference shows that what underlies the status of (492) and (493) is difficulties in mapping the

⁵⁶ In order to avoid a WCO effect in the question, it is phrased as a passive. Any awkwardness arising from the mismatch between passive question and active answer should be factored out.

QP/*wh*-phrase onto the topic. In the first example, placement of the QP in the default focus position, revealed in the tendency to assign it prosodic prominence, obstructs topic interpretation, while in the second, the potential binder is a plain *wh*-phrase, which will not be interpreted as a topic without strong motivation from the context. Some degree of IS accommodation is required of speakers in order to overcome these impediments to topic interpretation, and this is manifested in the judgments. IS accommodation is purely a matter of performance, and is hence associated with interspeaker variation; it can be compared to the well-known phenomenon of presupposition accommodation, where the interpretation of a sentence may similarly cause trouble for a speaker and require some effort on his part. Of course, the impediments to topic interpretation can also be alleviated by removing the QP from the default focus position and d-linking the *wh*-phrase.

The second condition on inverse binding—topichood of the binder—is somewhat more difficult to demonstrate, since many languages have no morphosyntactic or phonological correlates of topic status. How do we know, then, that the binder in acceptable binding configurations is a topic and not simply backgrounded material, that is, a tail? There are a number of indirect, yet robust, indications that this is the case.⁵⁷ First, in *wh*-questions acceptable binding is achieved when the *wh*-phrase is d-linked or when the question is non-genuine. As argued in section 2.4, what distinguishes d-linked *wh*-phrases is not only their discourse-anaphoricity, but also the strong tendency to construe them as topics. This construal is obligatory in non-genuine *wh*-questions (see section 4.3.2), confirming that topic status of the binder underlies the acceptability of inverse binding in this class of questions.

A second piece of evidence for the topichood requirement is WCO configurations in which the potential binder is a negative quantifier. These configurations are informative because they rule out the possibility of interpreting the potential binder as a topic, given the incompatibility between non-referential negative quantifiers and topichood (see section 3.2.2), but maintain tailhood as an option (see Vallduví 1994 for the lack of a referentiality constraint on tails). As expected, inverse binding is impossible, even when the bindee is overtly marked as the focus (494a) (see Zubizarreta 1998 for analogous examples). (494b) illustrates that surface binding by a negative quantifier is fine.

(494) a. ***Even** *his* MOTHER promises *no boy* a life of happiness.^{58,59}

b. *No boy* is promised a life of happiness by *his* mother.

(495a) is akin to (494a), but I have replaced the indefinite direct object with a definite object, in order to facilitate its interpretation as a topic. Nonetheless, the sentence remains

⁵⁷ Dave Embick (p.c.) suggests diagnosing the topichood condition by using a double object structure. Since the subject should be preferred as a topic over the direct object, one might predict that inverse binding is impossible with a direct object QP. However, sentences of this sort, as in (i), turn out to be unhelpful, arguably because the QP is not categorically barred from topichood and may therefore serve as a binder of the pronoun. This problem is overcome in (494)–(495) by introducing a negative quantifier.

(i) (?)?Mary showed **only** *his* prospective STUDENTS *every instructor* in the department.

⁵⁸ In judging this sentence, speakers report the type of topic coercion also identified in section 3.6.2, driving them to interpret the negative quantifier as a proper name, hence a possible topic.

⁵⁹ This sentence seems to get better if a modal is included, which might indicate some relation between topichood and genericity:

(i) ??**Even** *his* MOTHER can promise *no boy* a life of happiness.

unacceptable, indicating that it is the potential binder—the indirect object in this case—which must be a topic, and not some other element in the sentence.

(495) a. ***Even** *his* campaign MANAGER gave *no candidate* the results of the poll.

b. *No candidate* got the results of the poll from *his* campaign manager.

As observed with IS manipulations related to focushood, manipulations facilitating topic interpretation of the potential binder are usually not enough to derive a fully acceptable WCO configuration; they must be accompanied by focus on the potential bindee. Evidence for this was provided in section 4.3.1, and is repeated in (496), where the QP is not in the default focus position, and (497), in which the *wh*-phrase is d-linked; the sentences in (488)-(489) exemplify the same observation.

(496) ?*His* mother can give *every boy* a proper education. (=402a)

(497) ?[*Which man*]_i do *his* children dislike *t_i*? (=386a)

Here again is where the notion of IS accommodation comes in. The difference between fully acceptable and partially acceptable examples of inverse binding lies in the degree to which they require IS accommodation. That is, in both kinds of examples the IBG is satisfied, but full acceptability indicates that very little or no accommodation is called for, due to the presence of cues promoting both focus and topic interpretation. Partial acceptability, on the other hand, reflects the need to accommodate an IS articulation which is not motivated by sufficient cues in the sentence. In (497), for instance, d-linking does not force a speaker to assign topic status to the *wh*-expression, and there is no cue driving focus interpretation; the question mark attributed to this sentence represents the cost of carrying out the IS mappings necessary to get the bound variable interpretation under such conditions.

There is at least one case we have come across where no cost appears to be associated with an inverse binding reading, despite the lack of cues related to focushood. I am referring to non-genuine *wh*-questions, addressed in section 4.3.2 and repeated in (498)-(500), which are perfectly acceptable with a pronoun inversely bound by the *wh*-phrase.

(498) The newsman who criticized *him* later belted *what/which official*? (=330)

(499) Remembering you are under oath, the witness who claimed he had never seen *it* was walking towards *what/which building*? (=331)

(500) Mr. Jones, for \$100,000, the man who appointed *him* later said *what/which Secretary of State* was an imbecile? (=332)

These sentences, in which there is arguably no IS focus, are a first indication that focushood of the bindee is not a prerequisite per se for inverse binding. Topic interpretation of the binder, then, is the only condition that the grammar actually imposes on inverse binding. Other examples which hint at the same conclusion include topicalization in English and Chinese (section 4.3.3), though further work is required to determine the precise status of the former and whether or not this depends on focushood.

In addition to empirical evidence for the hypothesis that focus interpretation of the bindee is not a grammatical requirement, there is a conceptual reason why we should treat it differently from topichood. To make sense of this conceptual argument, it is necessary to recall the basic idea behind the approach to inverse binding proposed here;

namely, that inverse binding is contingent on the scopal relation between binder and bindee, and that scope is IS-sensitive, in the sense that topics take scope over the remainder of the sentence. This inevitably means that focushood does not figure in scopal behavior as it relates to binding, since anything outside the topic will fall under its scope and hence be bound by it, regardless of whether or not it is the focus. Put differently, if scope is represented as a hierarchical relation at LF, a topic will c-command a potential bindee so long as the bindee is not contained within the topic. Therefore, I maintain that focushood is not part of the requirements on inverse binding defined by the grammar, and amend the IBG as in (501).

(501) Inverse Binding Generalization (final version): Inverse variable binding is possible iff the intended binder is interpreted as a topic.

The details of how exactly scope works in an IS-based model, and how the difference in the status of topics vs. foci at LF falls out independently of scopal considerations, are left for the next subsection.

The hypothesis regarding focushood leads to the question of what role focus-related cues play in the previously described sentences. In other words, if the grammar does not demand that the bindee be interpreted as the focus for inverse binding to go through, why do speakers often need this interpretation? I argue that focus-related cues are a means to preclude the default IS mapping rules from operating on the sentence. These rules typically favor labeling the phrase embedding the intended bindee as the topic, by virtue of properties of this phrase and properties associated with other elements of standard WCO examples, such as (502)-(503).

(502) ??*Who_i* do *his* children dislike *t_i*? (=311b)

(503) ??*His* mother loves *every boy*. (=318)

First, the phrase under discussion—*his children* in (502) and *his mother* in (503)—is a referential NP; second, it is the subject in these types of examples and hence a preferred topic, and third, in such an example the only other possible topic is a *wh*-phrase or QP, both of which are not prime candidates for topic-hood.

In the absence of cues driving the construal of the phrase containing the bindee as the focus in examples like (502)-(503), it will be interpreted as the topic, and therefore the IBG will not be satisfied. Evidence that the subject status of this phrase plays a critical role in its interpretation as the topic is provided by the examples below, repeated from section 4.3.1. Specifically, when the bindee is placed in the direct object, it is possible to ameliorate the WCO effect by supplying a context which makes the *wh*-expression d-linked (505), but this is not possible if the bindee is in the subject, as in (507).

(504) Context: John, Bill, and Peter were walking along Main St. last week when an unidentified man came up to them and demanded their possessions at gunpoint. They all give him their wallets, and later reported the incident to the police. Yesterday they were summoned to the police station to hear about a development in their case. It turns out that one of the wallets was found near the site of the robbery.

(505) ??*Who_i* did the police return *his* wallet to *t_i*? (=389)

(506) Context: John, Bill, and Peter took their wives on a Caribbean cruise to celebrate their wedding anniversaries. In addition, each of them bought his wife an expensive gift. John bought his wife a necklace, Bill bought his wife a bottle of perfume, and Peter bought a lingerie set. It turns out, however, that one of the wives wasn't particularly pleased with the gift she had received.

(507) ??*Who_i* did *his* wife return the gift to *t_i*? (=392)

The difference between (505) and (507), I submit, is due to the robust relation between subjects and topichood vs. the absence of such a relation in the case of other grammatical functions, including direct objects. In both cases, the context sets up a competition for topic status between the *wh*-expression and the phrase containing the bindee. However, while in (505) the *wh*-expression can win out, because the phrase containing the bindee is the direct object and hence has no particular connection to topichood, in (507), with a subject bindee, this is precluded. The result is that the former allows the *wh*-expression to inversely bind the pronoun, but the latter does not. Of course, (505) is nevertheless only relatively acceptable, rather than perfect, because accommodation is involved in interpreting a *wh*-phrase as a topic.

The distinction between subject and direct object bindees indicates that default IS mapping rules are a crucial factor in determining the status of an inverse binding configuration. This distinction obviously fits in with the general IS approach espoused here, but not with a syntactic view of WCO: (505) and (507) are identical in terms of the syntactic relations assumed to be relevant to inverse binding, and the fact that the bindee occupies different positions should have no bearing on their status. (505) in particular is a problem for a syntactic view, since the syntax is predicted to block a bound variable reading.

The difference in acceptability between a subject bindee and direct object bindee is even starker if the preposition is raised together with the *wh*-phrase, rather than left stranding as in (505). Thus, the judgment in (508) is taken from Pica and Snyder's (1995) study discussed in section 4.2.4, and Higginbotham (1980) marks an analogous example as fully acceptable; importantly, no supporting context is needed to arrive at this judgment, unlike (505).

(508) ?[To *whom*]_i did Mary give *his* paycheck *t_i*? (=375c)

The only analysis of sentences like (508) that I know of, Higginbotham (1980), proposes that they evade WCO effects due to the possibility of free ordering between the direct and indirect object. As a result, the position of the trace of the *wh*-expression can be as in (509), instead of (508).

(509) ?[To *whom*]_i did Mary give *t_i* *his* paycheck?

(509) does not represent a case of inverse binding under the descriptive generalization assumed in the literature and adopted here; as an example of surface binding, it is expected to be acceptable under all approaches to WCO, including the IS approach. Accordingly, I assume that Higginbotham is correct, but note that his explanation does not extend to (505). The latter example should be categorically unacceptable if all that matters for binding is the syntactic relation between binder and bindee; crucially, this example cannot be analyzed as constituting a surface binding configuration, where the trace of the *wh*-binder c-commands the bindee.

While the IBG has a solid empirical basis in the simple examples of *wh*-questions and QP contexts presented in this chapter, there are three types of data which raise questions regarding this generalization. First is the case of restrictive relative clauses like (510a), which were subsumed under the original set of WCO examples. What is relevant for the line of argumentation laid out here is that these clauses exhibit IS-related amelioration on a par with *wh*-questions and QP contexts (510b), pointing to the IBG as the proper underlying generalization.

(510) a. ??The man *who_i his* mother killed *t_i* was put to rest. (=316b)

b. ?The man *who_i his own* MOTHER killed *t_i* was put to rest. (=394b)

Working out the IS properties of restrictive relatives and their LF representation would require a separate study, and so I leave it at this for the time being.⁶⁰

Second, the IBG ought to extend beyond primary WCO effects to cases of WCO in indirect binding contexts, i.e. secondary WCO. The relevant data, provided in section 4.3.1, shows that topic interpretation of the binder, aided by focus marking associated with the bindee, indeed renders such cases acceptable:

(511) [[*Which boy*]'s mother]_i has **even** *his* teacher never met *t_i*? (=403c)

(512) **Only** *his* mother can teach [[*every boy*]'s dog] to fetch. (=404b)

(513) [Which picture of [*which man*]]_i did **even** *his* agent fail to sell *t_i*? (=405b)

(514) **Even** *his* diehard supporters will find [some flaw in [*every candidate for office*]]. (=406b)

The examples in (511)-(514) fall under the IBG just like examples of obviation of primary WCO. However, a slight complication arises when we consider indirect binding in which the DP containing the binder c-commands the pronoun in the surface structure, as in (515).

(515) [Someone from [*every city*]] despises *its* mayor. (=381b)

(515) is an instance of inverse binding under the definition proposed at the beginning of this chapter, since the QP *every city* does not c-command the intended bindee pronoun in the surface structure. Accordingly, this sentence should be subject to the IBG, and binding is expected to be impossible unless the QP functions as a topic. This expectation is obviously not met: no IS manipulation linked to topichood or focushood is needed in order for the QP to bind the pronoun in (515), and this is what distinguishes it from (511)-(514).

I claim that there is no real problem with examples like (515) within the current framework, because their status follows from the scopal behavior of the QP. A QP embedded inside a DP can take scope over the DP regardless of its IS status, as we will see in the following subsection; by transitivity, then, the QP scopes over a pronoun lower than the DP and can bind it (cf. Ruys 2000). Since the scope of the QP is local, just over the container DP, it is the position of this DP which determines whether a given

⁶⁰ Satoshi Tomioka (p.c.) proposes a possible explanation for the greater acceptability of baseline examples of WCO in restrictive relatives compared to *wh*-questions (see fn. 4). Since there is no subject-topic correlation in restrictive relatives, unlike matrix clauses, it is easier for the subject, which contains the intended bindee, to be interpreted as the focus.

configuration involves inverse binding, and is hence subject to the IBG. If the DP does not c-command a pronoun, the QP will have to be a topic in order to bind the pronoun.⁶¹

A third interesting dataset, which appears to pose more of a challenge for the IBG, involves subject binders. The correct generalization regarding this type of binder is provided by Frank, Lee and Rambow (1996) (henceforth FLR): subjects consistently bind. While FLR consider only the syntactic aspects of this generalization in terms of the classification of scrambling as A- vs. A'-movement, we can examine its implications for IS and specifically the IBG; furthermore, though FLR base the generalization on German and Korean, I hypothesize that it holds universally, since it is rooted in some fundamental property of subjects. The relevant data, showing that subjects bind regardless of their position vis-à-vis the intended bindee, is given in (516)-(517); in the former case the direct object bindee is scrambled above the subject binder, and in the latter it is topicalized.⁶²

- (516) a. dass *jeder* *seine* Mutter mag.
 that everyone.NOM his mother.ACC likes
 'that everyone likes his mother'
- b. dass [*seine* Mutter]_i *JEDER* t_i mag.
 that his mother.ACC everyone.NOM likes
- (517) a. *Jeder* mag *seine* Mutter.
 everyone.NOM likes his mother.ACC
 'Everyone likes his mother.'
- b. [*Seine* Mutter]_i mag *JEDER* t_i.
 his mother.ACC likes everyone.NOM (Beatrice Santorini, p.c.)

The sentence in (518b) demonstrates that consistent binding is a property of subjects alone; the indirect object QP fails to bind the pronoun when the latter is scrambled to a position higher than the QP.

- (518) a. dass der Jörg *jedem* *seinen* vater gezeigt hat.
 that John.NOM everyone.DAT his father.ACC shown has
 'that John has shown everyone his father'
- b. *dass [*seinen* Vater]_i der Jörg *JEDEM* t_i gezeigt hat.
 that his father.ACC John.NOM everyone.DAT shown has (FLR 1996:73)

What (516)-(517) also indicate is that the IS status of binder and bindee is irrelevant as long as the binder is the subject: the binder is arguably the focus in these examples, as indicated by its prosodic prominence, and hence the bindee must be the topic. This is

⁶¹ The same analysis applies mutatis mutandis to *wh*-phrases embedded inside a DP.

⁶² An indirect object moving across a subject operator will also be consistently bound by the subject. This data is often misanalyzed in the literature, as FLR note. Instead of invoking subjecthood as the relevant factor, researchers frequently posit the incorrect generalization that the landing site of movement determines whether binding is possible (e.g. Wurmbrand 2008). Movement past the subject (IP or medium scrambling) as in (516)-(517) is said to allow reconstruction, and is thus A'-movement, whereas movement to a position to the right of the subject (VP or short scrambling) does not allow reconstruction, and is therefore classified as A-movement. That this generalization is erroneous is shown by the fact that a direct object scrambled past the subject reconstructs if bound by the subject (516b), but not if bound by the indirect object (518b).

exactly the opposite of the IS articulation we expect to license variable binding according to the IBG, and indeed, the same articulation in (518b) does not allow binding, on a par with the baseline examples of WCO in QP contexts. Along the same lines, in (519)-(520) a negative quantifier subject can bind a pronoun raised above it, despite not being a candidate for topic status.

- (519) a. dass *keiner/niemand seinen* Lehrer mag.
 that nobody.NOM his teacher.ACC likes
 'that no one likes his teacher.'
- b. dass [*seinen* Lehrer]_i *keiner/niemand* t_i mag.
 that his teacher.ACC nobody.NOM likes
- (520) a. *Keiner/Niemand* mag *seinen* Lehrer.
 nobody.NOM likes his teacher.ACC
 'No one likes his teacher.'
- b. [*Seinen* Lehrer]_i mag *keiner/niemand* t_i.
 his teacher.ACC likes nobody.NOM (Beatrice Santorini, p.c.)

The observation concerning subject binders is something of a problem for all analyses of variable binding. For syntactic analyses, as FLR point out, a distinction in the availability of variable binding should tie in to movement, specifically, either to properties of the moved element or the domain from which the movement takes place. Properties of the binder of the moved element are not expected to play a role, yet they do in (516)-(518). To deal with this issue within a purely syntactic framework, FLR propose the Subject Binding Generalization, which allows a subject to bind another element even if the original configuration licensing the binding no longer holds at later levels of representation. Their analysis also involves various modifications to the traditional definition of binding; readers are referred to the paper for further details.

From the point of view of an IS approach to variable binding, the fact that the nature of the binder makes a difference is not surprising. What is surprising, however, is that the relevant factor is the grammatical function of the binder, and not its IS category. I do not have a novel way of handling the uniqueness of subject binders, other than to situate them in an LF position which allows them to bind pronouns higher than them in the surface structure. In any case, the behavior of subject binders is noteworthy because, like QPs scoping out of DPs, it forces us to adopt a model of LF which is not exclusively information structural.

The final feature of the IBG which merits further consideration is its application to inverse binding alone, and not to surface binding. There are two aspects to this feature, the first concerning the status of the binder and the second concerning the bindee. First, if there is a c-command relation between a QP and pronoun in the surface structure, the QP does not have to be a topic in order to bind. We have already encountered relevant examples above, such as (521), in which binding is possible despite the fact that the QP cannot be a topic owing to its non-referentiality; (522) is an additional example of the same sort, where the negative quantifier is a direct object rather than subject.

(521) *No candidate* could get the results of the poll from *his* campaign manager. (=495b)

(522) Mary reimbursed *no employee* for *his* personal expenses.

Similarly, if the trace of a *wh*-phrase c-commands a pronoun because the *wh*-phrase is generated higher, there is no need for an IS manipulation of the *wh*-phrase to enable it to bind the pronoun. This can be a standard *wh*-phrase, rather than d-linked, and the question may be a genuine information-seeking question, as in (523)-(524).

(523) *Who_i t_i dislikes his children?* (=311a)

(524) *Who_i did Mary convince t_i to invite his parents?*

With respect to the bindee in surface binding configurations, the question is whether labeling it the focus is necessary to permit variable binding. It is not: associating elements other than the bindee with a focus particle, whether in a declarative (525) or a *wh*-question (526), has no effect on the acceptability of these sentences.

(525) *Every salesman reaches his quota **only** on black FRIDAY.*

(526) *Who_i t_i refused to give his students **even** a ONE day extension?*

In fact, even if we map the binder onto the category of IS focus, via a preceding question, thus preventing it from serving as the topic and ensuring that the bindee is not the focus, the sentence remains acceptable:

(527) a. Who forgot his extra uniform on the bus?

b. Every PLAYER forgot *his* extra uniform on the bus.

The distinction that the IBG makes between inverse binding and surface binding demands an explanation, as does the IBG itself. While it accurately expresses the conditions under which inverse binding is possible, the IBG does not tell us why the IS category of topic plays a role in inverse binding. Since scoping of the operator over the pronoun is a prerequisite on variable binding, we would ideally like to show that wide scope holds between the topic and other elements in the sentence. Furthermore, one would also want to demonstrate that topichood is necessary for inverse scope. These are the goals of the next subsection, which will ultimately lead to a simple, scope-based account of WCO.

4.4.3 Scope and Information Structure

This subsection is divided into two parts. First, I discuss the scopal behavior of topics and foci, arguing that the former scope over the remainder of the sentence, which inevitably includes the latter. I subsequently appeal to this behavior in accounting for the conditions under which inverse scope is possible, formulated in terms of the inverse scope generalization. In order for a quantifier to scope over an NP which it does not c-command in the surface structure, it has to be a topic, and for a *wh*-phrase to scope over an NP which it does not c-command in the base, it must similarly function as a topic. Evidence for the relation between inverse scope and IS comes from crosslinguistic differences and distinctions between quantifier types; if a quantifier cannot be interpreted as a topic, whether due to properties of the language or properties of the quantifier itself, inverse scope is unavailable.

The impetus for addressing the issue of scope in the context of a treatment of WCO and variable binding is a desire to make the findings regarding inverse binding fall out from an independently motivated generalization. Indeed, it has long been recognized in the literature that the desideratum of an optimal theory of variable binding is to derive the

conditions on binding from the conditions that license scopal relations (cf. Ruys 2000). The basic scope condition, assumed in one form or other by all theories of variable binding, requires an operator to c-command a pronoun at LF in order to be able to bind it, as stated in (528).

