

“Interfacing syntax with sounds and meanings”

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# ChapterX. Interfacing syntax with sounds and meanings

Yoshihisa Kitagawa

## 1. Introduction

From its inception, generative grammar has been pursued with the working hypothesis that grammar is an abstract form of language stored in our brain. Syntax as part of such knowledge has been assumed to constitute an autonomous component that can be studied independently of other aspects of grammar and the larger cognitive system. While this research strategy has yielded remarkable progress in the field, some serious problems have persisted in the process of its execution in the study of generative syntax. This chapter attempts to depict such problems, give an overview of some solutions offered in the literature and explore some future direction.

One such problem is empirical in nature. Theoretically, it is well-justified to attempt to elucidate our syntactic knowledge based upon the hypothesis that language users' introspection on linguistic expressions can faithfully reflect grammar. In reality, this hypothesis becomes legitimate only when researchers succeed in distilling grammaticality judgments from the language users' acceptability judgments. It, however, is an extremely difficult task to fulfill since neither the language users' actual linguistic performance nor their introspection can escape the influences of extra-syntactic/extra-grammatical factors. In many occasions, in fact, the "idealization" strategy in question with its somewhat distorted application may have created more confusion than clarification in the field.

Taking heed of this familiar but often disregarded warning, a significant number of researchers have argued in recent works that even the study of formal aspects of grammar should be conducted with reference to a wider linguistic context than usually considered. In particular, it has been pointed out and argued that extra-syntactic and extra-grammatical factors such as prosody, pragmatics, and processing have much more pervasive and significant influences on our grammaticality judgments than generally assumed. The issue is complex and delicate, but can be illustrated by a case study of *wh*-interrogative sentences in Japanese, which we will take up and examine in Sections 2 and 3.

The second problem is theoretical in nature. Generative grammar has always placed syntax at the center of its model of grammar as a mediator of sounds and meanings. It is hypothesized that syntax operates on its own, deriving two distinct types of output representations, on which

phonology/phonetics and semantics operate respectively and derive sounds and meanings. In such a theoretical framework, a problem arises if any syntactic operation takes place solely to achieve some desired effects in pronunciation and/or semantic interpretation. This is one instance of a problem known as “look-ahead”, which threatens the autonomy of syntax. Another type of problem arises when a clear correlation between sounds and meanings is recognized, but what role syntax plays in their association is disregarded (or at least remains unaccounted for). Since the sound-meaning association is captured without involving syntax, this state of affairs in a sense threatens *raison d’être* of syntax in generative grammar as a mediator of sounds and meanings. We will refer to this problem as “look-across”. Both of these theoretical problems are identified when we recognize the importance of the prosody involved in *wh*-interrogative sentences in Japanese and attempt to incorporate it into our formal syntactic analyses. We will examine the nature of these problems and discuss their possible solutions in the remainder of this chapter.

## **2. Sound-meaning association in *wh*-interrogatives**

There is growing concern in the field of Japanese syntax that many important and influential works on the so-called island effects in the past might not have been developed based upon precise empirical observations. In this section, we first summarize the recent development of a research method incorporating prosody into the formal study of syntax. We then describe the problem involved in the Subjacency effects in Japanese in detail and show how the investigation of prosody casts light on this problem. We will then introduce research that attempts to clarify the sources of the confusion involved in the Subjacency problem by appealing to extra-grammatical factors such as pragmatics and sentence processing.

### *2.1 Prosody-scope synchronization*

To begin with, it has long been observed in the phonetics literature that *wh*-interrogative sentences in Tokyo Japanese are generally accompanied by a distinctive type of prosody (e.g. Fujisaki and Kawai 1988; Pierrehumbert and Beckman 1988; Kori 1989; Maekawa 1991). For instance, based upon the data from his production and comprehension experiments, Maekawa (1991) reports that Tokyo Japanese speakers crucially rely on the “focus prominence” of the *wh*-phrase itself accompanied by what came to be referred to later as “post-focal reduction” as prosodic cues to indicate the *wh*-interrogative status of a sentence. This Focus Prosody (henceforth *FPd*) assigned to a simplex *wh*-interrogative sentence is illustrated in (1) below and

its corresponding pitch-track diagram in Figure 1, which is reproduced from Ishihara (2003: 53) with permission. (All the notations and abbreviations will be clarified shortly below.)

- (1) *Na'oya ga* *NA'ni* *o nomi'ya de no'nda no?*  
 Naoya NOM what ACC bar at drank COMP<sub>Wh</sub>  
 'What did Naoya drink at the bar?'

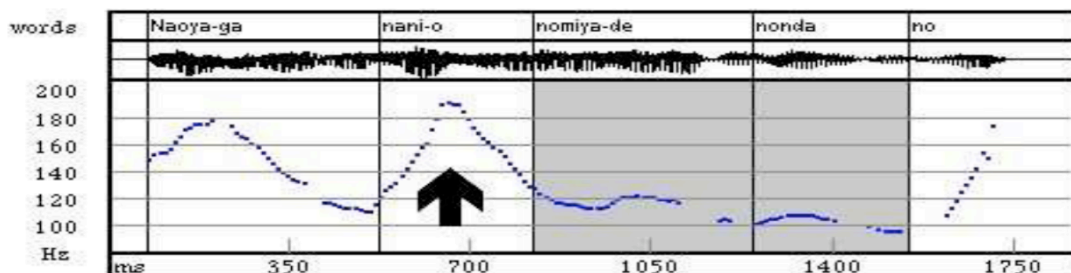


Figure 1 Pitch-track diagram for (1)

Incorporating such groundwork in phonetics into syntax, several researchers have over the past decade converged on the idea that the grammar of Japanese establishes a close association between the semantic scope of a *wh*-interrogative and the domain of focus prosody (Tomioka (1997; Deguchi and Kitagawa 2002; Ishihara 2002; Ishihara 2003; Kitagawa 2005 on Tokyo Japanese and Kubo 1989; Kubo 2001; Smith 2005 on Fukuoka Japanese, among others). For instance, the potentially ambiguous sentence in (2) below can be disambiguated with the two distinct prosodic patterns indicated in (3) and (4) in Tokyo Japanese.<sup>1</sup>

- (2) *Na'oya wa* [ *Ma'ri ga na'ni o nomi'ya de no'nda 'ka* ]  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>Wthr/Wh</sub>  
*i'mademo obo'eteru 'no?*  
 even.now remember COMP<sub>Wh/Y-N</sub> (Ishihara 2003: 61)

- (3) ... [ ... *NA'ni* *o nomi'ya de no'nda ka* ] *I'mademo oBO'eteru 'no?*  
 ... what ACC bar ↑ at drank COMP<sub>Wh</sub> even.now remember COMP<sub>Y/N</sub>  
**Wh-focus prominence** **Post-COMP rise**  
**Post-Focal Reduction**  
 'Does Naoya still remember [ what Mari drank at the bar ]?'

- (4) ... [ ... **NA'ni**o nomi'ya de no'nda ka ] i'mademo obo'eteru 'no?  
 ... what ACC bar at drank COMP<sub>wthr</sub> even.now remember COMP<sub>wh</sub>  
 'What<sub>1</sub> is it that Naoya still remembers [ whether Mari drank it<sub>1</sub> at the bar ]?'

The prosodic *wh*-domain typically realized in Tokyo Japanese is indicated on these example sentences as follows: the *wh*-focus is enclosed by a box and its pitch prominence is indicated by bold-face, the pitch-range compression by “post-focal reduction” is indicated by the underlined reduced fonts (up to the associated COMP), and the utterance-final interrogative rise is indicated by a question mark. The position of an accent (where a high tone goes down to a low tone) is indicated by an apostrophe (’), and the moras whose high tones do not undergo reduction in the post-focal position are indicated by uppercase letters. This coding scheme will be used throughout this chapter. The crucial difference between the two prosodic patterns here is that, in (3), the focus prosody is terminated at the end of the subordinate CP while in (4), it is extended to the end of the matrix CP. This distinction is detected by the fact that the matrix materials remain unreduced in (3) (as indicated by “Post-COMP rise”) but undergo post-focal reduction within the FPd domain in (4). The former pattern will be referred to as “Local Focus Prosody (Local FPd)” and the latter as “Global Focus Prosody (Global FPd)”. Figure 2 and Figure 3 below are the pitch-track diagrams illustrating the Local FPd in (3) and the Global FPd in (4), respectively, which are cited from Ishihara (2003: 61) with the author’s permission. Note the distinct length of post-focal reduction in the two figures (indicated by ovals) and the post-COMP rise signaling its end in Local FPd (indicated by a square).<sup>2</sup>