- (528) A pronoun P may be bound by a quantified antecedent Q only if Q c-commands P at LF. (=321)

This condition is an extension of May's (1977) Scope Principle, which handles multiple quantifiers (see section 4.2.4), to the relation between a quantifier and pronoun. Within the model proposed by May, the interpretation of quantifiers is determined by their position at LF, a covert structural level of representation in which semantically relevant information is encoded, and this representation is derived via QR, a rule of covert syntactic movement, identical to the rules of overt movement which generate surface structures. Among other observations, this model is meant to explain the ambiguity of (529), where both a surface scope (529b) and inverse scope reading (529c) are possible, depending on which quantifier is higher at LF. It also supposedly accounts for (530), in which *every man* cannot scope outside the relative clause, assuming that QR, like overt movement, is constrained by Subadjacency (but see section 4.4.4).

- (529) a. Someone likes everyone. (=377)

b. LF: [_{IP} someone_i [_{IP} everyone_j [_{IP} t_i loves t_j]]]

c. LF: [_{IP} everyone_j [_{IP} someone_i [_{IP} t_i loves t_j]]]

- (530) a. I know a woman that every man loves.

b. LF: *[[_{IP} every man_i [_{IP} I know [_{NP} a woman [_{CP} that t_i loves]]]]]

The purely syntactic conception of LF, with or without various modifications proposed after May (1977), is considered the standard in the syntactic and semantic literature, and figures prominently in any discussion of quantifier scope.⁶³ Nevertheless, there are reasons to question certain properties of this conception; two such properties are specifically relevant to this study. One is the idea that scope—represented by the placement of elements at LF in May's model—is exclusively a matter of syntax, and the second, related to the first, is the position that elements occupy at this level. That is, unless blocked by syntactic constraints, QPs and *wh*-phrases are thought to be uniformly high at LF, putatively adjoined to IP, as shown in (529). This subsection addresses the first of these aspects of May's model, the factors underlying scope, and establishes that they are not only syntactic; the issue of the position of QPs and *wh*-phrases is deferred to the next subsection.

The contribution of non-syntactic factors to scopal relations was revealed in early research on the topic (Kroch 1974, Ioup 1975), and emphasized once again in reaction to May's work, most notably by Kuno and his colleagues in a series of publications (Kuno 1991, Kuno & Takami 1993, Kuno et al. 1999). As an alternative to the syntax-only approach, Kuno proposed multi-factor models of quantifier scope and attributed different weights to the different contributing factors, while researchers working within the framework of Role and Reference Grammar called particular attention to the import of IS

⁶³ Recent surveys of the issue of quantifier scope include Szabolcsi (2003) and Ruys and Winter (2011).

in scope (see Van Valin 2005), on a par with the position endorsed in this study. I obviously cannot do justice to the wealth of observations and literature on scope here; instead, I will propose a simple IS-based generalization regarding scope, which seems to capture a good deal of data and fits in with our previous findings about variable binding. In describing scopal behavior, I will endeavor to make use of examples in which IS categories are unambiguously marked and other, non-related factors do not interfere; accordingly, languages other than English will be preferred wherever possible. Furthermore, I will focus on examples involving the interaction between two quantificational NPs or a quantificational NP and *wh*-phrase in a single clause, since these are the kinds of examples relevant to variable binding, and largely refrain from discussing scope as it relates to negation, modals, etc. Ultimately, it will be necessary to determine the extent to which the generalization arrived at has to be supplemented by principles referring to non-IS properties. Also worthy of further investigation is the crosslinguistic validity of the generalization, since it is chiefly grounded in the behavior of a small set of languages.

Beginning with the IS category of topic, we find that it takes scope over other elements in the sentence, which will be foci or tails in terms of the IS articulation.^{64,65} This is not a novel observation, but rather has been made numerous times in the literature (Ioup 1975, Kuno 1982, Reinhart 1983, Erteschik-Shir 1997); in fact, it is even recognized by May (1985), who states that "... since topics take prominence in discourse, it is not surprising that when they are quantified phrases, they will have preferentially broad scope." (p. 159). However, May fails to incorporate this property into his theory of LF. Evidence for the wide scope of topics is available in a variety of languages: in Japanese, a *wa*-marked phrase necessarily scopes over *dake* 'only' (531a), unlike a nominative *ga*-marked phrase (531b); in German, the scopally ambiguous sentence (532a) loses one reading when the indefinite is left-dislocated, forcing it to have wide scope over the universal quantifier in (532b);⁶⁶ in Chinese, we have already seen that a fronted *wh*-phrase, which functions as a topic, scopes over a quantifier in the question (533b).

- (531) a. *Tori-wa tob-u-dake da.*
 bird-TOP fly-PRES-only COP
 'The birds only fly.' (≠'Only the birds fly.')

⁶⁴ As in other parts of the dissertation, a distinction must be made between the aboutness topics I have in mind and contrastive topics, which are not discussed here. The latter take *narrow* scope crosslinguistically, as shown, for instance, by Aoun and Li (2000) for Chinese and Cohen (2003) for English. Cohen provides the following three-way distinction as illustration from English: (ia) is scopally ambiguous, allowing the indefinite *a spot* to take scope under or above negation, (ib) has only the wide scope reading for the indefinite because it is topicalized, while in (ic) a B accent on the indefinite, used to mark contrastive topics and indicated by the forward slash, restricts the interpretation of the indefinite to narrow scope with respect to the negation.

(i) a. John didn't see a spot. ($\exists > \neg, \neg > \exists$)
 b. As for a spot, John didn't see it. ($\exists > \neg, * \neg > \exists$)
 c. /A spot, John didn't see. ($* \exists > \neg, \neg > \exists$) (Cohen 2003:8)

⁶⁵ This division between the topic and the remainder of the sentence does not conflict with the focus-ground partition (see section 2.2), which is based on the IS status shared by topics and tails in the ground and is not manifested in the structure.

⁶⁶ See Jacobs (2001) for the claim that left-dislocation in German is a topic-marking device.

- b. Tori-ga tob-u-dake da.
bird-NOM fly-PRES-only COP
'Only the birds fly.'
(Kishimoto 2009:482)
- (532) a. Einen Linguisten kennt jeder. ($\exists > \forall, \forall > \exists$)
a.ACC linguist.ACC knows everyone
'Everyone knows some linguist.'
- b. Einen Linguisten, den kennt jeder. ($\exists > \forall, * \forall > \exists$)
a.ACC linguist.ACC RP knows everyone
'Everyone knows some linguist.'
(Endriss & Hinterwimmer 2007:87)
- (533) a. meigeren dou mai-le shenme? (what > $\forall, \forall > \text{what}$) (=451)
everyone all buy-ASP what
'What did everyone buy?'
- b. shenme_i meigeren dou mai-le t_i? (what > $\forall, * \forall > \text{what}$)
what everyone all buy-ASP
'What did everyone buy?'

The scopal behavior of topics makes sense under the theory of topic-hood adopted here. Given its function as an address for storing data, a topic must precede the remainder of the sentence, which provides the data; in terms of predication, the subject must come before the predicate, since the truth of the latter is assessed with respect to the former (see É. Kiss 1995 and Erteschik-Shir 1997; Portner and Yabushita 1998 provide a formal semantic analysis). The interpretive effects illustrated in (531)-(533) are just one manifestation of this property of topics, which becomes salient due to the possibility of ambiguity.

The scopal relevance of IS focus is more difficult to demonstrate than that of topics due to the dearth of unambiguous morphosyntactic correlates of this IS category; accordingly, we will have to rely on prosody. A pertinent pair of examples is provided in (534), inspired by Kuno (1991) and Erteschik-Shir (1997), who note that a typical case of scopal ambiguity between a *wh*-phrase and quantifier (534a) loses the wide scope reading for the quantifier if the latter is stressed, as in (534b).⁶⁷ Thus, while (534a) allows both an individual answer (e.g. *Everyone bought clothes for Max*) and a pair-list answer (such as *John bought a book for Max, Mary bought a wallet for Max, and Sue bought a shirt for Max*), (534b) can only be given an individual answer.

- (534) a. What did everyone buy for Max? (what > $\forall, \forall > \text{what}$)
b. What did EVERYONE buy for Max? (what > $\forall, ?? \forall > \text{what}$)

Following the discussion of IS focus in the context of inverse binding in previous sections, the fact that it influences scopal interpretations, specifically preventing a quantifier from taking wide scope, is not surprising. This is not, however, a scopal property of foci defined in the grammar, and it would therefore be somewhat inaccurate to state that foci take narrow scope. Rather, the scopal effect of foci is a consequence of the mutually exclusive relation between foci and topics and the scopal property of topics. Because the focus cannot simultaneously be a topic, some other phrase will have to serve

⁶⁷ See Pafel (2005) for analogous examples from Dutch, German, and Polish.

as the topic and will take scope over the focus.

The idea that foci do not move to a unique scopal position will be crucial in section 4.4.4, where we try to represent IS-based scopal relations at LF. It accords with the observation, noted in chapter 2, that in languages which indicate IS categories overtly in the syntactic tree, such as Catalan, foci do not move; instead, they remain in the lowest IP. It is also consistent with the claim that LF focus movement does not exist, which was mentioned in chapter 3 and has been argued for in Newmeyer (2004), among others.

The rival claim—that foci are displaced to a high position in the tree, just below topics but above IP, whether overtly or covertly (Rizzi 1997 et seq.)—is based, I believe, on a misinterpretation of the relevant observations. Three such observations seem to have misled researchers. First is the occurrence of WCO effects when a proper name following a pronoun is stressed (see fn. 6 in section 4.1), which Chomsky (1976) took as evidence that a focused NP raises at LF, like quantifiers and *wh*-phrases. Chomsky got it backwards: focusing an NP *prevents* it from raising at LF and thus scoping over the pronoun, and WCO effects stem from the lack of this scopal relation.⁶⁸

A second source of confusion regarding the position of foci derives from failure to properly identify phrasal stresses marking IS focus. Thus, May (1985) calls attention to the fact that stress on *each* in the sentence *Which of you has read EACH of Dickens's books?* gives the object wide scope, licensing a pair-list reading. From this he concludes that "maximally broad scope is, however, the general property of focused NPs" (p. 161). However, as shown in Vallduví (1990), Kuno (1991), and Erteschik-Shir (1997), this is not the correct interpretation of the data. Kuno, for example, points out that stress on *every* in *Who read EVERY question correctly?* does not allow the quantifier to have wide scope, while *each* in *Who is serving each of you?* does not require stress to obtain wide scope. In other words, May's claim is both too strong and too weak. It seems that stress on *each* has nothing to do with IS focus; rather, it is a way to disambiguate the collective vs. distributive readings of *each*, much like the presence of phrasal stress on other lexical items influences their interpretation (cf., for example, Krifka 1995 on *any*). A third reason for the misconception that foci are high in the tree is the conflation of contrastive foci and IS foci. The former may indeed be high in the tree, but their movement is not driven by their IS focus status and is hence shared by other, non-focus elements (see Neeleman et al. 2008 and Horvath 2010).⁶⁹

Having made the case for an IS-sensitive description of scopal relations, I apply this description to the domain of inverse scope. Although inverse scope readings—where a QP takes scope over a clausemate QP which it does not c-command in the surface representation—are regarded by May (1977, 1985) as key evidence for LF and QR, May's specific conception of LF and QR is contested by the distribution of these readings both crosslinguistically and within a given language. The distribution is best captured, I maintain, by a generalization which invokes IS factors, as stated in (535).

⁶⁸ This case apparently involves coreference rather than variable binding. See section 4.4.5 for further discussion.

⁶⁹ How to reconcile the possibility that contrastive elements are realized in high positions with the narrow scope of contrastive topics (see fn. 64) is a matter for future research.

- (535) Inverse scope generalization (ISG): A quantifier phrase QP will scope over an NP which it does not c-command in the surface structure, and a *wh*-phrase will scope over an NP which it does not c-command in the base, iff QP/*wh*-phrase is interpreted as a topic. Otherwise, NP will scope over QP/*wh*-phrase.

The ISG in (535) makes reference not only to QPs, but also to the scopal behavior of *wh*-phrases. Inverse scope is defined slightly differently in the latter case, taking into account the base position of the *wh*-phrase instead of its surface position, because this is its position at LF. Leaving aside further details of the ISG and the LF representation it presumes, which I comment on later, let us consider the evidence for the basic intuition it expresses, namely, that the IS category of topic is needed for inverse scope.

In terms of its crosslinguistic distribution, inverse scope is not a uniform phenomenon. Alongside languages like English, which usually allow inverse scope in basic sentences involving two clausemate quantifiers and no overt movement, there are languages which have been classified in the literature as "scope rigid". In the latter, speakers often report that sentences corresponding to the ones examined in English do not have an inverse scope reading. This is illustrated in the sentences below, from Chinese (536), Italian (537), and Japanese (538); (539) repeats an English example from above to allow comparison.^{70,71}

- (536) youyige xuesheng mai-le meiyiben shu. ($\exists > \forall, * \forall > \exists$)
 one student buy-ASP every book
 'A student bought every book.' (Huang 1982:129)
- (537) Una ragazza ha baciato ogni ragazzo. ($\exists > \forall, * \forall > \exists$)
 a girl has kissed every boy
 'A girl kissed every boy.' (Lisa Brunetti, p.c.)
- (538) dareka-ga daremo-o seme-ta. ($\exists > \forall, * \forall > \exists$)
 someone-NOM everyone-ACC criticize-PST
 'Someone criticized everyone.' (Kuno et al. 2001:141)
- (539) Some girl loves every boy. ($\exists > \forall, \forall > \exists$) (=371)

The existence of scope rigidity, though not considered in May's original formulation

⁷⁰ Classic references on scope rigidity in Japanese are Kuroda (1970) and Hoji (1985), and see Huang (1982) for Chinese. The scope rigidity of Italian is mentioned, for example, in Delfitto (1984/85). In order to keep this study manageable, I restrict myself to these languages and ignore other languages sometimes brought up in discussions of quantifier scope, including German, which is labeled a scope rigid language, and Hungarian, where scope is likewise claimed to be predicted by surface c-command. See Wurmbrand (2008) for a recent analysis of German which takes IS into account.

⁷¹ A methodological comment is in order regarding the doubly quantified sentences chosen to illustrate scopal behavior. These are sentences in which the surface reading is the stronger one, since in the opposite case, where the inverse reading entails the surface reading, it is impossible to tease apart the inverse reading from vagueness. For instance, in interpreting the sentence in (i), a speaker may imagine a scenario in which all the girls love the same boy, under which both the surface and inverse readings are true. He would then report that the sentence has two interpretations, but we would not know whether the inverse reading is a truly independent reading.

(i) Every girl loves some boy.

Examples like (539) do not suffer from this problem, since a scenario can be devised in which their inverse reading is true while the surface reading is false (see Reinhart 2006 for discussion).

of LF, has been addressed by a number of syntactic analyses which are broadly compatible with May's framework. Besides simply assuming that some languages possess QR while others do not, which does not actually explain the crosslinguistic differences and is inconsistent with the distribution of scope rigidity, analyses have attempted to reduce these differences to properties of the syntax. Thus, in the most well-known syntactic treatment of scope rigidity—Aoun and Li (1993)—the difference between English and Chinese reduces to the position of subjects. I briefly describe this analysis below, provide arguments against it and similar syntactic analyses, and then show why an alternative account, appealing to the ISG, is preferable.

The basic idea behind Aoun and Li's analysis is that English subjects raise to SpecIP at S-structure, whereas Chinese subjects stay inside the VP; this is due to the degenerate nature of Infl in Chinese, which is also reflected in its lack of agreement morphology. An additional component of the analysis is the Minimal Binding Requirement, which states that a variable must be bound by the most local potential A'-binder. Let us consider how these ingredients yield the scopal behavior attested in simple active sentences. At LF, an English subject QP will undergo QR and adjoin to IP, and an object QP will raise to adjoin to VP₁, as shown in (540) for the sentence (539). From its LF position, the object will c-command the trace of the subject in SpecVP, which is an NP-trace and thus not subject to the Minimal Binding Requirement.

(540) [_{IP} [some girl]_i] [_{IP} t_i [_{VP1} [every boy]_j [_{VP1} t_i [_{VP2} loves t_j]]]]]

Conversely, in Chinese the subject adjoins to VP₁ and the object to VP₂ at LF. The object cannot raise any higher, because it would then be the closest potential A'-binder to the subject trace in SpecVP₁, which constitutes a variable. Since the trace is bound by the subject, and not the object, this would create a violation of the Minimal Binding Requirement. Accordingly, the Chinese version of (540) is as in (541).

(541) [_{VP1} [some girl]_i] [_{VP1} t_i [_{VP2} [every boy]_j [_{VP2} loves t_j]]]]

The difference in scopal interpretations between English and Chinese falls out from the structures in (540) vs. (541). Aoun and Li assume that a quantifier can scope over another quantifier by c-commanding a member of the chain containing the latter, which allows the subject in (540) to take scope over the object, or vice versa. In the Chinese structure (541), however, the object fails to c-command the subject or its trace, and therefore only a surface scope reading is derived.

There are two fundamental problems with syntactic analyses of the type proposed by Aoun and Li.⁷² First, they are very limited in their scope; Aoun and Li, for example, deal only with English and Chinese. It is difficult to see how the syntactic parameterization Aoun and Li propose for these two languages would extend to Italian, which does not share the morphosyntactic properties that they attribute to Chinese. Italian does not lack agreement morphology, and there is no other indication that its subjects remain internal to the VP, but it is nonetheless scope rigid. Other syntactic accounts of scope rigidity similarly appeal to properties which do not correctly predict its crosslinguistic distribution. The proposal of Kasai (2001), for instance, whereby a difference in the setting of the head-directionality parameter correlates with a difference in the possibility

⁷² See Kuno et al. (1999, 2001) for a more specific critique of Aoun and Li (1993), as well as other syntactic approaches to scope.

- (543) a. *san-ge ren lai-le.
 three-CL man come-ASP
 'Three men have come.'
- b. you san-ge ren lai-le.
 have three-CL man come-ASP
 'There existed three men that came.' (Aoun & Li 1989:141)
- c. lai-le san-ge ren.
 come-ASP three-CL man
 'Three men have come.' (Yanyan Sui, p.c.)

Given the strong correlation between specificity and topichood (see section 4.3.5), a byproduct of the specificity restriction in Chinese is that a preverbal NP will be interpreted as the topic, all other things being equal; that is, unless it is forced to be a focus because, for example, it constitutes the answer to a question (see below). A second, postverbal NP in the sentence will then have to be the focus. This is precisely the articulation associated with the doubly quantified sentence repeated in (544), where the subject QP is preverbal and the object postverbal; since the latter is not interpreted as the topic, it cannot take scope over the subject.

- (544) [_{TOP} youyige xuesheng] mai-le [_{FOC} meiyiben shu]. ($\exists > \forall, * \forall > \exists$) (=536)
 one student buy-ASP every book
 'A student bought every book.'

In contrast, the ISG predicts that if an object QP ends up in a preverbal position, both surface and inverse scope readings should be possible, because either subject or object can be interpreted as the topic. This prediction is borne out, as demonstrated by the passive sentence in (545b), where the *by*-phrase is preverbal.

- (545) a. yaoshi liang-ge ren zhaodao meige xiansuo... ($\exists 2 > \forall, * \forall > \exists 2$)
 if two-CL man found every clue
 'If two men found every clue...'
- b. yaoshi liang-ge xiansuo bei meigeren zhaodao... ($\exists 2 > \forall, \forall > \exists 2$)
 if two-CL clue by everyone found
 'If two clues were found by everyone...' (Aoun & Li 1989:141-142)

The above claim regarding the mapping to IS in Chinese is quite subtle, and contrasts with other claims made in the literature. Van Valin (2005), for instance, maintains that the IS focus in Chinese cannot occur in preverbal position, and Li (1990) argues that postverbal elements cannot be definite. Both generalizations seem to me to be overstated, since they are inconsistent with an example like (546b), where the focus precedes the verb and the postverbal element is definite.

- (546) a. shui chi-le wo de dangao?
 who ate-ASP I POSS cake
 'Who ate my cake?'
- b. Lisi chi-le ni de dangao.
 Lisi ate-ASP you POSS cake
 'Lisi ate your cake.' (Yanyan Sui, p.c.)

What Chinese exhibits, then, is not a (non-)specificity constraint on postverbal elements, nor an explicit, strict constraint on the IS articulation. Rather, this is only a specificity requirement on preverbal elements, which naturally connects to the IS articulation, and is thus sufficient to prevent inverse scope readings in certain configurations.

Unlike Chinese, Italian specifically restricts the IS articulation one can assign to a sentence: the sentence-final phrase must be the IS focus. This restriction is revealed by the question-answer pairs in (547)-(549). The first example shows that the focus must occur in a postverbal position, contrasting with the Chinese example in (546), the second establishes that the final postverbal position cannot host anything but the focus, and hence cannot accommodate the topic, *Gianni* in this case, and the third example in (549) demonstrates that non-final postverbal positions can be (and in fact, must be) occupied by something other than the focus.

- (547) a. Chi è partito?
 who has left
 'Who left?'
 b. È partito GIANNI.
 has left Gianni
 'Gianni left.'
 c. #Gianni è partito.
 Gianni has left (Belletti 2001:62)
- (548) a. Che cosa studia Gianni?
 what studies Gianni
 'What does Gianni study?'
 b. Gianni studia FISICA.
 Gianni studies physics
 'Gianni studies physics.'
 c. #Studia fisica Gianni.⁷⁴
 studies physics Gianni (Lisa Brunetti, p.c.)
- (549) a. Che cosa hai restituito a Maria?
 what you gave.back to Maria
 'What did you give back to Maria?'
 b. Ho restituito a Maria le CHIAVI.⁷⁵
 I gave.back to Maria the keys
 'I gave back the keys to Maria.'

⁷⁴ VOS order in Italian is somewhat marked, but improves if the subject is heavy. Using a heavier subject in (548c), however, leaves a significant residue of awkwardness, which is the effect of the misaligned IS. The sentence can only be made better by right-dislocating the subject, which would then be deaccented and/or separated from the rest of the clause by an intonational pause; since right-dislocated elements function as tails (see section 2.2), they do not allow inverse scope. VSO structures cannot be tested because they are impossible in Italian for independent reasons, according to Belletti (2001).