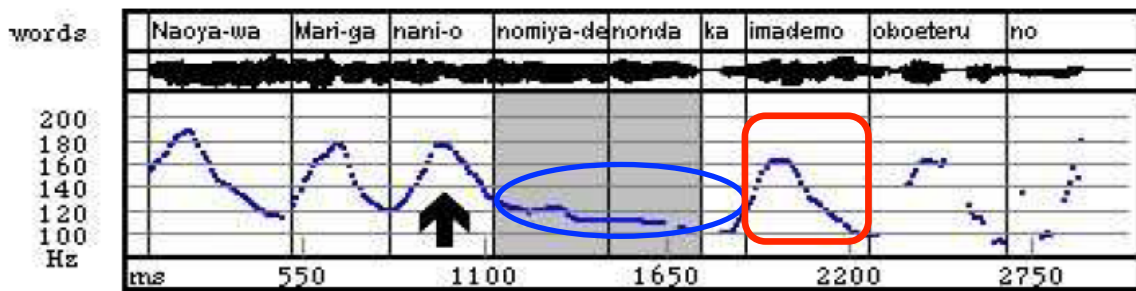


Figure 2 Pitch-track diagram of Local FPd in (3)

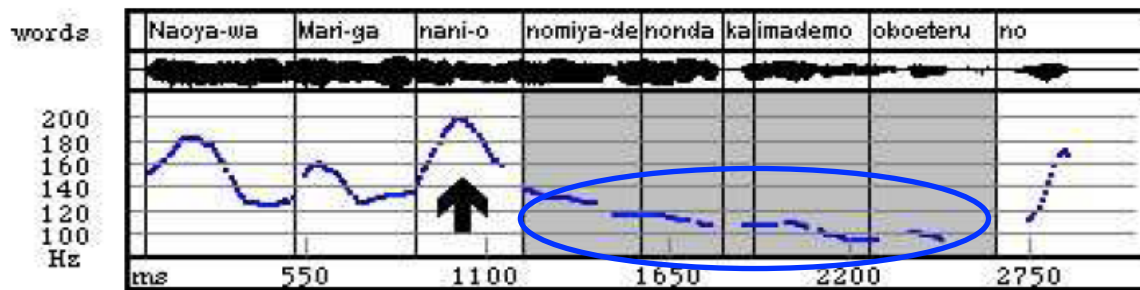


Figure 3 Pitch-track diagram of Global FPD in (4)

Kitagawa and Hirose (2012) also present Figure 4 below, in which the contrast between Local FPD and Global FPD is highlighted by two superimposed pitch-track diagrams. In each diagram, the pitch contours for the matrix *wh*-scope reading (black lines) and the subordinate *wh*-scope reading (grey lines) of the same example sentence (5) are superimposed onto each other (though the exact time is not matched).

- (5) *ana'ta wa [ do'no ri'kisi ga ka'tta ka ]*  
 you TOP which sumo.wrestler NOM won COMP<sub>Wh/Whether</sub>  
*kininarima'suka?*  
 curious.about COMP<sub>Wh/Y-N</sub>
- a. Subordinate *wh*-scope reading:  
 'Are you curious which sumo wrestler won?'
  - b. Matrix *wh*-scope reading:  
 '[Which sumo wrestler]<sub>1</sub> is it that you are curious whether he<sub>1</sub> won?'

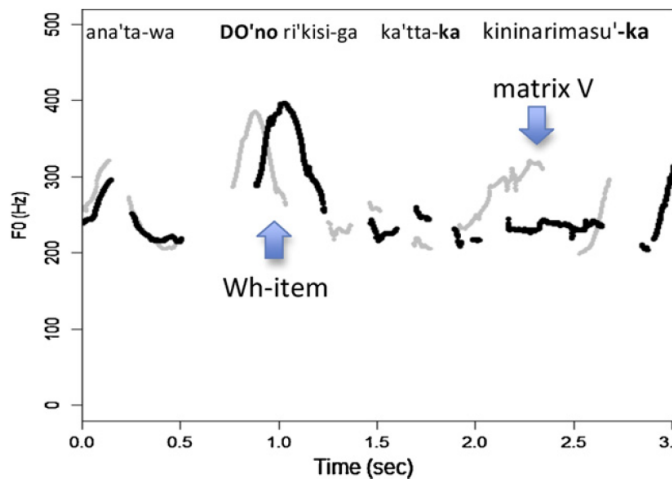


Figure 4 Pitch-track diagrams for (5) (by participant #3 in their production experiment)

The contrast just discussed indicates that prosody plays an important role in physically marking the interpretive domain of *wh*-focus in Tokyo Japanese.<sup>3</sup>

## 2.2 Subjacency effects in Japanese

It is well-known that the acceptability judgments reported for so-called Subjacency effects in Japanese are fuzzy, unstable, and variable. Subjacency violation was first reported for English as a type of locality restriction imposed on movement (Chomsky 1973). For instance, it was reported that the *wh*-phrase base-generated as the object of a subordinate *wh*-clause as in (6) below is not permitted to overtly move out of this clause (as a “*wh*-island”) and make up a direct *wh*-question.