⁷⁵ The pragmatic oddness of this answer, resulting from the fact that the backgrounded indirect object is not pronominalized and cliticized, should be factored out.

c. #Ho restituito le chiavi a Maria.

I gave.back the keys to Maria (Belletti & Shlonsky 1995:503)

In accordance with the ISG, the postverbal object QP in an Italian sentence like (550), which is final in the sentence, cannot take wide scope over the subject QP.⁷⁶

(550) [_{TOP} Una ragazza] ha baciato [_{FOC} ogni ragazzo]. ($\exists > \forall, * \forall > \exists$) (=537)
 a girl has kissed every boy
 'A girl kissed every boy.'

The last supposed scope rigid language left to discuss is Japanese. This is an interesting case, because it does not appear to straightforwardly align with the explanations given for Chinese and Italian: there is no Chinese-type specificity restriction in Japanese, nor a constraint directly regulating IS articulations.⁷⁷ Therefore, both subjects and objects in Japanese are equally well-suited to be topics, and we seem to be without an account for the scope rigidity of (551).

(551) dareka-ga daremo-o seme-ta. ($\exists > \forall, * \forall > \exists$) (=538)
 someone-NOM everyone-ACC criticize-PST
 'Someone criticized everyone.'

I argue that the cause of the scope rigidity of (551) is not a general constraint on IS articulations in Japanese, but rather a property of the particular quantifier used in this example, *daremo* 'everyone', which prevents it from serving as a topic. I briefly discuss this property and subsequently provide evidence for the distinction between *daremo* and other Japanese quantifiers in terms of both compatibility with topichood and availability of inverse scope readings.

Daremo is part of a crosslinguistically occurring class of quantifiers in which quantificational force arises from the combination of a *wh*-phrase and a quantificational particle, in this case *dare* 'who' and *-mo* 'even, also'.⁷⁸ According to Kawashima (1994), *daremo* is associated with a domain widening effect of the type attributed to English *any*. Domain widening quantifiers bring into consideration entities previously considered outside the domain of quantification. Tomioka (2007b) proposes that such a quantifier is incompatible with topichood since it introduces what he calls non-familiar entities, i.e. entities which are not part of the universe of discourse of the interlocutors. As discussed in section 4.3.5, a quantifier whose domain includes entities not active in the discourse cannot be a topic.

Whatever the semantics of *daremo* and its connection to topichood, the fact that *daremo* cannot be a topic is irrefutable. As pointed out in section 3.2.2, *daremo* cannot take the Japanese topic marker *-wa*.⁷⁹ In this respect, it differs from the quantificational

⁷⁶ Judgments regarding (550) can be altered by modifying the intonation pattern associated with this sentence. This, I would argue, indicates a change in the IS articulation of the sentence, though I leave the details for future work.

⁷⁷ Although Japanese NS falls on the immediately preverbal phrase in a neutral context (Ishihara 2001), the preverbal position is not a fixed focus position. Thus, NS may shift under various conditions, and a phrase answering a question need not occur in the immediately preverbal position.

⁷⁸ Everything I say here about *daremo* seems to also be true of its noun-modifying counterpart *dono NP-mo* 'every NP'.

⁷⁹ Recall that the incompatibility of *daremo* with topichood renders it an intervener in Japanese. The fact that we are able to explain a range of ostensibly unrelated phenomena—intervention effects and rigid

expression *subete-no NP* 'all (the) NP' and from bare numeral indefinites, both of which allow topic marking. Examples bearing out this difference are provided in (552).

- (552) a. **daremo-wa nemutteiru.*
 everyone-TOP be.sleeping
 'Everyone is sleeping.' (Satoshi Nambu, p.c.)
- b. *subete-no neko-wa nemutteiru.*
 all-GEN cat-TOP be.sleeping
 'All cats are sleeping.'
- c. *3-biki-no neko-wa nemutteiru.*
 3-CL-GEN cat-TOP be.sleeping
 'Three cats are sleeping.' (Endriss 2009:59)

The observation that Japanese quantifiers differ in their compatibility with topichood derives a straightforward prediction under the ISG: *subete-no NP* and bare numeral indefinites are expected to allow inverse scope readings. This prediction is confirmed by the experimental study of Han et al. (2008), who tested scopal readings among Japanese speakers using a truth value judgment task. Han et al. report an acceptance rate of 50% for inverse readings with *subete-no NP* and 56.25% for inverse readings with a nominal modified by the bare numeral *futa* 'two', compared to 21.88% for *daremo*. Beyond the fact that the difference between the quantifiers is statistically significant, the percentages reported for *subete-no NP* and *futa* correspond to findings regarding the availability of inverse readings among speakers of English. Anderson (2004), for example, found in a study using a forced-choice questionnaire that even in a context supporting an inverse scope reading, English-speaking subjects assigned such a reading to only 53% of items. This significantly differed from the rate of surface scope readings assigned to items biased towards a surface reading via the context (81%), and from the rate of inverse readings when no supporting context was provided (19%).

The unavoidable conclusion from the results of Han et al. is that *subete-no NP* and bare numeral indefinites in Japanese are no different from English quantifiers in terms of inverse scope. This accords with the ISG, since these quantifiers can be topics and hence take scope over elements which they do not c-command in the surface structure.⁸⁰ Apparently, the linguistic literature has been misled into thinking that scope rigidity in Japanese is a function of the syntactic structure by largely restricting itself to examples involving the quantifier *daremo*.⁸¹ Another oversight on the part of the existing literature has been the failure to seriously take into account interspeaker variation in Japanese scope judgments. Thus, although Kuroda (1970) provides a doubly quantified sentence involving *subete-no NP* in object position to exemplify scope rigidity, his judgment is not shared by all speakers, perhaps not even a majority of them. This is borne out by the

scope—by invoking the same IS-related property provides support for the theory proposed here.

⁸⁰ The fact that these wide-scoping quantifiers must be marked with accusative case because they are direct objects, rather than the topic particle *-wa*, is not a problem for the analysis proposed here, since *wa*-marking is an obligatory feature only of *subject* topics in Japanese (Satoshi Tomioka, p.c.). Objects can be topics even if accusative-marked; scrambled accusative-marked objects, for example, serve as stage topics.

⁸¹ Another quantifier sometimes used in the literature, the existential *dareka* 'someone', which consists of a *wh*-phrase and the disjunctive particle *-ka* 'or', belongs to the same class of quantifiers as *daremo*. Unsurprisingly, it is incompatible with *wa*-marking and does not allow inverse readings.

results of Han et al., as well as various authors who report the existence of inverse scope readings in Japanese (e.g. Hayashishita 2003). Accordingly, the status of Kuroda's example is very much like an English doubly quantified sentence, for which many speakers do not report an inverse reading. As repeatedly pointed out in the literature (e.g. Kuno et al. 1999), inverse scope judgments exhibit a great deal of interspeaker variability, suggesting that we should not rely on a single judgment in determining the availability of an inverse scope reading.

The absence of an inverse scope reading for certain sentences is not a phenomenon limited to scope rigid languages like Italian or Chinese. Even in English, there is a type of quantifier which is consistently unable to take wide scope over a quantifier that it does not c-command in the surface structure; unsurprisingly, this is the same quantifier type which consistently cannot bind a pronoun it does not c-command, namely, the negative quantifier.⁸² Thus, the sentence in (553) cannot have the reading where the object quantifier *no committee* takes scope over the universal subject.

(553) Every student joined no committee. $(\forall > \neg \exists, * \neg \exists > \forall)$

That (553) cannot have an inverse scope reading is shown by the fact that it cannot be used to describe the scenario in (554). Instead, we must resort to a sentence in which the negative quantifier has surface scope over the universal, such as the passive version of (553) in (555).

(554) There are three committees and thirty students. Ten students joined each committee.

(555) No committee was joined by every student. $(\neg \exists > \forall, ? \forall > \neg \exists)$

The behavior of the negative quantifier in English is exactly as predicted by the ISG, given that it cannot be interpreted as a topic, due to its non-referentiality. I suspect that the lack of inverse scope with negative quantifiers is not restricted to English, since it stems from a definitional property of these quantifiers, but rather should turn up in any language in which these quantifiers are available. It is unclear how a purely syntactic approach to scope would account for this behavior, which does not seem to correlate with a relevant structural feature of the sentence.

Let us take stock of what we have encountered thus far in this section. After establishing that quantifiers interpreted as topics take wide scope, whereas those construed as foci cannot do so, we found that the possibility of inverse scope is also contingent on the IS notion of topic. The distribution of scope rigidity, whether associated with a specific quantifier or characteristic more generally of a language, falls neatly into place once topichood is taken into account. In addition, the marked status of inverse scope readings and the way in which their availability varies between speakers point to the crucial role that IS plays in inverse scope. Like inverse binding, inverse scope depends on overcoming the default IS mapping and interpreting the object, instead of the subject, as the topic of the sentence. If such an interpretation is made available, the result will be scope ambiguity, since the surface scope reading exists regardless of IS; each reading will be associated with a different LF representation, as described in the next

⁸² This property of negative quantifiers is also noted in Liu (1990) and Hayashishita (2003), who mention additional types of quantifiers that either do not allow inverse scope readings or allow them only with great difficulty. Whether the behavior of the latter is predicted by the ISG is a matter for future research.

subsection. From the perspective of May's LF theory, the marginality and variability of inverse scope readings is yet another puzzling fact. Given that the same syntactic operations are assumed to be responsible for the emergence of surface scope and inverse scope readings, there is no explanation why speakers treat them differently.

The generalization meant to capture the sensitivity of scope to topichood, the ISG, is repeated below in (556).

- (556) Inverse scope generalization (ISG): A quantifier phrase QP will scope over an NP which it does not c-command in the surface structure, and a *wh*-phrase will scope over an NP which it does not c-command in the base, iff QP/*wh*-phrase is interpreted as a topic. Otherwise, NP will scope over QP/*wh*-phrase. (=535)

There are a number of issues related to the ISG which warrant further comment. First is the fact that it applies just to inverse scope, meaning that IS is not relevant for surface scope. This is expected in light of our earlier finding that variable binding is sensitive to IS factors only if the binder does not c-command the bindee. Proof that IS factors do not figure in surface scope is provided by examples like (555) above, where a negative quantifier takes wide scope, in spite of its incompatibility with topichood.

If inverse scope is influenced by IS factors, as formulated in the ISG, one might wonder why these factors have often been overlooked until now, particularly in English.⁸³ Because English allows a fairly free mapping to IS categories, contrasting, for example, with Italian, it is difficult to manipulate the IS articulation so as to facilitate or block an inverse scope reading. Nevertheless, it has been noted in the literature that IS does affect scope judgments in English; in particular, that stress on a QP subject—i.e. marking it as the focus—makes it easier to get an inverse scope reading (Kitagawa 1994). According to the theory presented here, marking the subject as the focus prevents it from being a topic, thus indirectly forcing the object to be the topic, which in turn allows the latter to take wide scope. Another way in which English scope judgments reveal sensitivity to IS is the marginality of inverse scope readings; as argued above, this stems from the default assignment of topic status to subjects.

A final question concerning the ISG is whether or not it captures the full range of scopal behavior attested in natural language; in other words, can scope judgments be reduced exclusively to IS considerations?⁸⁴ The answer is clearly no, in light of a variety of observations. One of these observations, noted in the previous subsection, involves scoping out of a DP: a QP embedded inside a DP is able to bind a pronoun c-commanded by the DP, even though the QP itself does not c-command the pronoun. I claimed that this is possible because the QP can scope over the DP, and that this scopal behavior does not hinge on the IS category of the QP; we must therefore exempt from the ISG local scope of a QP out of a DP. Besides the evidence from variable binding, we find two additional indications that IS considerations do not factor in scoping out of a DP. First is the

⁸³ Works on scope which do take IS into account, though not necessarily as explicitly as here, include Erteschik-Shir (1997), Sæbø (1997), Kuno et al. (1999), Hayashishita (2003), Deguchi (2005), and Endriss (2009), as well as the Role and Reference Grammar literature (Van Valin 2005, a.o.). Erteschik-Shir, Sæbø, Deguchi, and Endriss specifically invoke the notion of topichood to account for wide scope readings, though Endriss restricts her analysis to quantifiers scoping out of islands (i.e. exceptional wide scope).

⁸⁴ Grammatical function and linear position, which have been mentioned in the literature as factors influencing scope interpretations (Ioup 1975), may reduce to IS, given the strong correlation between subjecthood, initial position in the sentence, and topichood.

observation that these scopal interpretations are often preferred over other interpretations and do not have the air of markedness generally associated with inverse scope readings. Second, languages which are otherwise scope rigid in doubly quantified sentences have no problem allowing a QP to scope out of a DP.⁸⁵ For example, the Italian sentence in (557), with a QP embedded inside the subject DP, has the (only plausible) reading where the universal quantifier scopes above the existential. The sentences in (558) show that the position of the DP embedding the QP is not important: the QP embedded in the object DP in these examples can also scope out of the DP, and this is either the only plausible reading (558a) or the sentence is ambiguous (558b).

(557) Una mela in ogni cesto è marcita. (($\exists > \forall$), $\forall > \exists$)
 an apple in every basket is rotten
 'An apple in every basket is rotten.'

(558) a. (?)Gianni ha ballato con una ragazza di ogni scuola. (($\exists > \forall$), $\forall > \exists$)
 Gianni has danced with a girl of every school
 'Gianni danced with a girl from every school.'

b. Maria ha una soluzione per ogni problema. ($\exists > \forall$, $\forall > \exists$)
 Maria has a solution for every problem
 'Maria has a solution for every problem.' (Lisa Brunetti, p.c.)

There are cases in which quantifiers have particular scope-taking abilities that are not easily attributable to IS considerations. Consider, for instance, the English quantifier *all* in (559), which does not allow inverse scope (Ioup 1975).⁸⁶

(559) Some student read all the books. ($\exists > \forall$, * $\forall > \exists$)

All can take wide scope when it is in subject position, allowing a distributive interpretation in (560). Though this seems to suggest that the subject-object distinction vis-à-vis topichood may be involved, there is no evidence that *all* cannot be interpreted as a topic, leaving the lack of inverse scope in (559) unaccounted for.

(560) All the boys carried a table upstairs. ($\forall > \exists$, $\exists > \forall$)

Conversely, *each* in English tends to have wide scope (Ioup 1975, Kuno et al. 1999): while a wide scope reading for the object is possible when the subject is modified by *every* in (561a), this reading is unavailable in (561b), where *each* in the subject must have wide scope.

(561) a. Every student admires some professor. ($\forall > \exists$, $\exists > \forall$)

b. Each student admires some professor. ($\forall > \exists$, * $\exists > \forall$) (Kuno et al. 1999:78)

⁸⁵ Negative quantifiers seem unable to scope out of a DP, so that (i) cannot be interpreted as saying that there is no committee such that every student on that committee felt uninvolved (see May and Bale 2005). I do not have an explanation for this observation insofar as the incompatibility of negative quantifiers with topichood should be irrelevant.

(i) Every student on no committee felt uninvolved. ($\forall > \neg \exists$, * $\neg \exists > \forall$)

⁸⁶ *All* can scope out of a DP, as in (i), supporting the claim that this type of scopal behavior is different from that involving two arguments of the same verb.

(i) She knows a solution to all problems. ($\exists > \forall$, ? $\forall > \exists$) (Ioup 1975:42)

Unlike *all*, a connection to IS in the case of *each* is plausible. Specifically, Kuno et al. (1999) claim that *each* can only be used if its domain is d-linked, meaning that it is likely to be interpreted as a topic.

In the end, a comprehensive theory of scope will have to incorporate both the ISG and aspects of scopal behavior which are not derivative of the IS articulation assigned to the sentence. The goal of this section has been somewhat more modest; namely, to connect the findings from previous sections regarding variable binding to the notion of scope. While the discovery that inverse binding depends on assigning topic status to the binding operator is important, in that it delimits the space of possible explanations for WCO, this discovery by itself does not constitute an explanation. I have argued that the missing link between the topichood of an operator and its ability to inversely bind a pronoun is provided by scope: an operator functioning as a topic is able to bind a pronoun it does not c-command in the surface structure (QPs) or in the base (*wh*-phrases) by virtue of the wide scope property of topics. I take this to mean that the operator does c-command the pronoun, though only at a covert level of representation, LF. The next subsection picks up the discussion from this point, tackling the ramifications of this proposal for LF.

4.4.4 Ramifications for LF

The few previous works which identified the effect of IS factors on variable binding typically ascribed this effect to a level other than LF. Thus, Zubizarreta (1998) posits that IS categories are encoded at a level of representation labeled Assertion Structure (AS), existing alongside LF, and hypothesizes that variable binding may be licensed either at LF or at this level. Erteschik-Shir (1997) does away with LF entirely, claiming that all semantic relations are read off of the IS level of representation, which she calls focus structure (f-structure).

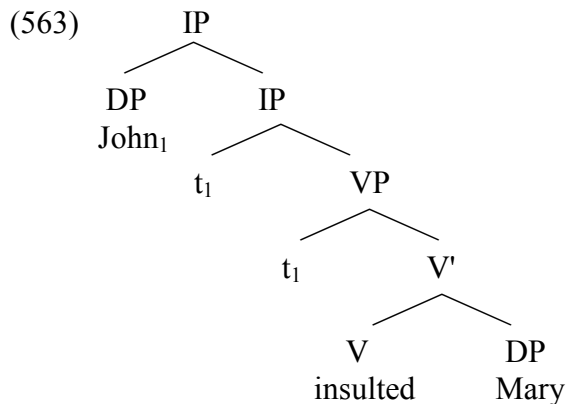
Regardless of the details of the abovementioned theories, which will be addressed in more depth in chapter 5, their approach to the variable binding data is problematic. Allowing binding to be computed at different levels, as in Zubizarreta's theory, entails duplication of the underlying mechanisms and should therefore be avoided if possible. The proposal of Erteschik-Shir, whereby all features of compositional meaning are represented in a level devoted exclusively to IS categories, is ruled out given the existence of non-IS-sensitive features of LF. Recall, for instance, that subject binders are able to inversely bind irrespective of their IS status. There is also a conceptual reason to separate IS from LF: these levels encode two different, independent types of meaning, informational vs. logico-semantic meaning, respectively. That they are independent of each other is demonstrated by the fact that the same logico-semantic proposition can be assigned different IS articulations, and conversely, the same articulation may be imposed on different propositions (see chapter 2 for examples).

In place of these kinds of theories, I propose to maintain LF as the level of logico-semantic meaning, and at the same time to allow information from IS to feed the LF representation. Accordingly, LF is the single level of representation relevant to variable binding, in which both IS-sensitive and non-IS-sensitive features can be integrated. This proposal requires certain modifications to the traditional conception of LF, in terms of the algorithm responsible for LF movement and the arrangement of operators at this level. The current section lays out these modifications.

The findings of this chapter point to the following basic form for the LF

representation: topics are in the highest position in the clause, while all other elements, including IS foci, remain in their surface structure position, barring reconstruction. This leaves a number of analytic options for the precise placement of topics: a left peripheral position dedicated to topics, a position specialized for IS-related categories in the periphery but not differentiated in terms of its specific IS function, or adjunction to an existing projection. The last option requires the interfaces to fill in the interpretive import of the adjoined element. Each of these options has been argued for in the literature, though primarily in the context of topics which have undergone overt movement; the first represents the cartographic approach of Rizzi (1997), the second is adopted by Culicover (1991), and the third option is defended inter alia in Lasnik and Saito (1992). For reasons which were given in chapter 3 and are to be expanded on in chapter 5, I have rejected theories which seek to encode IS notions directly in the syntax. Accordingly, I assume the last of the three approaches just described. Topics are adjoined to IP (or CP), resulting in the LF in (563) for the basic example of a topic-tail-focus articulation in (562).^{87,88}

(562) [_{TOP} John] insulted [_{FOC} MARY].



While the representation in (563) does not include quantifiers, and therefore does not bear on the issues of scopal ambiguity or variable binding, it does have interpretive import. In particular, it serves as the input to predication interpretation: as the subject of predication, the topic *John* precedes what is predicated of it in the remainder of the sentence. In (563), *John* happens to also be the subject, though this is not necessary; given a different context, the object *Mary* could similarly function as the topic and would thus adjoin to IP at LF, ending up higher than the subject in SpecIP.

The same logic applies to the examples of variable binding addressed in this chapter, though the introduction of *wh*-phrases and QPs as topics requires some discussion. Recall that Ruys (2000), described in section 4.2.4, provides a framework for representing these expressions in a scope-based approach to binding, based on two assumptions. First, he separates the specifiers of *wh*-phrases and QPs from their restrictors, so that only the specifier is high at LF. Second, he proposes that the specifier of a *wh*-phrase or QP is

⁸⁷ I assume that adjunction is to the highest maximal projection in the clause and that basic declaratives do not project a CP. The first assumption allows a topic *wh*-phrase to raise to SpecCP and then adjoin to this projection in accordance with its IS function, while the second assumption is solely for the sake of convenience and can be dispensed with if necessary.

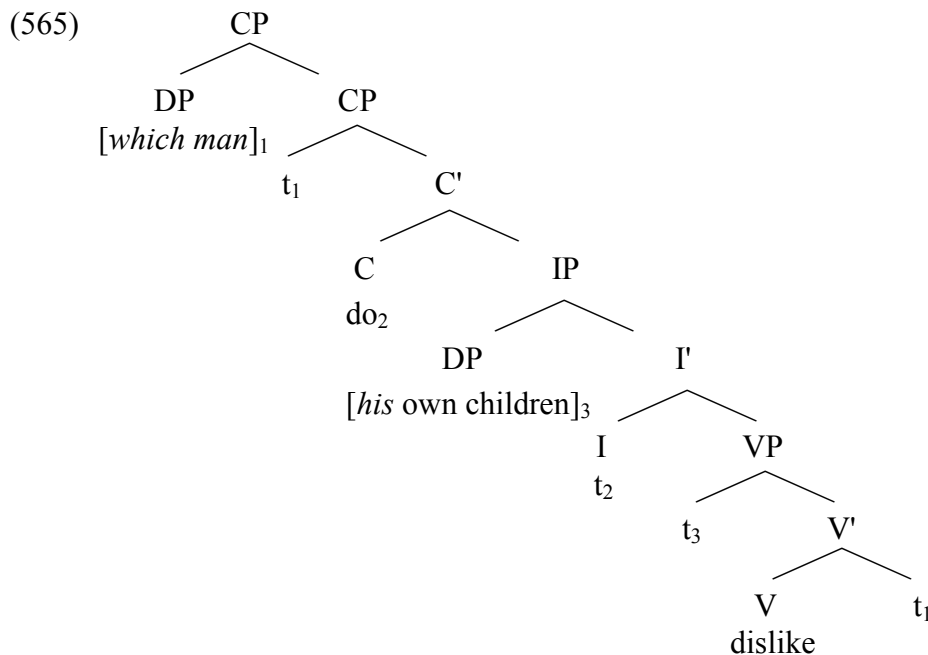
⁸⁸ Trees here are kept maximally simple, omitting irrelevant details regarding the existence of *vP*, a split IP, etc.

sufficient for scope, but the restrictor is the element responsible for binding. Accordingly, the restrictor must be higher than a pronoun at LF in order for the pronoun to be bound.

There are two substantial problems with Ruys' framework, which lead me not to adopt it here. First is the weak motivation for the claim that binding is carried out by the restrictor. Ruys sets up a choice function semantics for *wh*-phrases and QPs that derives this conception of binding, but gives no independent evidence for it or reasons why other semantic analyses are unsuitable. The second, more serious problem is that scope does not pattern in a way which warrants treating it separately from binding, and thus splitting the specifier of operators from their restrictor. As we discovered in the previous subsection, inverse scope is made possible by the same particular IS articulation as inverse binding, and is not an interpretive option constrained solely by syntactic considerations. Therefore, the specifiers of *wh*-phrases and QPs are not freely placed in high positions at LF, as Ruys assumes. Rather, unless it is a topic, the entire *wh*-expression reconstructs to its base position, and the entire QP remains in its surface position. These operators are able to scope over and bind a pronoun under one of two conditions: if they are generated higher than the pronoun, and hence are also higher at LF, or if interpreted as topics, causing them to raise at LF. Alleged counterexamples to the alignment between scope and binding are dealt with in the next subsection.

Drawing on the findings of this chapter instead of Ruys' framework generates the appropriate LF structures for the various binding and scope configurations. I begin with LFs of acceptable inverse binding configurations: a *wh*-question in which the *wh*-phrase is a d-linked topic and the phrase containing the pronoun is the IS focus (564)-(565), and a declarative where a QP is the topic and the pronoun is part of the focus (566)-(567).⁸⁹

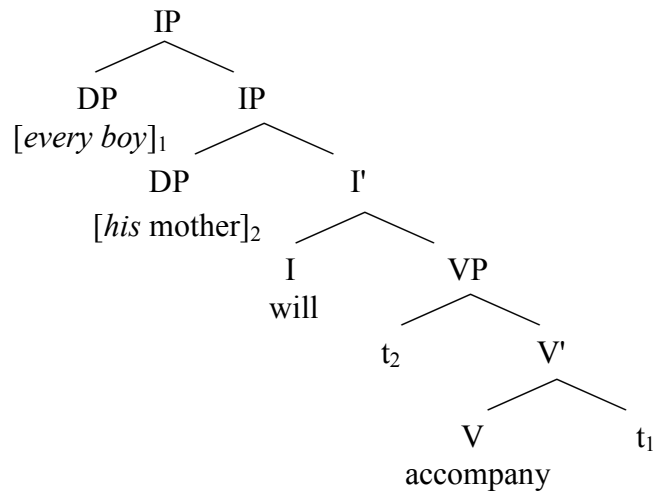
(564) [_{TOP} *Which man*]_i do [_{FOC} *his own* CHILDREN] dislike *t_i*? (=395a)



⁸⁹ A possible issue with these LFs is that they treat the whole operator expression as the topic and not just the restrictor. Perhaps one can think of the representations as indicating that the topic is selected from the restrictor set (see fn. 46-47).

(566) [_{FOC} *his* MOTHER] will accompany [_{TOP} *every boy*] (the first day of school). (=397b)

(567)



In (565) and (567), the availability of variable binding is directly encoded in the tree: the operator, whether a *wh*-phrase or QP, c-commands the pronoun, and can hence bind it. This is about as simple a representation as one can get, necessitating no extra stipulations or conditions beyond the scopal relation between the operator and potential bindee to establish the status of binding. In particular, movement of the topic is necessary and sufficient to make variable binding possible. However, focus movement in such a representation, targeting a position in the left periphery in accordance with the Rizgian tradition, would be meaningless for binding purposes. The topic is highest in the tree, and movement of any constituent below it will not alter the relations between this constituent and the topic. This is consistent with the hypothesis put forward in section 4.4.3, whereby IS foci are not associated with a specific structural position.

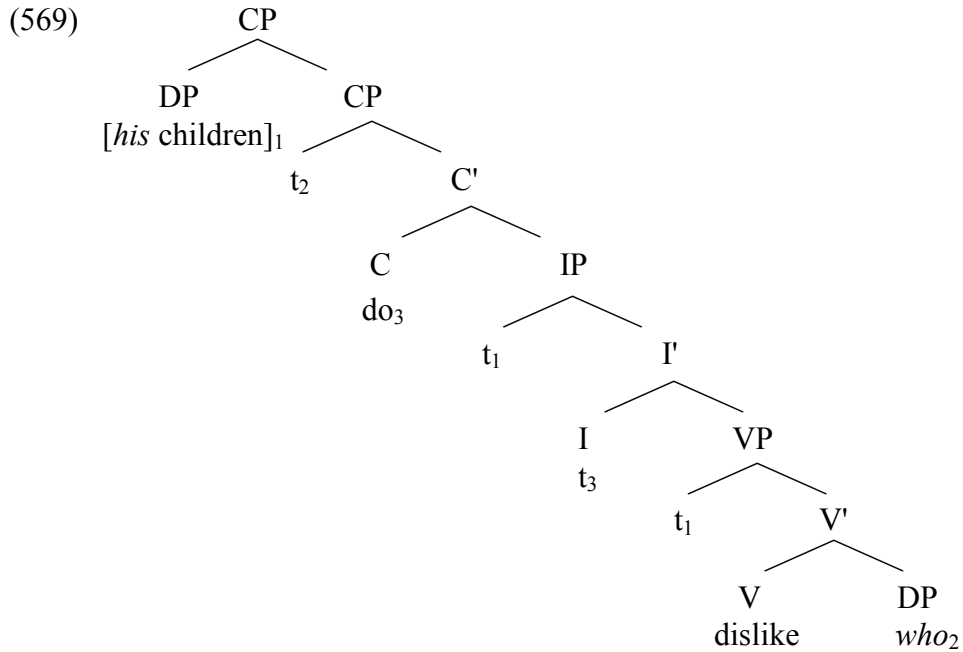
Things are just as straightforward when we turn to examples of variable binding that do not go through, i.e. give rise to WCO effects. In the LF representation (569) for the *wh*-question in (568) and the LF (571) for the QP example in (570), the operator does not scope over, or c-command, the pronoun; assuming that binding requires scope, the unacceptability of these examples follows.⁹⁰ Put differently, while (565) and (567) show what happens in representational terms when the ISG is satisfied, failure to interpret the operator as a topic and hence satisfy the ISG in (568) and (570) results in the LFs (569) and (571).

⁹⁰ In the basic examples schematized in (569) and (571), the outcome would be the same even if we did not assume that the operator is low at LF, since the intended bindee is in the topic and hence highest in the tree. However, in more complex sentences where the topic is neither the intended binder nor bindee, such as (i)-(ii), the assumption is needed. Otherwise, the operator would end up higher than the bindee and the sentences should be perfectly acceptable, contrary to fact.

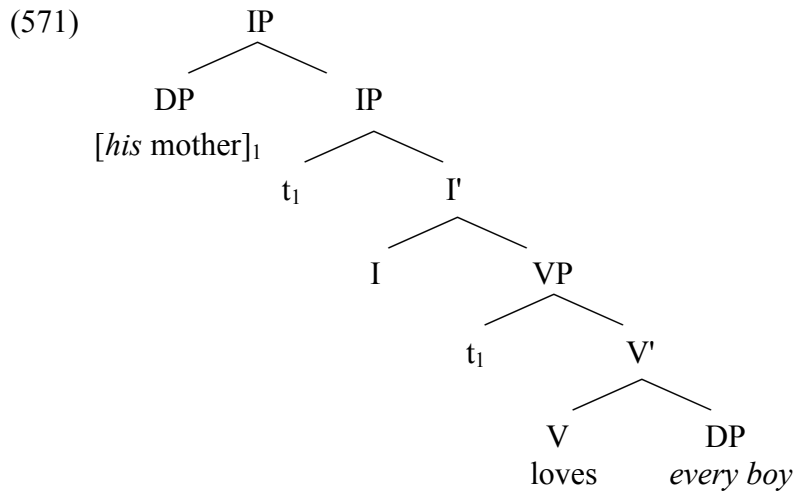
(i) ??*Who_i* did [_{TOP} the police] return *his* wallet to *t_i*?

(ii) ??[_{TOP} The police] returned *his* wallet to *every student*.

(568) ??_[FOC Who_i] do _[TOP his children] dislike _{t_i}? (=311b)

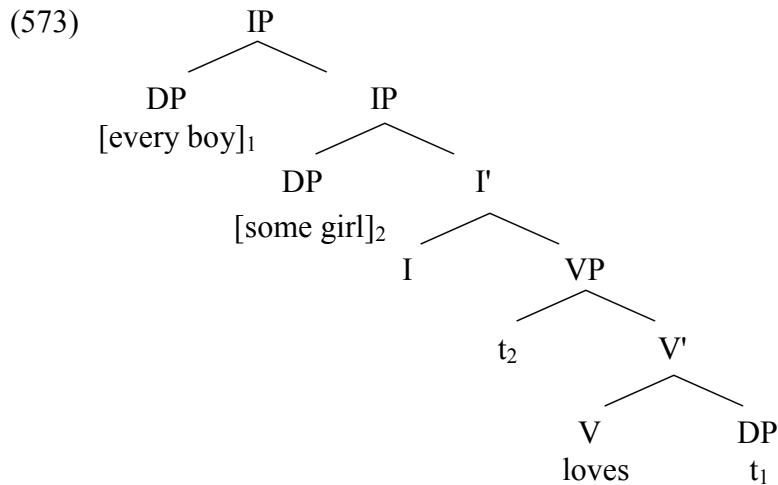


(570) ??_[TOP His mother] loves _[FOC every boy]. (=318)



Under the approach espoused here, the LF representations of inverse binding presented above are actually representations of scope. Thus, the LF of an inverse scope reading in (573) is identical to the structure representing inverse binding in (567), except that the topic quantifier scopes over another quantifier. If an inverse scope reading is unavailable, because the object quantifier cannot be interpreted as a topic, the object will simply remain lower than the subject at LF.

(572) Some girl loves every boy. ($\forall > \exists$)



There are two ways in which these LFs differ from the customary structures used following May (1977, 1985). First is the representation of *wh*-phrases and QPs, which do not necessarily occupy a high position at LF. Fronted *wh*-phrases which are not topics reconstruct from their surface structure position in SpecCP to their base position, while non-topic QPs and in situ *wh*-phrases do not undergo movement at LF. Although this arrangement diverges from a long tradition of obligatory QR and LF *wh*-movement, it is not as radical a step as it may seem.

Movement represents one of two possible ways to encode quantificational expressions at LF. The movement, or operator, approach adopts the Frege/Russell distinction between names and quantifiers, and thus maintains that a sentence involving a quantifier must have an LF which reflects this distinction (see Lappin 1982). In the original formulation of Chomsky (1976, 1981) and May (1977), QPs and *wh*-phrases are considered sentential operators which, unlike names, adjoin to the clause at LF and bind a trace in their base position. Crucially, although Chomsky and May present arguments for this approach, it is not grounded in semantic necessity, as has been repeatedly pointed out in the literature (Szabolcsi 2003, Reinhart 2006). Furthermore, one of the key phenomena claimed by Chomsky and May to constitute evidence for LF movement, WCO effects, does not actually support their position. While the assumption of LF movement yields a uniform generalization covering all the relevant environments for WCO, it does so at the cost of giving up a simple, scope-based explanation for WCO. Since this chapter has shown that we are able to appeal to the latter type of explanation, the argument for obligatory LF movement based on WCO collapses.⁹¹

The second possible approach to the representation of quantifiers, the term approach, is rooted in the Montague tradition, which does not make the aforementioned distinction between names and quantifiers. Both types of expressions can remain in situ at LF and be interpreted there. The results of this chapter implicate this kind of approach, since it alone allows one to straightforwardly differentiate between acceptable and unacceptable configurations of inverse binding at LF. Of course, leaving QPs in situ raises a host of questions and issues which go far beyond the scope of this study; I am not committed, for

⁹¹ See section 4.4.5 for discussion of the supposed distinction between names and QPs with respect to WCO, which Chomsky and May's approach was meant to capture.

example, to a particular mode of interpretation for in situ QPs, nor do I rule out the existence of local, interpretability-driven QR (see Heim and Kratzer 1998). The latter type of movement would not bear on the results of the current study as long as topics are positioned highest.

Though *wh*-phrases should ideally pattern just like QPs at LF, they involve a number of complications. For one thing, they differ from QPs in being subject to obligatory overt movement in English and a wide range of other languages. I posit that this movement is purely syntactic. Accordingly, its effects are not retained at LF, and the *wh*-phrase reconstructs to its base position unless IS considerations come into play (i.e. unless it is a topic). The base position alone determines whether the *wh*-phrase serves as a variable binder, whereas intermediate positions are irrelevant to variable binding, as indicated by the sentences in (574).⁹²

(574) a. *Who_i* did you say [_{t_i} [_{t_i} admires [*his* boss]]]? (=312a)

b. ??*Who_i* did you say [_{t_i} [[*his* boss] admires _{t_i}]]? (=312b)

The idea that *wh*-phrases reconstruct and are interpreted in their base position introduces a second complication in *wh*-questions. In terms of the semantics of *wh*-questions, this idea goes hand in hand with an analysis of *wh*-phrases as sets of individuals, rather than existential quantifiers (Hamblin 1973, Hagstrom 1998, a.o.). The existential force of the question is then provided by the C head. Conversely, LF *wh*-movement is associated with the more common view of *wh*-phrases as existential quantifiers, originating in Karttunen (1977), since the quantificational status of the *wh*-phrase provides semantic motivation for movement. That is, the semantics of the question forces the *wh*-phrase qua existential operator to be outside the scope of the question nucleus. This semantics is shown in (575): the LF of the question (575a) in (575b), with the question operator Q in C, is directly mapped onto the formula in (575c), giving the interrogative meaning of a set of propositions. As required, the *wh*-phrase is interpreted outside the scope of the propositional variable *p*, introduced by Q.

(575) a. *Who_i* did John insult _{t_i}?

b. LF: [_{CP} *who_i* [_{C'} Q did [_{IP} John insult _{t_i}]]]?

c. $\lambda p. \exists x [\text{person}(x) \wedge p = \text{insult}(\text{John}, x)]$

There is no semantic obstacle to treating *wh*-phrases as sets, as the data here suggests. However, by doing so, we lose the equivalence between *wh*-phrases and QPs from the perspective of topichood. It is not clear to me at present whether or not this step is truly detrimental to the claim that *wh*-phrases are possible topics, given that we have accumulated ample empirical evidence for this claim.

Though *wh*-phrases and QPs do not have to occupy a high position at LF, they may do so; this brings us to the second aspect of the LF representations postulated above

⁹² How to reconcile the facts about variable binding in (574) with the possibility of a reflexive being bound in an intermediate position, as in the classic example in (i), is an open question. An important distinction between the examples is that the *wh*-phrase is not the binder in (i), but rather contains the bindee. When the *wh*-phrase is the binder, its base position is critical from a Binding-Theoretic perspective, and not only for the purpose of variable binding. Thus, a bound reflexive is acceptable in (ii) but a bound pronoun is not.

(i) [Which picture of *himself*]_i does *John* think [_{t_i} that *Bill* likes _{t_i}]?

(ii) [*Which guy*]_i do you think [_{t_i} would contradict *himself*/**him* in such a blatant way]? (Büring 2005:246)

- (579) a. [Which of *her* relatives]_i do you think *Mary* visits every week _{t_i}?
 b. [Which of *her* relatives]_i do you think *Mary* is visited by _{t_i} every week?

Positing an IS-sensitive mechanism for LF movement in place of a syntactic algorithm connects to a variety of issues, only some of which I can touch on here. First, from the perspective of locality, there is in any case little empirical evidence for a purely syntactic algorithm at LF, of the type responsible for overt movement (i.e. Move α in the GB tradition). The claim that quantifier scope relations are governed by island constraints (Rodman 1976), on a par with overt movement relations, was shot down by Farkas (1981), who calls attention to the data in (580)-(581).

- (580) a. Guinevere has a bone in every corner of the house. ($\exists > \forall, \forall > \exists$)
 b. Guinevere has a bone which is in every corner of the house. ($\exists > \forall, * \forall > \exists$)
 (581) John told a reporter that Peter lives in every French town. ($\exists > \forall, * \forall > \exists$)
 (Farkas 1981:59-60)

A comparison of (580a) and (580b) appears at first glance to indicate that the scope of *every* is constrained by islandhood, since the first sentence allows a wide scope reading for *every corner* while the second only has the nonsensical reading in which *every corner* scopes under *a bone* (see also (530) in section 4.4.3). Rodman (1976) attributes the status of (580b) to the fact that *every* is inside a relative clause island. (581) indicates that this is not the correct interpretation of the data: *every French town* here is not in an island, but nevertheless fails to take scope above *a reporter*. Instead, Farkas (1981) argues, *every* and most other strong quantifiers are restricted to having scope in their clause.

Whatever principle the locality restrictions on quantifier interpretation eventually reduce to, it cannot be identical to the constraint that underlies restrictions on overt movement. The fact that this locality is defined in terms of the clause, at least for many quantifiers, and may hinge on whether or not the verb embedding the clause is a bridge verb (May 1977), raises the possibility that it is information structural in nature. Constraints referring to the clause and to the bridge/non-bridge distinction are characteristic of IS, as mentioned in chapters 2 and 3 (e.g. the restriction to one IS focus per clause). I leave further exploration of this matter for future research.

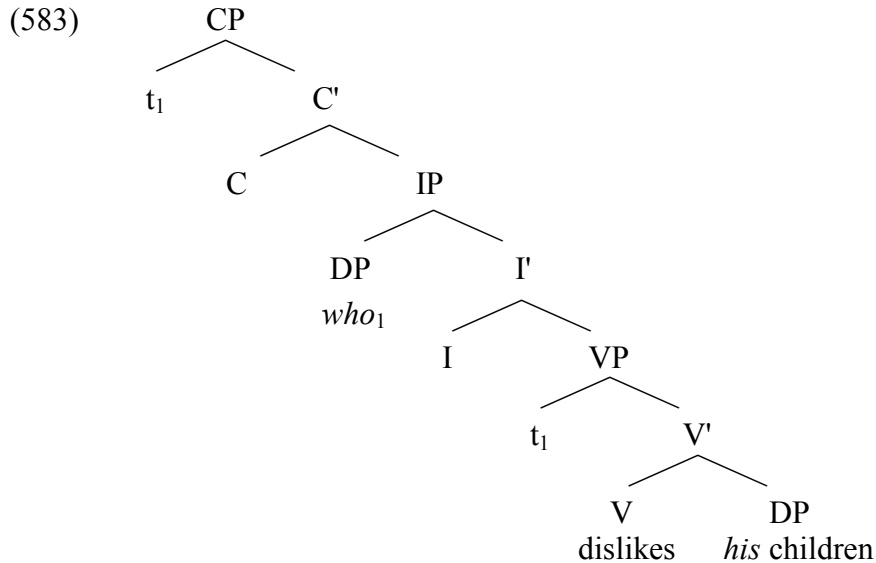
A second issue related to the notion of an IS-sensitive mechanism driving movement is the fact that this mechanism alone cannot explain the whole range of data; rather, it must be supplemented by LF movement that is not motivated by IS. This non-IS movement, needed to account for the behavior of subject binders and QPs embedded within a DP, can be thought of as a type of LF repair, applying only in a limited set of cases. In representational terms, the elements in question have to be identified at LF and raised accordingly; subject binders in particular should end up above topics, which are high for IS reasons.⁹⁴

A final aspect of LF which supplements the IS-sensitive mechanism pertains to the representation of surface binding. Here it is necessary to encode the finding that IS factors play no role; if a QP or the trace of a *wh*-phrase c-commands a pronoun in the surface structure, it can bind the pronoun regardless of whether or not the QP/*wh*-phrase

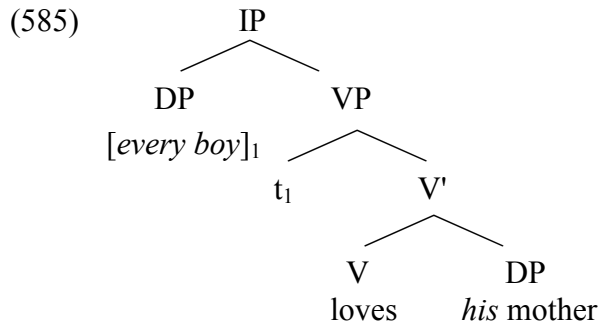
⁹⁴ This property must be restricted to subject *binders*, rather than subjects in general, which can end up lower than non-subjects at LF (i.e. in inverse scope and binding readings).

is a topic. Accordingly, I hypothesize that LF makes available representations in which no IS-driven movement has taken place, and in which, with the exception of *wh*-phrase reconstruction, phrases maintain their surface positions. These representations enable surface variable binding, as demonstrated in (582)-(585), where a c-command relation between the QP/*wh*-phrase and the pronoun allows the former to bind the latter. Surface scope is licensed by the same representations, *mutatis mutandis*.

(582) *Who_i t_i dislikes his children?* (=311a)



(584) *Every boy loves his mother.* (=317)



Crucially, the existence of LF representations like (583) and (585) does not interfere with the distinction between acceptable vs. unacceptable inverse binding configurations. The acceptability of such configurations is contingent on an LF featuring IS-driven movement, in which the operator functioning as a topic is in a c-commanding position; an additional LF preserving the surface structure will not license inverse binding.

Summing up this section, we have translated the results of previous sections into a formal representation by using the established level of LF, both building on and diverging from currently prevalent approaches to LF. On the one hand, the recognition of a covert level of structure encoding semantic information, including scopal and binding relations, follows the dominant view of compositional meaning. We have specifically maintained the idea that scope is represented by the hierarchical relation of c-command at LF. On the other hand, the approach advocated here differs from most current theories in arguing that

LF responds to IS properties of the sentence. While this requires a reconsideration of various claims regarding LF under current theories, particularly those which attribute to it some syntactic property or other, the empirical basis for many such claims was never very solid to begin with.

4.4.5 Remaining Issues

As a longstanding topic of research, WCO effects have been analyzed in numerous frameworks, appealing to a variety of theoretical constructs and focusing on different subsets of the data. It is therefore impossible to cover all the issues related to this phenomenon within the confines of this dissertation. Here I mention a few of the questions I do not fully resolve, and then tackle in some more detail two specific issues raised earlier in the course of this chapter. One is the discrepancy between judgments of inverse binding vs. inverse scope, discussed in section 4.2.4. The second issue I deal with is the behavior of focused NPs vis-à-vis anaphoric relations, which ties in to the broader subject of the distinction between variable binding and coreference.

One type of data which I have overlooked in the discussion concerns pronouns in adjunct phrases. Interestingly, these pronouns can be bound by an operator that does not c-command them; thus, no WCO effects arise in (586) despite the fact that the trace of the *wh*-phrase does not c-command *him*.

(586) *Who_i did Jan say she admired t_i [_{PP} in order to please *him*]?*

(Lasnik & Stowell 1991:690)

This observation has not received a satisfactory explanation in the literature; Lasnik and Stowell (1991), for example, leave pronouns in adjuncts out of the constraint underlying WCO by stipulation. Of course, though the *wh*-trace in a sentence like (586) does not c-command the pronoun, it does precede the pronoun. Accordingly, it might be worth reconsidering the evidence for a hierarchical, as opposed to linear, account of variable binding (see fn. 7 and 11). Alternatively, perhaps adjoined positions are actually lower than, and hence c-commanded by, the phrase they adjoin to.

A second class of data, which I touched on in section 4.2.3 but have not explained in the IS approach, involves resumptive pronouns. Across many languages, the presence of a resumptive pronoun in a WCO configuration is correlated with the absence of a WCO effect (but see fn. 14). This is illustrated in the Hebrew example in (587): the relative clause in (587a) exhibits a WCO effect, but no such effect arises when a resumptive pronoun is introduced in place of the trace in (587b).

[illegible]

b. ha-iš *OP_i* še-im-o ohevet *oto_i*
the-man that-mother-his loves him
'the man who his mother loves'

Following the line of reasoning of this chapter, the status of (587b) must indicate that the resumed operator is interpreted as a topic. Indeed, there is a well-known connection between resumption and specificity, reflected, for instance, in the fact that only d-linked *wh*-phrases may be resumed in Hebrew (Sharvit 1999). Specificity, in turn, is related to topichood in the way described in section 4.3.5.

An issue which deserves particular attention in light of the arguments put forth in this chapter is the difference between the status of inverse binding configurations and their inverse scope counterparts. Inverse binding configurations are generally unacceptable unless tinkered with via IS-related manipulations, while inverse scope readings, though not immediately accessible to all speakers, do not seem to require the same kind of support. The baseline examples of inverse binding and inverse scope are repeated in (588) and (589), respectively, demonstrating this discrepancy.

(588) ??*His* mother loves *every boy*. (=318)

(589) Some girl loves every boy. ($\exists > \forall, \forall > \exists$) (=371)

On the face of it, this data constitutes a problem for the IS approach to variable binding and scope, as well as any theory which seeks to reduce WCO to scope. Under such theories, if an operator takes wide scope at LF, it should also be able to bind a pronoun within that scope. The data is not problematic for structural, binding-theoretic approaches to variable binding, since these approaches impose conditions on binding above and beyond those required by scope. I will first consider a number of potential explanations which, in the end, do not seem satisfactory, and then suggest a new direction for thinking about the issue, based on the IS approach to scope.

Perhaps the most attractive way out of this problem would be to claim that there is in fact no discrepancy between binding and scope. While Pica and Snyder (1995) adopt such a strategy, as noted in section 4.2.4, we have ruled it out given the robust evidence that speakers do not treat the two phenomena identically in their judgments. A second potential solution acknowledges that the discrepancy is real and therefore separates binding from scope, imposing some constraint specifically on binding. There are several possible ways to implement such a solution. First, one could assume that topichood of the operator is a requirement on variable binding, and not make the parallel assumption for scope, along the lines of Zubizarreta (1998); in other words, adopt the IBG but not the ISG. This approach has two significant weaknesses: first, it ignores the large amount of evidence gathered in section 4.4.3 for the link between scope and IS, and second, it leaves us with no explanation for the patterning of variable binding judgments. Why would topichood be relevant for binding, unless topichood also plays a role in determining scope? Zubizarreta does not provide an answer to this question.

Another way of conceptualizing inverse binding as more difficult than inverse scope involves adopting the economy-based framework of Reinhart (1998, 2006). In this framework, QR is a non-economical operation, and hence motivated only when it is needed to derive a distinguishable interpretation for a given sentence. This should yield the distinction between (588) and (589), since in the latter case the object QP *every boy* must raise in order to scope over the subject, whereas QR in (588) would not generate a distinct scope reading; consequently, *every boy* does not scope over the pronoun and cannot bind it. Reinhart (1998) posits that economy considerations also correctly predict the status of the sentences in (590), which are said to allow binding, unlike (588), because QR does derive a distinguishable scope reading for them.

(590) a. A copy of *his* speech was placed in front of *every speaker*.

b. ?A friend of *his* mother praised *every speaker*.

c. ?Someone paid by *his* mother praised *every speaker*. (Reinhart 1998:55)

Unfortunately, the full range of data considered in this chapter casts doubt on the applicability of this kind of approach to variable binding. Numerous acceptable examples of inverse binding do not submit to an economy-based explanation, and differ from their unacceptable counterparts only in their IS. Moreover, simply incorporating economy considerations into the IS theory will not work, given that overriding such considerations runs counter to the basic idea behind the economy-sensitive approach. Lastly, there is an alternative explanation for the relative acceptability of the sentences in (590), which I will get to shortly.

A final strategy for distinguishing inverse binding and scope readings based on the existing literature invokes the underlying syntactic or semantic mechanics. Thus, one could follow Ruys (2000) in separating the restrictor of a *wh*-phrase or QP from its specifier and making c-command by the restrictor necessary for the purpose of inverse binding, but not for inverse scope. An alternative is to take up the idea of Shan and Barker (2006), discussed in section 4.2.5, whereby the scope-binding distinction is encoded in the semantic rules needed to derive each type of reading. Both these options, however, do not incorporate IS considerations and are therefore out of the running. Such considerations have turned out to be central to any analysis of scope and variable binding; importantly, they can also account for (588) and (589).

Given the inadequacy of existing explanations for the scope-binding distinction, and assuming that we would like to keep our scope-based analysis of WCO, it is worth contemplating a new approach to the data. Such an approach, I submit, ought to reframe the question under consideration in light of the critical oversight on the part of the explanations available in the literature; namely, the fact that inverse binding readings are available, and that this availability is connected to IS. Thus, the question should not be why inverse scope is possible while inverse binding is not, but rather why the IS conditions which make inverse scope and binding readings possible are not fulfilled in (588).

A possible answer to this question, suggested to me by Satoshi Tomioka (p.c.), rests on the difference between the subject in (588) vs. (589), as the constituent which the object needs to scope over. In (588), the subject is a definite DP, and in (589) it is indefinite. This affects the IS articulation each sentence is assigned: in the former the subject is practically forced to serve as the topic, while the latter allows the object to be the topic and consequently scope over the subject. Contra existing theories, the fact that the object scopes over the subject in (589) is not evidence that it does so in (588): whether or not inverse scope is possible is determined on a case-by-case basis, and depends on the identity of the constituents in a sentence other than the intended wide-scoping constituent. This explanation predicts that a case of inverse binding like (588) should be acceptable if the definite subject is replaced by an indefinite; this prediction is borne out by the examples in (590).⁹⁵

To complete this section, I revisit a topic which was briefly commented on in fn. 6, and also brought up later in this chapter in various contexts; namely, anaphoric relations involving focused NPs as potential antecedents. As shown in (591a), a lexical NP—the proper name *John* in this case—can be the antecedent to a pronoun without any c-

⁹⁵ The supposed counterexample repeated in (i), from section 4.2.4, indicates that judgments may vary. This is unsurprising for an IS approach.

(i) ??A student of *his* called *every professor*.

(=373)

command relation between the two in the surface structure. However, if the NP is focused, as in (591b), the anaphoric relation is blocked.

(591) a. *His* mother loves John.

b. ??*His* mother loves JOHN.

Motivated by the goal of achieving a uniform representation for WCO, Chomsky (1976) views (591b) as evidence that foci raise at LF, like *wh*-phrases and QPs. The IS approach to WCO, however, affords us a novel perspective on (591b): foci do not and cannot raise at LF, because they cannot be topics by definition. Accordingly, WCO effects uniformly reflect failure of the potential binder, whether a *wh*-phrase, QP, or focused NP, to scope over the pronoun at LF. This explanation of WCO is simpler than the analyses proposed by Chomsky and others who have assumed May's version of LF.

Extending the IS approach from cases of anaphoric relations in which a *wh*-phrase or QP is the antecedent to those involving a focused NP has considerable implications. If focused NPs are not quantificational elements, and the relation under discussion is therefore one of coreference rather than variable binding, the inevitable conclusion is that the same IS factors have an effect on both types of anaphoric relations.⁹⁶ That is, a backward anaphoric relation hinges on the antecedent being interpreted as a topic, regardless of whether or not it is quantificational.⁹⁷ This, in turn, reintroduces a question which was debated early on in the literature but is now assumed by many to have been resolved: is there a grammatical distinction between coreference and variable binding?

It is conceivable that the supposed coreference-binding distinction is in fact epiphenomenal, in the sense that differences in the acceptability of anaphoric configurations are just a function of the ability to interpret the potential antecedent as a topic. The sentence in (588), with a QP as potential antecedent, is then less acceptable than (591a), where a proper name is the antecedent, because the QP is difficult to construe as a topic, and not because its presence entails a uniquely defined anaphoric relation. The same line of reasoning obviously applies to *wh*-phrases, which are natural foci but can be pushed to topic status through manipulation of their specificity. Indeed, even the anaphoric relation between a definite DP and a pronoun it does not c-command is sensitive to the specificity of the DP (592).

(592) a. *Her* mother loves *the girl that Sue dislikes*.

b. ??*Her* mother loves *the girl*.

(Isac 2006:283)

Isac (2006) regards this data as proof that definite DPs are quantificational. This is, in my opinion, a misinterpretation of the data; what it shows is that the connection between specificity, topichood, and the licensing of backward anaphoric relations is not limited to quantificational expressions, thereby reinforcing the possibility that coreference and

⁹⁶ Claims in the literature that IS foci are quantificational (cf. Rizzi 1997) appear to have little support. Foci do not give rise to scope ambiguities, as would be expected of quantifiers (see Vallduví 1990); furthermore, one of the pieces of evidence for these claims—the fact that focused NPs behave like *wh*-phrases and QPs with respect to variable binding—has been reinterpreted here as a matter of IS. Attempts to treat focused NPs as quantificational by assuming a covert *only*, as in Lasnik and Stowell (1991), are doomed to failure, given that IS focus and *only* are not interchangeable (see section 4.3.1).

⁹⁷ The existence of a topichood requirement on backward coreference relationships is independently established in Reinhart (1986) and mentioned in fn. 82 in chapter 3.

variable binding are not distinct phenomena. This is precisely what the early generative literature on anaphoric relations assumed, and thus treated both inverse coreference and variable binding as cases of "backward pronominalization" (Wasow 1972, 1979).

An approach which does away with the coreference-binding distinction is desirable in that it allows a simple and uniform theory of anaphora. Many questions regarding such an approach remain, including how to explain differences in the domains across which coreference vs. binding relations may hold, noted in section 4.2. Given the results of this chapter concerning WCO effects, as well as the general IS framework set forth in this dissertation, we are well-positioned to explore these questions in the near future.

4.5 Summary and Implications

I began this chapter by citing Postal's (1993) comment regarding the inexplicability of WCO effects, made against the backdrop of numerous attempts to account for this phenomenon and an ever-expanding set of relevant data. In the chapter I have established that WCO effects cease to be a mystery once IS is taken into consideration. The IS approach to WCO and variable binding I have put forward, in place of existing purely syntactic or semantic analyses, also requires a reconsideration of assumptions about LF made by Chomsky (1976) and May (1977, 1985). Although these assumptions are widely held in the current literature, key forms of data used to justify them—the distribution of WCO effects and inverse scope readings—have been reanalyzed here. Consequently, they no longer support the model of LF advocated by Chomsky and May.

To make the case for the IS approach, I first identified a large class of examples of inverse binding whose acceptability conflicts with the predictions of existing analyses. Going through these examples, I showed that what they have in common are particular IS properties, and then traced these properties to the computation of inverse scope. Finding that inverse binding and inverse scope are sensitive to the same factors is a welcome result for any theory of WCO, given that the former should ideally reduce to the latter; what is especially revealing is that these are IS factors. This result casts the discrepancy between inverse binding and scope judgments in a new light: the unacceptability of baseline inverse binding configurations (i.e. barring IS manipulations) is a unique problem of natural language, as previous accounts claimed, but it does not reflect a categorical, syntactic constraint on binding. Finally, I represented the IS generalizations regarding binding and scope in terms of hierarchical relations at LF, on a par with the prevailing class of syntactic and semantic analyses.

The proposed IS approach has many advantages over approaches in which IS does not play a role. These include its robust empirical basis, both within English and crosslinguistically, the fact that it is able to explain the gradient judgment patterns and variation between speakers characteristic of WCO, and its parsimoniousness. In addition, the IS approach makes learning of the conditions regulating inverse binding simpler than competing analyses, without imputing innate knowledge to the learner. What the learner needs to do is to acquire the categories which make up the IS articulation, the rules for mapping elements of the sentence onto these categories, and the cues associated with them in the surface string (phonological, morphological, and/or syntactic). Crucially, none of this is specific to WCO or variable binding, but rather must be acquired from the input for independent purposes. Moreover, because aspects of the input relevant to IS may slightly differ across languages, crosslinguistic differences in the distribution of

WCO are possible. A German-speaking child is able to figure out the status of WCO effects in his language, differing from a language like English, even if he is not exposed to a single example of inverse binding. These ideas about acquisition derive clear and testable predictions. We expect to find certain correlations and patterns of chronological order in acquisition; first and foremost, mastery of IS categories should precede adult patterns of inverse binding judgments.

The results of this chapter have major repercussions for issues other than variable binding. While they contest the specific version of LF often assumed in the literature, these results confirm that a covert level of semantic information exists in the grammar. Binding and scope relations are not predictable on the basis of the surface structure alone because these relations are sensitive to IS, which, although correlated with certain aspects of the overt structure (e.g. topics tend to be sentence-initial), is an independent level of representation. In other words, Chomsky (1976) was right that the conditions governing the use of pronouns as bound variables are defined at LF; however, these conditions are very different from what he envisioned. The formulation of the conditions under the IS approach not only captures the distribution of WCO effects, but also provides an explanation for the effects. The same cannot be said of competing semantic and semantic analyses.

The form of LF proposed here is also distinct in the way it ties in to another aspect of compositional meaning, predication. The structure needed to represent the relation between the predicate and the subject of predication, which is the topic (see chapter 2), is identical to that used for acceptable inverse scope and binding configurations. The fact that these two aspects of compositional meaning converge on the same representation provides strong support for the current approach. The LF representation can serve as the structure for the semantic derivation, using the standard type-semantic analysis of Heim and Kratzer (1998). Some modifications to the analysis would have to be made in order to accommodate the subject-predicate division, which is derived via movement, but this does not appear to require anything beyond the mechanisms already available in semantic theory (predicate abstraction, etc.).

Turning to the connection between this chapter and the broader themes of the dissertation, we find that it nicely complements the results of previous chapters. First, the analysis of WCO effects and variable binding bolsters the claim that IS is a level of representation independent of the syntax and semantics. In addition to the existence of well-formedness conditions on IS, reflected in the distribution of intervention effects, the evidence for this claim now includes the import of IS for anaphoric relations. As we discovered in the study of intervention effects, topichood is a crucial grammatical notion; in the case under discussion, it determines whether or not an anaphoric relation is possible. In fact, the same elements which constitute interveners, due to their incompatibility with topichood, are precisely those elements that cannot take wide scope and serve as binders in an inverse binding configuration (e.g. negative quantifiers, Japanese *daremo*, etc.). If topic were not a single IS category, defined separately from its particular effects on the syntax, semantics, morphology, and possibly phonology, this sort of consistency across different phenomena would be entirely unexpected. In effect, we have found a way to operationalize the notion of topic, and thus make it easier to identify; those who find the definition of topic provided in chapter 2 vague can fall back on this operationalization.

The findings of this chapter relate to preceding chapters in additional respects. In working out the IS approach to WCO and variable binding, I relied not only on the basic descriptions of topics and foci, shared by most theories of IS, but also on the more contentious idea that *wh*-expressions, as well as QPs, can be topics. The hypothesis that *wh*-expressions may function as topics was defended in chapter 2, and receives further support from its utility in explaining WCO effects. In order to distinguish topics and foci, I made use of the same kinds of cues which were employed in chapter 3: *which*-phrases and d-linking via context for topics, focus particles and answers to questions for IS foci. The way in which some of these cues affect judgments suggests that they do not have a fixed, one-to-one relation with IS categories. A d-linked *wh*-phrase, for example, is a likely but not a necessary topic, and, as was also argued in chapter 2, a phrase associated with a particle like *only* or *even* tends to be interpreted as the IS focus but does not have to be. This naturally follows from the claim that IS categories are autonomous constructs, which interact with units of other levels of representation in the grammar but can be teased apart from these units.

A central idea of the dissertation is that speaker judgments are always given in a context, even if such a context is not made explicit. In some cases, the contextualization of an example by a speaker has no bearing on whether or not he is willing to accept it, but in other cases contextualization is decisive. Anaphoric relations, including those in which the antecedent is a *wh*-phrase or quantificational expression, i.e. variable binding, are a context-sensitive phenomenon of the latter type. There are two ways in which contextualization manifests itself, and both can be discerned in judgments of variable binding. On the one hand, speakers may impose a default IS articulation on a sentence, interpreting the subject as the topic and the object, or the entire VP it is part of, as the focus. This articulation may be thought of as the answer to a question under discussion, with the focus corresponding to the *wh*-expression in the question and the topic remaining constant across question and answer. The default IS articulation is what most speakers use when asked to evaluate a baseline example of inverse binding; since this is not the articulation required for binding to be successful, judgments of unacceptability ensue.

The other way in which contextualization manifests itself is interspeaker variation in judgments. Speakers can create implicit contexts other than the default context, but the ability to do so is not regulated by the grammar and differs from speaker to speaker. Adopting a non-default context and matching IS articulation for a sentence involving a WCO configuration, in a process I have labeled IS accommodation, renders the sentence relatively acceptable. To the extent that speakers report awkwardness in judging the sentence, this reflects the processing cost associated with IS accommodation.

Besides pointing to the theoretical significance of IS accommodation and its role in WCO judgments, there is an important methodological lesson to be learned from the approach to the data in this chapter. Contrary to the widespread assumption that context has no influence on speaker judgments, or that we have privileged access to a grammar in which there is no such influence, contextual effects are ubiquitous.⁹⁸ Accordingly, even if

⁹⁸ The assumption that context can be ignored in analyzing judgments is part of a dangerous tendency in the literature to equate judgments of unacceptability with ungrammaticality. Highlighting the difference between the two has been a theme of Chomsky's work since the beginning (e.g. Chomsky 1977); cf. Newmeyer (1983:52): "Only in the simplest cases does the conclusion that a sentence is ungrammatical

we are not interested in directly studying these effects, they must be taken into account. Once we have a good grasp of how context, whether explicit or implicit, influences judgments in a given set of examples, it can be factored out by being held constant across the examples.

Following up on the claim that IS is an independent level of representation, it is necessary to examine how IS interacts with other components of the grammar, and determine what these interactions tell us about the structure of the grammar as a whole. The study of WCO and variable binding is particularly informative with respect to the relation between IS and semantics. The idea that the assignment of IS labels to a sentence has semantic import, presented in chapter 2, is validated by the way in which these labels determine the possible values a pronoun can take. At least in some circumstances, a pronoun can take its value from a quantificational antecedent—i.e. be bound by the quantifier—if and only if the latter is a topic. However, this is not a primitive, and hence stipulative, condition on variable binding, but instead follows from a more basic relation between IS and semantic interpretation. As the subject of predication, a topic is evaluated first in establishing the truth value of a sentence; consequently, if the topic happens to be a quantifier, its scope, or the domain within which it can affect the interpretation of other expressions, will be the entire sentence. If, furthermore, there is a pronoun in this scope, it can be bound by the quantifier.

In terms of the architecture of the grammar, these observations indicate that IS feeds LF. The relation between the topic and the rest of the sentence is structurally represented at LF, alongside non-IS-sensitive relations. At the same time, lexical semantic properties may affect the mapping to IS categories, so that, for example, a quantificational expression which does not denote entities cannot be a topic. The bottom line is that IS mediates between the lexical content of an expression and its behavior at the level of compositional meaning. Of course, this is not to say that IS exclusively controls how propositional content is derived, nor does this mean that the surface representation plays no role in the derivation. As emphasized in this chapter, the surface structure, as well as other factors whose nature is not entirely clear, affect the placement of expressions at LF.

As for the connection between IS and syntax, this chapter implicates a structural representation of IS notions which is compatible with certain approaches to IS but not others. The fact that an adequate analysis of WCO invokes a structural relation between the topic and the remainder of the clause is a challenge for the theories of Lambrecht (1994) and Erteschik-Shir (1997). In these theories, no structural properties are attributed to IS categories and they play no role in explaining phenomena which involve IS.

At the same time, the c-command relation between topics and other constituents in the clause is instantiated only covertly, at LF, and has no necessary correlate in the overt structure. Topics are usually not associated with a fixed overt position in the tree, nor with a syntactic operation that places them above IP. The opposite is also true: the same position can house different IS categories. Furthermore, overt structural operations which are typically thought to serve a specific discourse function, such as topicalization in English, do not mark just one IS category to the exclusion of others. Consequently, the effect that these operations have on the status of variable binding configurations differs between speakers, depending on what IS category the speaker assigns to the moved constituent. We are justified, then, in assuming that the LF landing site of topics is not

follow directly from a judgment that it is unacceptable."

specialized for topics, but rather is an all-purpose position putatively created by adjunction to the highest node. Since it is often, if not always, impossible to unambiguously read the interpretation of a phrase as a topic off of the structure, encoding this interpretation in the structure would be redundant.

This conclusion about topics and their structural representation is at odds with cartographic approaches to the syntax-IS interface, in the vein of Rizzi (1997). The case against encoding IS categories directly in the syntactic tree is greatly strengthened by what the WCO data tells us about foci. These elements remain in their base position, whatever it may be, both overtly and at LF, which explains why they have narrow scope and serve as bindees in successful inverse binding configurations. The behavior of foci is a problem for cartographic approaches not just in terms of the specific structure which Rizzi has in mind. Rather, they undermine a fundamental idea of such approaches, whereby there exists a part of the clausal structure dedicated to structurally representing discourse-sensitive relations, i.e. the so-called left periphery. What we need is a way to associate topics with raising at LF alone, without this raising being driven by a feature licensed in a particular position and without movement applying to foci. Chapter 5 puts forward a model that meets these requirements.

A final interaction observed in the WCO data is that between IS, specifically IS focus, and phonology. Phonological prominence is a robust indicator of IS focus, whether or not additional cues associated with focushood are present in the sentence, such as focus particles. In English, we used such cues to promote focus interpretation and ultimately enable a bound variable reading, while in German this reading came "for free", due to alignment between the default IS articulation and the articulation needed for binding. Crucially, the position of phonological prominence in German matched the hypothesized IS articulation, falling on the phrase claimed to be the focus.

The interaction between focus and prominence brings up a longstanding question in the literature, namely, whether the former is derived from the latter, or vice versa (see Erteschik-Shir 2007 for a recent summary). Erteschik-Shir (2007) remarks that the two options can be viewed as two sides of the same coin, stress-to-focus reflecting the perspective of the speaker, who marks the focus via stress, and focus-to-stress reflecting that of the hearer, who uses stress to discern which phrase is the focus (see also chapter 3 for a description of focus-to-stress theories). However, since there is presumably only one grammar, this sort of response is unsatisfactory. Providing a comprehensive answer to the question requires addressing the broader issue of where in the derivation the IS representation stands in relation to the phonological representation; therefore, I defer further discussion to chapter 5.

Chapter 5

The Architecture of the Grammar

One of the primary goals of this dissertation, laid out in chapter 2, has been to explore the question, "Where is information structure in the grammar?". Although IS categories like topic and focus, as well as the surface cues used to mark them, are often recognized in the generative literature, broad questions of this sort about IS are rarely asked. Thus, authors tend to put IS categories to use in the analysis of a particular phenomenon without taking an explicit stand on their status in the grammar. In the syntactic literature, the cartographic approach originating in Rizzi (1997), which incorporates the IS into the syntax, is frequently assumed.

Through a careful and detailed study of two phenomena, focus intervention effects and WCO effects, in chapters 3 and 4, respectively, we have made a great deal of progress towards answering the aforementioned question. The first step in answering this question was to determine whether or not it is reasonable to postulate an autonomous IS level of representation. The data we have uncovered indicates that this is necessary: properties specific to IS categories affect the felicity of sentences, in ways that do not implicate other components of the grammar. Thus, a non-referential expression, which cannot function as a topic, will render a sentence deviant if topic is the only IS category available to it in the sentence. This deviance, labeled an intervention effect, is found even in cases where IS categories have no morphosyntactic correlate, and it is separable from the reflexes of IS categories in the phonology. The category of topic plays a role not only in determining sentence felicity, but also bears on the interpretive properties of sentences. It controls the order in which a sentence is evaluated in terms of its truth value, and as a result, indirectly affects interpretive relations involving quantifiers and pronouns, where order of evaluation is crucial. That the same IS notion, topic, has such a wide range of repercussions for different parts of the grammar is solid evidence for its status as an independent theoretical construct, as one component of the IS level of representation.

Having found evidence for the autonomy of IS, the next required step is to locate this component in the grammatical architecture. This will be the primary task of this chapter, which is structured as follows. Section 5.1 reviews the case for an autonomous IS component and against approaches which encode IS categories directly in the syntax, based on the data from focus intervention and WCO effects as well as arguments gathered from the literature. In light of this data, section 5.2 surveys existing theories which posit an IS level, singling out Zubizarreta's (1998) A-structure, Vallduví's (1990) IS, and Erteschik-Shir's (1997) f-structure. I note the strengths and shortcomings of these theories, concluding that an accurate and comprehensive model must incorporate some aspects of the existing proposals, but also differs from them in a number of ways. Such a model is described in section 5.3, which addresses both the format the IS articulation takes and its relationship to other components of the grammar. Although introduction of

an IS level of representation into the grammar requires changes to the architectures assumed in the GB and Minimalist frameworks, the final product is well-motivated and actually simplifies many of the analyses proposed under the latter frameworks.

5.1 The Autonomy of Information Structure

The primary alternative to the conception of IS as an autonomous component is the cartographic approach. Given the widespread approval that this approach enjoys in the syntactic literature, it is important to unequivocally establish that it is a flawed way to handle IS. Not only is this approach at odds with a range of empirical observations concerning the behavior of IS categories, but it is also conceptually objectionable, since IS notions are fundamentally different from conventional morphosyntactic features. In reviewing the drawbacks of the cartographic approach, we will also reintroduce various findings from chapters 3 and 4, which point to certain core properties of IS.

As described in chapter 3, the syntactic encoding of IS categories in the cartographic approach is implemented via features—chiefly [topic] and [focus]—and their corresponding functional projections, TopP and FocP. These projections are situated in a domain of the sentence above IP, labeled the left periphery. Topic and focus are basically morphosyntactic notions under such an approach, comparable to tense or Case features, and attract relevant syntactic constituents for feature checking purposes. Thus, informational meaning can be read off of the syntactic structure. Although the appeal of the cartographic approach is clear, given the existence of syntactic operations which seem to target specific IS categories (e.g. topicalization in English), there are many reasons to doubt this kind of approach.

Empirical problems with the cartographic approach pertain both to the specific structure assumed by Rizzi (1997) and to more basic features of the approach. One such problem concerns the idea that foci raise to a left peripheral position. We claimed in chapter 4 that foci do not move at LF, since leaving them in situ allows us to account for the scopal properties of foci, and ultimately for the distribution of WCO effects. The reanalysis of WCO removes a key piece of data used to argue for LF focus movement; moreover, this movement is not semantically necessary (Rooth 1996a, Wold 1998), and there is plenty of direct evidence against it which is not specific to our account of WCO (see Newmeyer 2004 for a summary). For example, LF movement would have to apply to foci which do not correspond to syntactic constituents (Jackendoff 1972, Zubizarreta 1998), as in (593), where the focus spans the subject and verb.

- (593) a. What about Mary? What happened to HER? (=21)
 b. [_{FOC} John INSULTED] [_{TOP} Mary].

In addition, LF focus movement would have to ignore islands (Jackendoff 1972), such as the sentential subject in (594) and the relative clause in (595).

- (594) [That Linda argued with [_{FOC} the CHAIRMAN]] is surprising.

- (595) Even [the paper [that [_{FOC} LUCIE] submitted to our journal]] was weak.
 (Reinhart 1991, in Newmeyer 2004:405)

As for overt focus movement, I assume two possible analyses, whose distribution depends on the language and construction in question. One possibility, following Horvath (2010), is that such movement is driven by phonological or semantic considerations.

Horvath shows that the exemplar case of overt focus movement, in Hungarian, is unrelated to the notion of IS focus, and instead is motivated by a semantic feature, exhaustivity. Similarly, É. Kiss (1998) associates foci that undergo movement, "identificational foci" in her terms, with such a feature. The second option is that alleged movement of a focus phrase actually amounts to movement of another phrase. In Catalan, for instance, structures involving a clause-initial focus (so-called focus preposing) are derived through right-dislocation of phrases other than the focus, while the focus remains in situ (Vallduví 1990). To conclude, whatever mechanism gives rise to the impression that an IS focus is displaced from its base position, this mechanism does not displace foci per se.

The hierarchical structure posited by Rizzi has also been critiqued on the basis of its incompatibility with language-specific word order patterns (e.g. Pereltsvaig 2004 on Italian and Russian, Neeleman and van de Koot 2008 on Dutch). In any case, the conclusion that IS foci do not move is sufficient by itself to contest a tenet of the cartographic approach; namely, that discourse-sensitive notions are encoded in features which drive movement, and that such movement uniformly targets a unique part of the clause structure, the left periphery or C domain. Rizzi's motivation for proposing this division of the clause—the supposed affinity between the properties associated with topics and foci and those characterizing other elements in the C domain (*wh*-phrases, relative pronouns, etc.)—is questionable as well. *Wh*-phrases do not share a consistent IS category, as we have observed throughout this dissertation; what characterizes them is a fixed semantics and the fact that they are associated with a particular sentence type. Thus, they can occur multiple times in a clause, unlike topics and foci, and move independently of IS considerations in languages that structurally indicate these considerations, such as Catalan.

Another empirical shortcoming of the cartographic approach emerges in the context of focus intervention effects, where a proper analysis must invoke IS well-formedness conditions. Insofar as IS notions are nothing but features in the phrase structure, it is not clear how they could impose non-syntactic requirements on the sentence. For example, the requirement that topics be referential and the constraint on the number of foci per clause do not lend themselves to a syntactic representation.¹ These requirements indicate that, contrary to the predictions of the cartographic framework, IS categories are constrained in ways which are unique to them and do not implicate the syntax.

Moving on to conceptual aspects of the cartographic approach, two crucial issues arise. First is the matter of how IS categories are understood under this approach; I see three problems with the notion of these categories as morphosyntactic features, on a par with tense or Case. For one thing, IS categories are assigned to phrases—noun phrases, verb phrases, prepositional phrases, and combinations thereof—and not to lexical items.²

¹ Rizzi (1997) claims that the limit on foci amounts to a restriction on the type of material that may be contained in the complement of Foc^0 (i.e. the complement cannot include another focus). However, as Neeleman and van de Koot (2008) point out, standard functional projections do not impose conditions on the material in their complement.

² Alert readers may object to this statement, noting that there are a variety of cases in which IS foci do not seem to correspond to syntactic phrases. One type of case, where the focus spans multiple constituents that do not combine to form a syntactic phrase, such as a focus consisting of a subject and verb, will be dealt with below. Another class of examples, in which the focus is less than a phrase, has been excluded from consideration in this dissertation, and is treated separately in other studies of IS as well (e.g. Erteschik-Shir

To quote Lambrecht (1994:215):

"... information structure is not concerned with words and their meanings, nor with the relations between the meanings of words and those of phrases or sentences, but with the pragmatic construal of the relations between entities and states of affairs in given discourse situations. Entities and states of affairs are syntactically expressed in phrasal categories, not in lexical items."

In (596), for example, the topic is the entire complex DP *the boy with the blue shirt*, and not any subpart of this phrase.

- (596) a. What about the boy with the blue shirt? What did HE do? (=34)
b. [_{TOP} The boy with the blue shirt] [_{FOC} insulted MARY].

This status of IS categories is particularly problematic for Aboh's (2010) version of the cartographic approach, according to which IS features are part of the numeration; phrases are undoubtedly not available in the numeration.

A second problem with the conception of IS categories as morphosyntactic features is the fact that the IS articulation is by definition a property of a sentence in a context. While the morphosyntactic properties of an item, such as subjecthood and accusative Case, are determined *within the sentence*, topichood, focushood, and tailhood are determined by properties *outside the sentence*. A phrase functions as a focus, for instance, by virtue of being the answer to a question, so that the same phrase will be a focus in one context but not in another. This aspect of IS categories connects to a third and final problem with the way in which they are viewed under the cartographic approach.

Consider a derivation in which morphosyntactic features are not properly assigned (or checked; the specific mechanism involved is irrelevant here): the derivation will crash. In other words, the sentence is ungrammatical. Conversely, the assignment of an inappropriate IS category to a phrase results in a sentence which does not fit a particular context. We call this infelicity, rather than ungrammaticality, since the sentence *is* generated by the grammar. An example of this distinction is given in the question-answer pairs in (597)-(599). (597b) is well-formed in terms of the Case of the subject and object, overtly manifested in the morphological case of the object pronoun, and in terms of the IS categories, which fit the question. In (598b), the IS categories are mismatched, as indicated by the prominence on the object, instead of the subject, and in (599b) it is the Case features which have been incorrectly assigned, reflected in the nominative form of the object. Crucially, the status of the answers in (598) vs. (599) is not the same, and naïve speakers will make this distinction. (598b) is fine as the answer to the question *Who did John insult?*, but (599b) is never acceptable. Within the cartographic framework, however, the two sentences cannot be distinguished; both involve violations of well-formedness conditions on morphosyntactic features.

- (597) a. Who insulted Mary?
b. [_{FOC} JOHN] insulted [_{TOP} her].

1997, Zubizarreta 1998); these foci possibly reflect a separate dimension of discourse structure. They include verum focus, where the polarity of the proposition is emphasized, as in (i).

(i) You are right. Mary DID lie to me.

- (598) a. Who insulted Mary?
 b. #_[TOP John] insulted _[FOC HER].
- (599) a. Who insulted Mary?
 b. *_[FOC JOHN] insulted _[TOP she].

Alongside the problematic view of IS notions as morphosyntactic features, there is a second conceptual reason to question the cartographic approach. This is the way in which the approach deals with optionality; essentially, it is forced to assume that IS categories are optional, given that it views IS in syntactic terms, and languages do not obligatorily encode IS notions in their syntax. Thus, Rizzi (1997:288) suggests that "it is reasonable to assume that the topic-focus system is present in a structure only if 'needed', i.e. when a constituent bears topic or focus features to be sanctioned by a Spec-head criterion."

Contrary to what Rizzi has in mind, the IS articulation is not an optional property of sentences, and topics and foci in particular are mandatory components of every articulation. Sentences are never neutral in IS terms because every sentence is associated with a context (Lambrecht 1994, Zubizarreta 1998), whether this context is explicit or not. This was illustrated in chapter 1 with examples whose interpretation depends on the implicit context, and is a key component of the analysis in chapter 4: in judging out-of-the-blue sentences involving a WCO configuration, speakers create a context, or question under discussion, on the fly. The IS articulation corresponding to this default context obstructs variable binding in English, but facilitates binding in German.

Not only does every sentence have an IS articulation, but every element of the sentence is mapped onto an IS category. That is, every element either contributes information to the knowledge store of the hearer or serves to anchor the information carried by other elements, so that it is properly entered into the knowledge store. Just as the logico-semantic meaning of a sentence is composed of the lexical meanings of individual words, its informational meaning is formed by the combination of the IS categories assigned to these words.

What Rizzi is attempting to deal with by making IS features optional is the non-deterministic relationship between IS and syntax: IS categories are not realized in a unique syntactic position, and a given position can host different IS categories. This is true even of positions in structures which are often thought to be exclusively linked to one IS category, such as topicalization in English. Thus, a topic in English does not have to be topicalized, and what we (confusingly) call topicalization is not restricted to topics (Prince 1997). On the flip side of topicalization, there are constructions like passivization, whose derivation is normally analyzed without any mention of IS categories. However, passives may be used for IS purposes, to promote the interpretation of the theme as the topic and preclude this interpretation of the agent (see chapter 4). From our perspective, the fact that the results of a syntactic operation can be used by IS does not show that the operation is triggered by IS. Conversely, Rizzian analyses which appeal to IS functions in explaining topicalization, but leave them out of passivization, are difficult to justify.

The absence of a consistent association between IS categories and syntactic positions is, I posit, not specific to English. Although claims that there is such an association in certain cases have been put forward in the literature, the prototypical examples invoked to support these claims do not stand up to scrutiny. For example, Hungarian focus reduces to semantic considerations, as noted above, and the existence of morphemes used to mark IS categories (e.g. Japanese *-wa* and the Gungbe focus morpheme illustrated in chapter 2)

does not in and of itself prove anything regarding the syntax. The common assumption that these morphemes are overt realizations of functional heads is motivated by conceptual arguments rather than incontrovertible syntactic evidence.

A discussion of the relation between IS and syntax would not be complete without taking into account two additional types of languages. First, there exist languages claimed to have a fixed focus position, which is generally either preverbal (e.g. Basque; see chapter 2 and Arregi 2002) or clause-final (cf. Italian, discussed in chapter 4).³ In some of these languages the position is not linked to a semantic function, making them different from the abovementioned case of Hungarian, while others have not been analyzed in sufficient depth to permit an unequivocal conclusion about the nature of their supposed focus position. A second class of languages applies overt movement operations to topics and tails; Catalan is a prime example. These two types of languages are naturally more difficult to accommodate under the hypothesis that there is no consistent IS-syntax relation, and to conclusively prove that they do not refute the hypothesis would require an independent study of their syntactic, semantic, phonological, and IS features. Within the confines of this dissertation, I will only point out a number of ways in which the behavior of the aforementioned languages does not support the cartographic position.

First, an analysis of the fixed focus languages does not require the cartographic assumption that focus is realized in the specifier of a specialized projection. The terms used to describe the focus position in these languages—"preverbal" or "clause-final"—do not necessarily pick out a single syntactic position. Instead, they may identify a position in the IS representation or a position relative to a phonological boundary; this idea is supported by evidence that IS categories in Italian and Russian are limited to positions defined in linear, rather than hierarchical, terms (Pereltsvaig 2004). The syntax is then indirectly constrained: a sentence is acceptable only if the syntactic position of the focus aligns with the position required in the IS or phonological representation. If the IS representation dictates the position of focus, we predict that the status of a sentence with a misplaced focus is akin to (598b); that is, it exhibits IS infelicity and not syntactic ungrammaticality. To the extent that phonology is involved, this take on fixed focus languages is similar to the focus-to-stress theories mentioned in chapter 3 (Reinhart 1995, 2006, Zubizarreta 1998, a.o.), which reduce the placement of focus to the alignment between focus and sentential stress. Unlike such theories, however, we need not assume direct interaction between PF and LF insofar as there is an IS component mediating between the two (see section 5.3).

As for languages like Catalan, the widely accepted analysis of Vallduví (1990), which we have adopted here, posits adjunction of links and tails to IP. Again, contra the cartographic approach, no specialized TopP and TailP projections are assumed (and certainly no FocP, which would be at odds with the fact that foci in Catalan remain in situ). Furthermore, the elements that undergo left-dislocation in Catalan, links, are only a subclass of topics, namely, new or shift topics; continuing topics do not move. Lastly, even in Catalan, canonical word order—i.e. retaining links and tails in situ—is almost always possible, perhaps with the exception of links in a very contrastive context (Laia Mayol, p.c.).

³ Languages like Italian are also known in the literature on focal typology as word order languages, since the placement of the focus is fixed in terms of word order, compared to intonation languages, such as English, where focus is freely assigned and the prominence pattern changes accordingly.

Regardless of what further inquiry into languages like Basque and Catalan might yield, Rizzi (1997) essentially concedes that IS categories and phrase structure do not stand in a one-to-one relation, as reflected in the quote above. The fact that IS-related syntactic operations like topicalization are optional in this way distinguishes them from standard cases of feature-driven movement, such as *wh*-movement. Moreover, as Neeleman and van de Koot (2008) and Horvath (2010) note, strategies proffered in the cartographic literature to handle this property of IS-related movement are questionable. Attributing optionality to IS features or to their projections is stipulative, and allowing the relevant projection to appear only when needed is also contrary to the typical behavior of functional projections.

The assessment of the cartographic framework has been useful in exposing the flaws of this framework and in identifying key properties of IS, some of which will inform the architecture of the grammar I will eventually put forward. Before turning to this architecture, it is appropriate to evaluate other proposals to replace the traditional T-model with an architecture including an IS component. In discussing these proposals, we will examine both the way in which they represent IS and the grammatical architecture which the IS representations are embedded in.

5.2 Existing Architectures

The idea that there exists a level of representation which encodes IS notions is not novel, but rather has been previously presented in various forms in the generative literature. In this section we will specifically consider Zubizarreta's (1998) A-structure, Vallduví's (1990) Information Structure, and Erteschik-Shir's (1997) f-structure as models of IS. These models are relevant here because they are relatively comprehensive, treating multiple dimensions of IS and integrating the IS level of representation in a general architecture of the grammar.

5.2.1 Zubizarreta (1998)

Zubizarreta (1998) puts forward a model of IS as part of an analysis of word order in the Romance and Germanic languages. This analysis falls under the group of focus-to-stress mapping theories, whereby movement in some cases is motivated by the requirement that the focus surface in the nuclear stress position. For example, this prosodically motivated movement, or *p*-movement in Zubizarreta's terms, is posited to account for the position of the element answering a subject *wh*-question in Italian. The subject focus appears in the clause-final nuclear stress position, rather than the canonical preverbal subject position, because the VP raises and adjoins to a higher VP node.

Focus is thus a central notion of Zubizarreta's theory. It is encoded via a diacritic [F] in an annotated syntactic structure labeled F-structure, as illustrated for the broad focus in (600), the narrow focus on the object in (601), and the narrow focus on subject and verb in (602).

- (600) a. What happened?
 b. [_F John [ate [_F the pie]]].
- (601) a. What did John eat?
 b. [John [ate [_F the pie]]].

- (602) a. What happened to the pie?
 b. $[[_F \text{ John}] [_F \text{ ate}] [\text{the pie}]]$.

The interpretation of F-structure takes place at a level of representation called the Assertion Structure (AS), derived from LF by a set of interpretive rules. Interpretation at AS is intended as a means to do away with LF focus movement, whose dubious status was highlighted in the previous section. At the same time, AS allows Zubizarreta to retain the treatment of IS focus as a quantifier-type element, creating an operator-variable structure at some level of representation (see below). AS is also motivated by Zubizarreta's finding, which we greatly expanded on in chapter 4, that variable binding is sensitive to IS considerations and therefore cannot be handled entirely at LF.

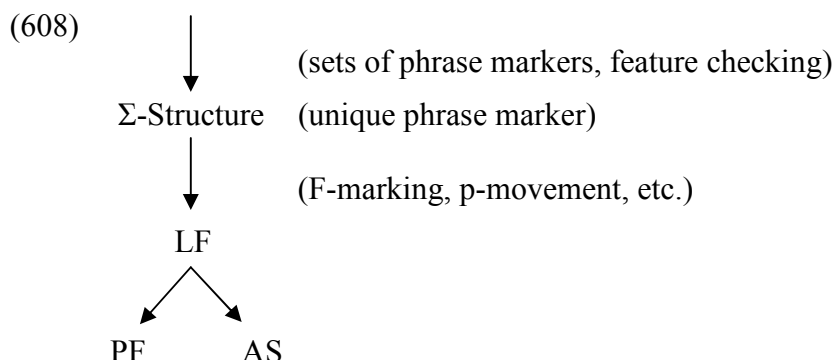
AS is basically a linear semantic representation, consisting of two ordered assertions. The first is the background assertion, which expresses the existential presupposition of a context question (A_1), and the second is the main assertion (A_2), which is an equative relation between a definite variable, whose restriction is the aforementioned presupposition, and a value. (603), (604), and (605) are the ASs of (600), (601), and (602), respectively.

- (603) A_1 : there is an x , such that x happened
 A_2 : the x , such that x happened = [John [ate the pie]]
- (604) A_1 : there is an x , such that John ate x
 A_2 : the x , such that John ate x = the pie
- (605) A_1 : there is an x , such that x happened to the pie
 A_2 : the x , such that x happened to the pie _{i} = [John [ate it _{i}]]

The IS category of topic is also incorporated into the AS, specifically as the subject of an open propositional predicate in the background assertion. Thus, the AS for the sentence in (606b), where the object *the beans* is the topic, is (607).

- (606) a. What about the beans? Who ate them?
 b. $[_F \text{ Fred}]$ ate the beans.
- (607) A_1 : the beans _{y} \ there is an x , such that x ate y
 A_2 : the beans _{y} \ the x (such that x ate y) = Fred

Zubizarreta embeds the AS, as well as other components of her analysis, in the grammatical architecture (608), which is somewhat different from the standard T-model.



The key features of this architecture are as follows. First, AS is distinct from and follows LF, since it is a level of semantic representation not connected to the hierarchical structures posited at Spell-Out and LF. Second, there is a stretch of the derivation which follows all syntactically driven movement, represented at Σ -Structure, but precedes LF. It is to this portion of the derivation that the components of the grammar responsible for p-movement are attributed, thereby satisfying two requirements. The first requirement is that these components be defined over a single phrase marker, because they refer to relations between categories rather than individual items. Second, allowing the rules deriving p-movement to apply between Σ -Structure and LF avoids direct PF-LF interactions. Such prohibited interactions would be expected otherwise, given that the p-movement rules refer to both semantic and phonological features.

Zubizarreta's conception of how IS is represented in the grammar is something of a compromise between different approaches to the issue. On the one hand, Zubizarreta reaches the conclusion that a level encoding IS notions needs to be included in the grammatical representation of the sentence. In this respect, her model differs from that assumed by much of the current literature. On the other hand, she retains ideas from theories which do not posit an IS level; some of these ideas are problematic and others simply create redundancy in the system. In addition, the level of AS is relegated to a peripheral position in the architecture, meaning that it cannot serve as a source of explanation for many phenomena.

Let us enumerate a few aspects of Zubizarreta's theory which will not be carried over into the model proposed here. In terms of the representation of IS, we have rejected Zubizarreta's conception of the focus-ground partition as a focus-presupposition structure. The complement to the focus does not have the status of an existential presupposition (see chapters 2 and 4), since, among other things, this leaves constituents for which an existential presupposition cannot be constructed, such as negative quantifiers, out of the definition of focus.

Zubizarreta's treatment of topics is incomplete. Though she recognizes the topic as the subject of predication, this only affects the AS assertions, where the topic is placed first, and has no bearing on LF. As a result, predication is determined at AS, while scope and variable binding are separated, the first applying at LF and the second either at LF or at AS. As argued at length in chapter 4, it is possible to unify the structures needed for predication, scope, and variable binding, and thus avoid the complicated mechanics involved in Zubizarreta's model. In fact, because these mechanics are never fully spelled out, one is left wondering exactly how they work. It is not clear to me, for example, how variable binding is computed, since it can call on information from both LF and AS. The former must be checked to see that the operator takes scope over the pronoun, and in the latter representation the operator must (sometimes) function as a topic.

A form of redundancy which characterizes Zubizarreta's theory and which I have attempted to eliminate is IS features in the syntax. In addition to the [F] feature mentioned above, Zubizarreta retains an optional morphosyntactic feature "focus", which attracts [F]-marked constituents to its specifier. "Focus" would putatively come into play in cases where movement of a focus seems unrelated to the prosody or semantics. I have hypothesized above that such cases do not exist; at any rate, Zubizarreta's claim regarding the interaction between [F] and "focus" is puzzling, given that the former is assigned only after all syntactically driven movement has been completed, between Σ -Structure and LF.

Topics are also associated with a morphosyntactic "topic" feature which drives movement, beyond their representation at AS.

As should be obvious from the use of features like "topic" and "focus", which are tied to appropriate functional projections, Zubizarreta in effect adopts much of the cartographic framework. Because she also posits the notion of p-movement and AS, the end result is that IS is represented in three different places in the grammatical architecture, each of which reflects a different facet of IS. Syntax-related aspects of IS are manifested in the derivation of Σ -Structure, the stretch between Σ -Structure and LF encodes movements relating prosody and IS, and AS represents interpretive aspects of IS. Clearly, this is not a very elegant outcome, one which in my opinion can be avoided. Section 5.3 provides the relevant details.

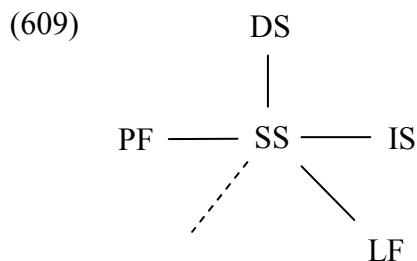
5.2.2 Vallduví (1990)

The model of IS put forward by Vallduví (1990) should be familiar by now. Vallduví's conception of IS in terms of its categories, how they are manifested in the overt structure, and how they translate into information packaging instructions, has been described in chapter 2 and made use of in the subsequent case studies. Accordingly, I focus here on broad architectural features of his model.

The IS categories in Vallduví's model are labels on a level of IS, just as logico-semantic notions are annotated on a structural representation known as LF. Like LF, IS has a hierarchical format, and it interfaces between the surface structure and an interpretive module, informatics. As an interface, IS represents informational meaning either when the meaning is generated by the informatics and then mapped onto the surface structure, or when this meaning is read off of the surface structure, on its way to be interpreted in the informatics.

Although this view of the IS level is very much in line with the model advocated here, Vallduví's case for a hierarchical format is rather unconvincing. Specifically, he invokes the overt structural representation of IS notions in Catalan, assuming by analogy that the same representation is instantiated universally, albeit covertly in a language like English. Whatever the merits of this type of analogy, more direct evidence for a hierarchical structure is obviously desirable. Furthermore, the appeal to Catalan is undermined by the fact that the generalization regarding topics in this language applies only to the subset of links, and by the claim made in the previous section, that there is no one-to-one mapping between syntax and IS, even in Catalan.

Vallduví's IS is part of the grammatical architecture he proposes in (609).



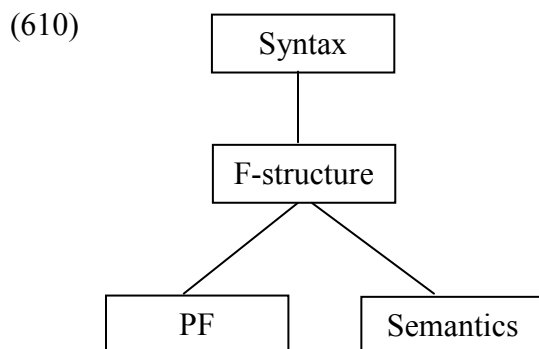
We can ignore the aspects of this architecture which are specific to the GB tradition in which Vallduví is working, that is, the levels of D- and S-structure. What is important for our purposes is that IS does not directly interact with PF or LF in this model. The need to

keep IS and LF apart is stressed by Vallduví, who points out the different types of meaning each level is devoted to, and gives a number of empirical arguments against merging the two. Thus, he establishes that truth-conditional *only*-type operators do not always coincide with IS focus (see section 2.3), and he asserts that quantificational expressions may occupy different positions at IS vs. LF. A quantifier which functions as the focus will stay in situ at IS but raise at LF, according to Vallduví, since he presupposes May's (1977, 1985) view of quantifier behavior at LF. More persuasive evidence for the independence of IS and LF was found in chapter 4 of this study; at the same time, however, the phenomena addressed in this chapter—predication, scope, and variable binding—clearly indicate that IS does have some bearing on LF without any involvement of the overt structure. Vallduví's take on the relationship between the two levels, then, is not entirely accurate. Similarly, there is good reason to assume a direct link between IS and PF, allowing the former to regulate the placement of sentential prominence in the latter. The architecture I outline below aims to remedy these flaws.

5.2.3 Erteschik-Shir (1997)

The third and final model of IS to be discussed here is perhaps the closest in architectural terms to the one we will end up with in the following section. Erteschik-Shir (1997) proposes a sweeping rethinking of the architecture of the grammar, in light of her theory of IS. According to Erteschik-Shir, there is a level of representation—focus structure (f-structure)—where foci and topics are marked.⁴ This level has its own interpretation rules, which follow Reinhart's (1981) idea of the common ground as a set of file cards and resemble the information packaging instructions adopted here from Vallduví (1990). In terms of format, Erteschik-Shir states that f-structure is comparable to LF, that is, a hierarchical representation allowing movement that is not reflected in the surface string.

F-structure occupies a key position in the grammatical architecture, feeding not only PF but also the semantic interpretation, as schematized in (610).



F-structure provides the input for the PF stress rule, which assigns stress to all focus constituents and which will be addressed further in the next section. On the meaning side, all semantic relations are marked in f-structure and hence semantics has no level of representation of its own; that is, there is no LF.

Erteschik-Shir's initial motivation for eliminating LF comes from the connection she

⁴ Erteschik-Shir explicitly states that "topic and focus are the only information structure primitives needed to account for all information structure phenomena" (p. 7). Given the evidence for the existence of tails and their significance in analyzing certain phenomena, this is an unwelcome omission.

makes between topichood and the assignment of truth values. She then goes through a long list of phenomena which are typically claimed to have a syntactic and/or semantic basis and suggests alternative IS explanations. These phenomena range from donkey anaphora, through Superiority, to scope and binding, which are especially relevant here. Wide scope is linked to topichood and is thus represented at f-structure, making QR at LF superfluous. Erteschik-Shir does not associate variable binding with scope, but instead subsumes it under a broader class of phenomena labeled identificational dependencies (I-dependencies). An I-dependency is a dependency in which the identity of a dependent (a pronoun, *wh*-phrase, trace, etc.) is fixed by its antecedent; Erteschik-Shir claims that this type of dependency requires that the dependent element be in the focus. Besides variable binding, an I-dependency also underlies reflexive binding, *wh*-phrases in multiple *wh*-questions, and the interpretation of quantifiers in *wh*-questions. Finally, to account for WCO effects in *wh*-questions, Erteschik-Shir makes reference to an additional constraint whose details are not important here, and thereby dissociates this phenomenon from WCO effects in QP contexts.

Some of Erteschik-Shir's ideas concerning IS have been taken up in this study, such as the notion of stage topic, and the IS-based accounts she offers justify further consideration as substitutes for existing syntactic and semantic explanations. Additionally, an architecture of the sort she presents, in which IS mediates between the syntax and other levels of representation, is attractive insofar as it abolishes the need for IS-related features in the syntax.

However, Erteschik-Shir's attempt to do without LF is overly ambitious, as are some of the generalizations invoked. For example, the analysis of scope captures the basic intuition which was fleshed out in chapter 4, but overlooks scope processes which do not exhibit IS sensitivity. For example, QPs scope out of DPs regardless of their IS status, and surface scope does not hinge on the wide scoping element functioning as a topic. The treatment of variable binding relations in Erteschik-Shir's theory neglects their connection to scope and equates them with reflexive binding. Contra Erteschik-Shir, the two types of relations are not governed by the same constraints; in particular, reflexive binding is not susceptible to IS manipulations, and therefore the unacceptability of (612b), unlike that of (611b), holds irrespective of the IS status of the reflexive pronoun.

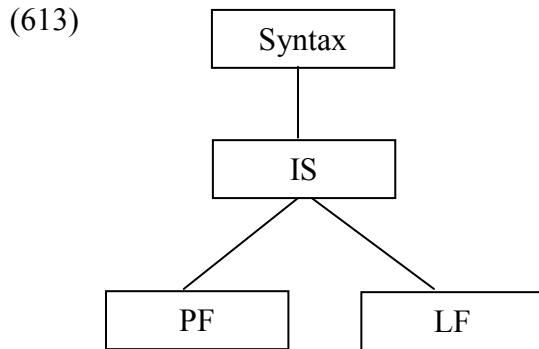
- (611) a. Who will accompany every boy the first day of school?
 b. [_{FOC} *His* MOTHER] will accompany *every boy* the first day of school.
- (612) a. Who talked to John?
 b. *_[FOC HIMSELF] talked to John.

In all of the analyses, Erteschik-Shir does not appeal to the structural aspects of f-structure which she herself posits, arguably making certain analyses more complicated and unintuitive than they need to be. At any rate, I have concluded that LF is a necessary component of the grammar, and so there is no need to try and fit everything within f-structure.

5.3 The Proposal

The previous section gave us an idea of the considerations that go into a model of IS and its placement vis-à-vis other components of the grammar. Though the theories available in the literature have many positive features, they were obviously devised without taking

into account the findings of this study. Given these findings, as well as general criteria of parsimony and elegance, I propose the grammatical architecture in (613):



Let us go through the various pieces of this architecture and assess the motivation for them. First is the relationship between the IS and syntax: the syntactic structure serves as input to the IS. It cannot be the other way around, i.e. the IS feeding the syntax, because this would amount to a cartographic conception of IS, and therefore raises the same problems which led us to reject the cartographic approach. First, the IS would not have the phrases it needs to work with, and second, sentences which are infelicitous in a specific context would not be generated by the grammar. These sentences are in fact generated by the grammar; accordingly, speakers do not attribute to them the same status as ungrammatical sentences. In addition, if the IS provided input to the syntax, a fixed relation between IS categories and syntactic positions would be expected, on a par with the way in which syntax treats other features which feed into it (e.g. the features relevant to *wh*-movement). The existence of IS labels without a consistent reflex in the syntax would then have to be accommodated by building optionality into the syntax, a result which is best avoided.

The conclusion that the syntax feeds IS connects to a number of important issues. For one thing, there arise questions about the nature of the IS component and the format of the representation at IS. Since IS receives a hierarchical structure as input from the computational system, and such a structure is used by the level it feeds, LF, it seems inevitable that the representation at IS should also be hierarchical. However, IS itself does not manipulate this structure; in fact, I maintain that it does not see the hierarchical structure. Instead, IS is a procedure that scans the structure and annotates it with IS labels, which serve as instructions to LF and PF, as described below.

The conception of IS as an annotation procedure on existing syntactic trees enables us to capture a number of observations. First, it accords with the claim that movement of topics which is triggered by IS occurs only at LF, and is hence covert. If movement were carried out at IS, we would expect it to always have an overt reflex at PF. Second, the idea that IS, as a labeling procedure, is blind to syntactic constituenthood explains why there exist mismatches between IS categories and syntactic constituents. We have already encountered an example in which an IS category does not coincide with a constituent, repeated below in (614); additional relevant examples are provided in (615)-(617).

- (614) a. What about Mary? What happened to HER? (=21)
 b. [FOC John INSULTED] [TOP Mary].

- (615) a. What did John do with the BOOK?
 b. John [_{FOC} gave [_{TOP} the book] to MARY].⁵
- (616) a. We sat around the campfire last night, telling all sorts of stories about bats.
 Then, today guess what happened?
 b. [_{FOC} MARY bought a BOOK about [_{TOP} bats]]. (von Stechow 1994:56)
- (617) a. What about the nametags? Who gave THEM to the guests? (=24)
 b. [_{FOC} MARY] gave [_{TOP} the nametags] to the guests.

In the sentences (614)-(616), the non-constituent is a focus, while in (617) it is a tail. In addition, (615)-(616) differ from (614) in that the topic occurs inside the focus, which in (615) creates a discontinuous focus.

These examples pose a challenge only under the assumption that IS categories must be syntactic constituents (cf., for example, Zubizarreta 1998). However, this assumption does not appear to be rooted in empirical findings or a compelling theoretical argument, but rather has its origins in the QR analysis of focus popular in the 1970s, which we have repeatedly ruled out here. By replacing theories that treat IS categories as part of the syntax and/or LF with the proposed conception of IS, we have removed any basis for this assumption. As labels imposed on a hierarchical structure, IS categories need not fully correspond to the units of this structure.⁶ In this sense, they resemble prosodic constituents, which are similarly non-isomorphic to the syntactic structure. Furthermore, if an IS category nevertheless functions like a syntactic unit in one respect, we expect it to do so in other respects as well. This may well be what we find with topics, which match syntactic constituents and are perhaps the only IS category to undergo movement at LF.

The claim that the syntax precedes IS, so that the syntactic structure is fully derived before IS categories are assigned, means that syntactic operations cannot be driven by IS factors. Within a standard model of the grammar, operations are carried out based only on the information available at the current and previous stages in the derivation, and therefore the syntax cannot look ahead into the IS component. Entirely divorcing the syntax from IS requires multiple structures to be compiled by the former and then evaluated by the latter; nonetheless, this idea is well-motivated. From a descriptive point of view, we have already noted that the connection between IS categories and structural positions is much more flexible than current syntactic theories hypothesize, justifying a separation of the two in the grammar. Moreover, in failing to divorce syntactic operations from IS factors, these theories are inconsistent—encoding functional considerations in some cases but not others—and also deviate from the fundamental assumption of the autonomy of syntax.

Having excluded the possibility of IS-driven movement, we are left with two options for analyzing movement described as such (e.g. topicalization). On the one hand, it can be triggered by the conventional mechanism underlying movement, namely, a formal, uninterpretable feature. While appearing to be optional, this movement would be required from the perspective of the computational system: the feature is not present when no such movement is observed, and if it is in the derivation, movement must apply. On the other

⁵ The verb and indirect object here do form a constituent under the VP shell analysis of Larson (1988).

⁶ Recall from chapter 3 that there may also be mismatches between syntactic clausehood and the IS articulation, so that two clauses may constitute a single articulation.

hand, at least some cases of movement that realizes purely discourse-relevant notions may be interface-driven, as Horvath (2010) suggests and as was discussed above in the context of focus movement. The optionality of the latter, contrasting with the obligatoriness of feature-driven movement, would then be linked to their distinct triggers.

To complete the discussion of the syntax-IS relation, let us review a couple of observations which have been raised in the literature as instances of a direct link between the two components, and consider how they are accounted for under the novel architecture in (613). First, the crosslinguistic tendency of topics to appear at the left edge of the clause, whatever the syntactic operation that gets them there (topicalization, scrambling, etc.), is motivated by economy considerations. That is to say, the annotation of constituents at the left edge as topics achieves alignment between the surface structure and the LF representation.⁷ Given the proposed architecture, this tendency must be a matter of annotation: it is not that topics tend to move to the left edge, but rather that elements at the left edge tend to be annotated, and hence interpreted, as topics.

A second type of observation that has been used to justify a direct connection between the syntax and IS is the existence of what I called fixed focus languages in section 5.1.⁸ Within the novel grammatical architecture, these languages can be accounted for by imputing language-specific annotation schemes to the IS component. In Italian, the focus label is restricted to the clause-final element, while in languages like Basque or Malayalam it must immediately precede the verb. Structures that do not allow the IS annotation procedure to be executed are filtered out, such as an answer to a subject *wh*-question in Italian with a preverbal subject. There is nothing unusual about the postulation of IS-related constraints and the filtering out of structures which are in violation of these constraints, given that the same process must apply to structures that do not adhere to the IS well-formedness conditions discussed in chapter 3. I leave open the precise formulation of the IS annotation constraints, i.e. whether they make reference to clause edges, grammatical functions, etc.; importantly, however, they need not be expressed in terms of positions in the syntactic tree, in line with the claim that IS does not see this tree. I also allow for the possibility, mentioned in section 5.1, that phonological constraints which prohibit certain prominence patterns figure in the distribution of focus. Such constraints would come into play at PF, after prominence has been assigned to the constituent annotated as the focus.

Lastly, there is the matter of morphemes associated with IS, found *inter alia* in Japanese and Gungbe. I propose to analyze these morphemes as the spell-out of IS labels at PF, rather than the realization of topic and focus heads, as in the Rizian framework (e.g. Aboh 2007). They are then akin to phonological prominence; like prominence, the morphemes do not indicate a particular position in the syntax, but nevertheless can have a limited distribution due to constraints on the assignment of IS categories. Furthermore,

⁷ See Neeleman and van de Koot (2008) for a similar proposal to explain the distribution of IS categories, formulated in terms of rules mapping syntactic representations onto IS representations.

⁸ It is not clear to me to what extent these are fixed focus languages, as opposed to languages with a fixed IS articulation. In order to tease apart the two options, one would have to test sentences with more than two arguments (for example, as answers to questions) and see whether word order is constrained among the non-focus constituents. However, because the languages in question do not necessarily mark topics, variable ordering among the non-focus constituents cannot be taken as conclusive evidence for free placement of the topic. In any case, I am not aware of such work on these languages.

they may differ from syntactic operations in unambiguously encoding topics or foci precisely because they are PF realizations of these IS categories.

A second component of the architecture in (613) is the link between IS and LF. In separating these two representations, we follow Vallduví (1990), supplemented by various observations from this dissertation. These are cases in which the truth-conditional semantics of an expression remains constant even as its IS status does not. Particularly noteworthy are *wh*-expressions, quantifiers, and the associates of *only*-type operators, since it is commonly presumed that their IS status is either fixed (*wh*-expressions and associates of *only*-type operators as foci) or restricted (quantifiers cannot be topics). These assumptions are misguided; what is permanent about these expressions is just their semantics. Evidence of a similar sort for the distinction between IS and LF is provided by scope and variable binding, which are independent of IS in certain respects. Each level has its own interface with the conceptual-intentional system, so that the interpretation of informational meaning and logico-semantic meaning is carried out separately.

The fact that scope and variable binding relations, as well as the predication structure, are affected by IS considerations leads us to diverge from Vallduví and represent IS as feeding LF. LF interprets the labels assigned by IS in a uniform way, universally taking the topic label as an instruction to raise and adjoin the phrase assigned this label to the highest maximal projection, as described in chapter 4. That LF is invariant, because it is inaccessible to the language learner, is a widely held assumption; it thus differs from IS, which includes language-specific annotation constraints, and from PF, whose marking of topics and foci varies crosslinguistically.

The final relationship left to discuss is that between IS and the intonational phonology, which is encoded in the PF representation. This relationship essentially amounts to the requirement that IS foci be indicated via sentential prominence, which manifests itself in different ways in the case studies of previous chapters.⁹ We observed that a prominent phrase serving as the answer to a question is a focus in the IS articulation, and that when the associate of a focus particle is an IS focus it is marked by prominence, but not otherwise. Additionally, *wh*-phrases in certain languages and the disjuncts of alternative questions are defined as foci regardless of the context, and consequently always carry prominence (see chapter 3).

Focus status is also reflected in the behavior of the prominent phrase with respect to intervention effects and WCO. In the case of intervention effects, a prominent phrase qua focus constitutes an intervener because there is a restriction on the number of foci allowed in a clause. If this phrase does not bear prominence by virtue of the context or its position in the clause (i.e. postnuclear deaccenting), it is no longer an intervener. In the domain of WCO, a prosodically prominent phrase facilitates inverse binding to the extent that it contains the intended bindee; conversely, if the phrase embeds the binder, this will obstruct binding. Although these distinctions in interpretation or well-formedness are due to differences in IS status, they are crucially indicated in the intonational phonology.

In both intervention and WCO, phonological prominence on a phrase was claimed not only to mark it as the IS focus, but also to preclude it from functioning in another capacity, i.e. as a topic or tail. In the case of tails, we formulated this as a specific constraint, requiring them to be non-prominent. However, we should probably not take

⁹ IS focus may also be signaled through phonological phrasing, as suggested for Amharic in chapter 3. The issue of implementation by prominence vs. phrasing does not affect the discussion below.

the incompatibility between prominence and IS categories other than focus to be (exclusively) a phonological matter. This would cause problems if the IS does not have access to the phonology, as implied by (613). Instead, the phonology is an indication of the IS category, so that the incompatibility ultimately derives from a problem with assigning two IS categories to the same phrase.

The connection between phonological prominence and IS focus reveals itself in another way in inverse binding configurations. In certain cases, focus status is not expected on account of the context or a cue like a focus particle, as there is no context or cue of this sort; nevertheless, a phrase carries prominence and behaves like a focus. Thus, in German object *wh*-questions this is a phrase containing a pronoun, which can be bound by the *wh*-phrase, whereas in English this occurs with sentence-final QPs. The focus status of the latter prevents them from functioning as binders of a preceding pronoun, even if the context promotes this binding. The IS focus in these examples is a function of the default IS articulation, guided by the implicit context in which the example is situated.

The use of sentential prominence to mark IS focus is the basis for the IS-PF feeding relationship represented in (613). The specific rule regulating the placement of sentential prominence given this architecture is (618), from Erteschik-Shir (1997).

(618) Assign stress to the focus constituents.

Ideally, this simple rule should be the only mechanism needed in the grammar for the purpose of sentential stress assignment, replacing all non-IS-based procedures. Indeed, I submit that it makes PF-related features in the syntax redundant, as well as most, if not all, so-called "sentence grammar" mechanisms of stress assignment. I briefly describe the latter type of mechanisms and then proceed to the issue of whether or not a focus feature in the syntax is justified.

One widespread view of sentential prominence considers it the product of a purely syntactic rule, and hence impervious to IS factors (e.g. Culicover & Rochemont 1983). Chomsky and Halle's (1968) Nuclear Stress Rule (NSR) is such a rule, basically enhancing the lexical stress of the rightmost constituent in an English sentence so that it serves as the main stress of the sentence. Focus is then defined based on the location of stress, together with a set of focus projection rules, allowing constituents larger than the one bearing stress to be the focus. To take a simple example, consider the sentence (619), with sentential stress on the rightmost constituent, *a hammer*. Given the relation between stress and focus defined in (620), the focus in this sentence can be any of the phrases indicated in the (b) sentences of (621)-(623), i.e. the DP, VP, or IP, each of which matches a different preceding question.¹⁰ (622b) and (623b) are cases of focus projection.

(619) John killed the judge with a HAMMER.

(620) If a phrase P is chosen as the focus of a sentence S, the highest stress in S will be on the syllable of P that is assigned highest stress by the regular stress rules.
(Jackendoff 1972:237)

(621) a. What did John kill the judge with?
b. John killed the judge with [_{FOC} a HAMMER].

¹⁰ This description of the data will be revised below.

- (622) a. What did John do?
 b. John [_{FOC} killed the judge with a HAMMER].
- (623) a. What happened?
 b. [_{FOC} John killed the judge with a HAMMER].

However, there is a major problem for NSR-based approaches to sentential prominence: the existence of many examples in which the main stress does not fall where the NSR would predict.¹¹ These include answers to subject *wh*-questions, as in (624).

- (624) a. Who killed the judge with a hammer?
 b. [_{FOC} JOHN] killed the judge with a hammer.

In order to treat such examples, an NSR-based approach is forced to single them out as marked in some sense, attributing them to a process separate from the supposed regular NSR. Since there is no evidence for a distinction between (621)-(623) and (624), the definition of the former as normal or neutral and the latter as marked is circular.

In spite of this fundamental weakness, NSR-based approaches to prominence have persisted in the literature. Thus, Cinque (1993) proposes a single, universal NSR to replace previous accounts, in which the stress rule had to be parameterized for different languages. Cinque's NSR places stress on the most embedded element on the recursive side of the tree, meaning that an independently determined syntactic property is responsible for the attested crosslinguistic variation in the position of sentential stress. Given a verb and object, both a right-branching language like English and a left-branching language, such as Dutch, are derived correctly, with stress on the object. Like the original NSR theories, Cinque must add what he calls a discourse grammar mechanism to the sentence grammar procedure embodied in the NSR. It is the discourse grammar mechanism that marks a focus as more prominent than the stress assigned by the NSR in examples like (624). Once again, this is an unwelcome strategy, since it is uneconomical and lacks empirical support: the motivation for two separate mechanisms is entirely theory-internal. The same criticism can be leveled against contemporary focus-to-stress theories, which adopt some version of the NSR.

The need for both an NSR and an IS-sensitive procedure for stress assignment (largely) goes away under the current framework, where stress assignment is driven by IS, rather than by the phrase structure. The single PF stress rule in (618) covers all stress patterns, and there is no principled distinction between neutral and marked stress. Moreover, neutral stress—i.e. rightmost stress in out-of-the-blue sentences—is nothing but the PF stress rule applying to a default IS articulation, whose existence has been amply illustrated in this dissertation. Accordingly, the NSR is superfluous.¹²

¹¹ A different problem for the NSR is posed by sentences where the main stress does not fall at the end of the phrase containing the focus, such as the all-focus example in (i). These will not be addressed here.

(i) Her HUSBAND died.

¹² One type of data which Cinque (1993) uses to justify his NSR, alongside a discourse grammar procedure, involves the placement of stress within non-focus constituents, as in (i)-(ii) ("'" is less prominent than "'"). However, these examples do not demand a syntactic prominence rule, as Erteschik-Shir (1997) shows.

(i) a. Any news of John?
 b. [Our poor child] [is in bed with a flú].

(ii) a. Who's in bed with a flu?
 b. [Our poor child] [is in bed with a flû].

The introduction of the rule in (618) leaves the pattern in (621)-(623) unaccounted for: why are there not accents on all the elements of the focus in (622) and (623)? To answer this question, we have to consider the idea of a focus feature in the syntax, first proposed in Jackendoff (1972).¹³ This feature was originally motivated by two considerations. First is the assumed existence of focus ambiguity, illustrated in (621)-(623), where the same stress can indicate different foci, and this possibility is often claimed to be restricted by the structure. Such focus projection patterns are explained by allowing the focus feature to percolate in accordance with structure-sensitive rules (e.g. Selkirk 1995). The second reason for a focus feature is of a conceptual nature, namely, the principle that PF and LF do not directly interact with each other. Given such a principle, the assumption is that a feature in the syntax is the only way to encode a notion like focus, which affects both the phonology and the semantics/pragmatics.

The second of these considerations is no longer relevant once the theory is altered to include an IS component which connects PF and LF. As for the first consideration, I believe that the actual data does not justify syntactic focus projection rules; therefore, a focus feature is unwarranted, and we can stick to an IS-based approach to stress placement. As pointed out in Gussenhoven (1999), Erteschik-Shir (2007), and Breen et al. (2010), the empirical basis of current research on focus projection is critically flawed. Contrary to the basic tenets of this research, pitch accents appear on *all* constituents which form part of the focus; furthermore, to the extent that they are reduced, this is not due to a syntactic rule. Experimental work shows that the presence of prenuclear pitch accents is detectable and can be used by speakers to figure out what the focus is (Gussenhoven 1999, Breen et al. 2010). In other words, an all-focus articulation is not phonologically identical to articulations in which the focus is narrower.

To illustrate the distribution of pitch accents, consider once more a question demanding an all-focus answer (625a). According to both Gussenhoven and Erteschik-Shir, (625b) is the attested answer, with pitch accents on all the constituents but the predicate. Gussenhoven analyzes the lack of an accent on the predicate as resulting from a deaccenting rule which is sensitive to the notions argument, modifier, and predicate, while for Erteschik-Shir this is a rhythm rule that reduces intermediate accents in rapid speech. Erteschik-Shir maintains that the rhythm rule may not apply, deriving (625c), or applies to everything except the subject and rightmost constituent, as in (625d). Regardless of the differences between (625b), (625c), and (625d), an answer with only final stress (625e) is not appropriate in this context.

(625) a. What happened?

- b. [_{FOC} JOHN killed the JUDGE with a HAMMER].
- c. [_{FOC} JOHN KILLED the JUDGE with a HAMMER].
- d. [_{FOC} JOHN killed the judge with a HAMMER].
- e. #[_{FOC} John killed the judge with a HAMMER].

The sentence in (625e) is precisely what much of the work on focus projection, which is based on intuitions rather than phonetic analysis, predicts as the answer to (625a). Conversely, (625b)-(625d) are not expected. Given this data, what we need is just the PF stress rule in (618), supplemented by either Erteschik-Shir's rhythm rule or

¹³ This feature should not be confused with the type of focus feature utilized in cartographic approaches to motivate movement.

Gussenhoven's deaccenting rule. Crucially, neither of these rules takes the phrase structure into consideration.

This approach to the placement of sentential prominence does not mean that anything goes—i.e. that main stress can randomly surface on any of the words in a focus—or that there is always a one-to-one relation between pitch accents and focus. The accent deletion rule, whatever its exact formulation, ensures that this does not happen. Take, for instance, the fact that in many cases the answer to an all-focus question cannot have a pitch accent just on the subject (626b) or just on the predicate (626c).¹⁴

- (626) a. What happened?
b. #_[FOC] JOHN killed the judge with a hammer].
c. #_[FOC] John KILLED the judge with a hammer].

Traditional approaches to stress placement regard this fact as evidence for structural constraints on focus projection and for a distinction between marked and neutral stress, only the latter being assigned by the NSR. Focus obtained by marked stress, according to these approaches, does not project, and this is why (626b-c) are infelicitous. In contrast, I consider this to be the result of the way in which the accent deletion rule operates; essentially, accent deletion cannot apply to the beginning or the end of the focused constituent.

The issue of sentence-level prominence is extremely complex, as it involves theoretical questions potentially implicating the IS, phonology, semantics, and syntax, as well as questions of phonetic implementation. Accordingly, I have concentrated here on the primary implications of an approach to this issue which rests on IS, in line with the architecture in (613). In the classification mentioned at the end of the previous chapter, this is a stress-to-focus approach: stress is governed only by the position of the focus. It is a promising alternative to NSR-based analyses, which are the relic of a period in generative research when IS was largely ignored. Having recognized IS as a level of representation in its own right and identified the importance of implicit contextualization, there is no need to posit multiple mechanisms for what is in actual fact a unitary phenomenon. Of course, it is important to work out the details of the accent deletion rule, which interacts with the PF stress rule to yield the surface patterns. This, in turn, is contingent on determining what speakers actually produce, through the type of careful phonetic analysis which is generally lacking from the current literature on this issue.

An appealing aspect of the proposed treatment of sentential prominence is its simplicity. This is an upshot of the inclusion of an IS component in the grammatical architecture, and thus characterizes the other explanations offered here as well. In other words, what may appear at first glance like a complication in the architecture—the addition of a level of representation—is in truth a simplification of the system as a whole. Including IS also enables us to get rid of IS-related features from the syntax, ranging from morphosyntactic features associated with movement to features which are supposed to regulate the phonology. This leaves a simple, truly encapsulated computational system, in line with the original model of the grammar in the generative tradition (Chomsky 1965), and with the original conception of the relation between syntactic form and discourse function in the generative literature (Prince 1997).

¹⁴ An exception to this generalization can be found in fn. 11.

A further benefit of the notion of an IS component is that it shifts the burden of explanation for certain phenomena from other components. Instead of stipulative syntactic or semantic machinery with very limited empirical coverage (e.g. Beck's 1996 constraint on LF movement in the case of intervention effects, and the A-command Requirement on Pronoun Binding), we can appeal to broad IS generalizations which tie together superficially disparate phenomena. In doing so, we attain the goal of theoretical elegance, as described by Newmeyer (1983:41):

"The goal of linguistics is to formulate the most elegant hypotheses possible about how language works, consistent with the data... given two theories that cover the same range of facts, the one in which the facts follow from a small number of general principles is better than one that embodies myriad separate statements and auxiliary hypotheses."

Substituting IS-based analyses of intervention and weak crossover for syntactic explanations accords with the fact that these phenomena are not associated with categorical ungrammaticality. Sentences involving an intervention effect or weak crossover effect are generated by the computational system and only later categorized as infelicitous, or unusable, in a particular context. This is comparable to the infelicity of (627) in the context of the preceding question, except that intervention and weak crossover effects arise in the *default* context.

- (627) a. Who insulted Mary? (=598)
 b. #_[TOP John] insulted _[FOC HER].

Because IS well-formedness is checked following the syntax and the latter cannot look ahead into the IS, multiple structures may be generated. Details of the mechanism responsible for the comparison and filtering out of illicit structures are left for future research. Ideally, this mechanism would be entirely in the IS, so that cases in which a problem is manifested in the phonology (e.g. question-answer incongruence as in (627)) are marked infelicitous by IS and not PF.

In Minimalist terms, the current framework achieves both methodological and substantive economy (Chomsky 1995 et seq.). Methodological economy is a matter of using the minimal number necessary of theoretical entities—i.e. following Ockham's razor—whereas substantive economy places a premium on reducing the unwarranted machinery attributed to the computational system. The framework proposed here differs from its syntactic and semantic competitors especially in the latter regard, minimizing the features and constraints in the computational system. The IS properties it invokes in places of such features and constraints, to the extent that they are not specific to language (see Erteschik-Shir 2007) and/or are needed for language to be usable, yield the kind of principled explanation which is a central goal within Minimalism:

"We can regard an explanation of some property of language as *principled*, to the extent that current understanding now reaches, insofar as it can be reduced to the third factor [language-independent principles] and to conditions that language must meet to be usable at all..." (Chomsky 2008:134)

Although the architecture of the grammar assumed in generative work has undergone various changes over the years, one thing that has remained constant is the basic division into a syntactic, semantic, and phonological component. This was a reasonable view

when proposed in Chomsky (1965), but, it seems to me, warrants a reassessment in 2011, given our current understanding of the grammar and of IS in particular. This chapter has carried out such a reassessment. We have found that IS primitives are encoded in a level of their own, rather than as an appendage to the syntax, and that introducing this level into the architecture has major repercussions for other parts of the grammar. While previous treatments of IS have recognized the existence of an autonomous IS component, they have typically attributed to this component a position in the grammar from which its potential influence is rather limited. Contrary to these treatments, I have placed the IS component in a central position, allowing it to interface with the syntax, semantics, and phonology. Placing it at this junction represents the idea that it is IS which mediates between sound and logico-semantic meaning, and not the syntax, as commonly claimed.

The addition of an IS component to the grammar raises many questions which I cannot comprehensively address in the confines of this dissertation. Further crosslinguistic work is needed on the interaction between IS and the other components of the grammar, in light of the hypothesis that IS does not and cannot dictate operations in the syntax, but at the same time is pivotal in determining the distribution of sentential prominence. It is my belief that the architecture put forward here is a promising alternative to existing approaches.

Chapter 6

Conclusion

Consider two fundamental properties of natural language: first, it conveys information, and second, this information is organized in every sentence in ways that are unique to natural language, via conventions that are part of the grammar. It seems natural to ask where these conventions are encoded in the grammar and how they interact with other parts of the grammar.

This dissertation has attempted to answer the aforementioned questions by taking a detailed look at two phenomena which have been central to linguistic research in the generative framework, focus intervention effects and weak crossover effects. Both of these phenomena have been primarily analyzed in the literature through a syntactic or semantic lens. Contra existing analyses, I have argued that the phenomena are information structural in nature, each reflecting different aspects of the way in which IS representations are generated and interface with the syntax, semantics, and phonology. The crucial evidence against syntactic and semantic approaches rests on definitional properties of such approaches, which do not allow ill-formed sentences to become acceptable by virtue of changes in the context. In the case of both focus intervention and weak crossover, there exist a wide range of examples that are precisely of this sort, that is, predicted to be ill-formed by syntactic or semantic approaches and yet fully acceptable. Moreover, it is the IS, mediated by the context and IS-related cues, which distinguishes between these examples and their unacceptable counterparts.

The first of these phenomena, focus intervention effects, stems from failure to map a sentence onto an IS representation. That is, properties of (at least) one of the constituents making up the sentence, as well as IS properties of the entire sentence, preclude this constituent from being assigned to an appropriate IS category. Intervention effects thus provide robust evidence that the mapping to IS categories is constrained by conditions that are specific to these categories. The fact that these conditions are not reducible to the syntax, semantics, or phonology indicates that IS is an autonomous component of the grammar.

Weak crossover effects provide a complementary case study to focus intervention, since they enable us to better understand the internal composition of IS representations and their relations with other levels of representation in the grammar. I have claimed that weak crossover ultimately reflects an IS constraint on inverse scope, such that inverse scope is available to an operator if and only if it is interpreted as a topic. The wide scope property of topics is independently supported by data from a variety of languages, and fits in perfectly with the idea that the topic is the subject of predication, and therefore evaluated prior to the rest of the sentence, i.e. the predicate. This property of topics bears on variable binding because binding is dependent on scope: an operator has to scope over a pronoun at LF in order to bind it. Given that topichood is a context-sensitive notion, it

is possible to induce a topic interpretation of the operator in an inverse binding configuration, resulting in the elimination of weak crossover effects. A key conclusion from this case study is that anaphoric relations in natural language are sensitive to IS considerations. In addition, the acceptability of inverse binding examples under certain contextual conditions demonstrates that there need not be isomorphism between the surface order of a sentence and the order in which it is evaluated; although this claim has been made before in the literature, what is novel about the current findings is that such discrepancies are driven by the IS.

The results of the study of focus intervention and weak crossover effects provide a great deal of insight into the broad questions posed at the outset. Not only is it clear that IS must be recognized as an independent component of the grammar, whose representations adhere to a set of well-formedness conditions, but also that it occupies a central position in the architecture of the grammar. The IS representations serve as the input to the levels of LF and PF, influencing both the logico-semantic meaning of the sentence and its phonological form. In terms of logico-semantic meaning, the IS representation determines the predication relations in the sentence, singling out the topic as the logical subject. This, in turn, affects processes which depend on the order in which sentences are evaluated, such as the variable binding relations discussed above. With respect to the phonological representation of a sentence, IS regulates the placement of prosodic prominence. A focus-stress correspondence rule, potentially supplemented by deaccenting processes, is what derives the sentential prominence patterns we find.

The introduction of an IS component does not complicate the grammar. On the contrary, by removing stipulative features from the syntax and shifting the burden of explanation for various phenomena from the syntax to the IS, the current proposal yields a maximally simple and truly autonomous computational system. This architecture accords with the original model of the grammar in the generative tradition and with Minimalist assumptions.

Beyond its theoretical findings outlined above, this dissertation makes significant methodological and descriptive contributions to the literature. From a methodological point of view, the dissertation highlights the need to recognize that linguistic expressions are always evaluated by speakers in a context, even if such a context is not explicitly provided to them. Since we do not have privileged access to the speakers' judgments devoid of such contextual influence, one cannot automatically construe a judgment of unacceptability as indicating ungrammaticality. At the descriptive level, the dissertation provides a wealth of novel data from a variety of genetically and areally unrelated languages, ranging from English, through Amharic, to Japanese. New findings reported here about the clause structure of an underresearched language like Amharic or the scopal properties of quantifiers in Japanese should be of interest to linguists regardless of their theoretical bent.

It is true that IS notions are often less explicit and formal than those employed by a good syntactic or semantic theory. However, this ought not to dissuade linguists from exploring these notions, nor should it compel them to propose syntactic or semantic accounts for phenomena whose source of deviance is *a priori* unknown. By showing that an appeal to IS produces empirically well-motivated and parsimonious explanations, which also converge across ostensibly unrelated phenomena, this dissertation has opened the door to a reassessment of the import of the IS component in the grammar.

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