- (6) \***What crimes**<sub>1</sub> does the FBI know [<sub>CP</sub> **whether** to solve **t**<sub>1</sub> ]?  
 ↑ \_\_\_\_\_ × \_\_\_\_\_ |

It was long assumed that *wh-in-situ* in languages like Japanese and Chinese does not exhibit Subjacency effects (Kuno 1973; Huang 1982). It became increasingly popular in the 1990s, however, to take the stance that *wh-in-situ* in Japanese in fact obeys the Subjacency Condition as a grammatical constraint although its effect is claimed to be detectable only when *wh*-islands are examined.<sup>4</sup> Nishigauchi (1990) and Watanabe (1992) reported, for instance, that a *wh*-phrase located within a *wh*-clause as in (7) below generally cannot take matrix scope (although

Nishigauchi admits an exception, to which we will return shortly). The judgments indicated on the example in (7) is from the original source (Watanabe 1992: 257, 263).

- (7) (?)~?? *Zyon wa* [<sub>CP</sub> *Mearii ga nani o katta kadooka* ] *siritagatteiru no?*  
 John TOP Mary NOM what ACC bought COMP<sub>wthr</sub> want.to.know COMP<sub>wh</sub>  
 '\*What does John want to know whether Mary bought?'

Those researchers who detected such interpretive restrictions attempted to assimilate them to the Subjacency violation observed for overt *wh*-movement in English as in (6), postulating some version of “phonetically invisible movement” in the *wh*-in-situ construction. While many interesting theoretical claims about Japanese syntax have been made along the lines of the invisible movement analysis, the syntactic judgments reported for the matrix *wh*-scope interpretation in question are notoriously fuzzy and variable. Watanabe (1992: 257, 262), for instance, adds the disclaimer that there is “a subtlety in the judgment” and that its “degree of unacceptability varies among different speakers.” Note, for instance, the ambivalent grammaticality judgments indicated for (7) above, suggesting that some accept it without any problem while others find it somewhat awkward (though not completely unacceptable).<sup>5</sup>

When we appeal to the prosody-scope correlation in *wh*-questions observed in Section 2 above, however, we can shed new light on this chaotic situation. As we already pointed out, for many speakers of Tokyo Japanese, a *wh*-phrase located in a subordinate clause is interpretable as a direct *wh*-question when it is assigned *Global Fpd* as in (4) and interpreted in an appropriate pragmatic context in mind. Similarly, for many speakers, (7) permits the matrix scope interpretation of the *wh*-phrase when we assign *Global Fpd* as in (8).

- (8) *Zyon wa* [ *Mearii ga* NA'ni *o katta 'kadooka* ] *siritagat'teiru 'no?*  
 John TOP Mary NOM what ACC bought COMP<sub>wthr</sub> want.to.know COMP<sub>wh</sub>  
 'What<sub>1</sub> is it that John wants to know [ whether Mary bought it<sub>1</sub> ]?'

Tomioka (1997), Deguchi and Kitagawa (2002), Ishihara (2003), and Kitagawa (2005) all appeal to this general prosodic property of *wh*-interrogatives in the syntactic investigation of Subjacency effects in Japanese. They maintain that the grammar of Japanese permits both matrix and subordinate *wh*-scope interpretations in a potentially ambiguous sentence like (2) and that there is a one-to-one correspondence between the domain of *wh*-scope and the domain of focus prosody, as indicated in (3) and (4). Kitagawa and Hirose (2012: 618) also report that all seven participants



in their production experiment confirmed that they could detect not only subordinate but also matrix *wh*-scope interpretations in thirteen potentially ambiguous stimulus sentences similar to (7), which they were asked to read aloud assigning a prosodic pattern they found to be appropriate for the particular scope interpretation forced by a specific dialogue added as its context. The availability of the matrix *wh*-scope in (4) and (8) to a significant number of speakers demonstrates that *wh*-in-situ in Japanese does not induce a violation of a grammatical condition like the Subjacency Condition even when its scope is extracted out of a *wh*-island.<sup>6</sup>

In order to maintain the Subjacency condition in Japanese, one may attempt to marginalize what was observed above, claiming that the unexpected acceptability of (8) arises only exceptionally due to a peripheral factor that does not belong to grammar. The phenomenon thus resides outside the domain of the explanation of generative syntacticians. In this approach, the prosody in (8), for instance, is regarded as an extra-grammatical factor that can *exceptionally repair ungrammaticality* induced by the violation of a syntactic constraint. Nishigauchi (1990: 35), in fact, takes such a position and assumes that the Subjacency Condition can be overridden by "focus-assignment". In other words, FPD in *wh*-questions, especially *Global FPD*, is regarded as an exceptional extra-grammatical phenomenon which can, quite mysteriously, overturn our grammaticality judgment.

To the contrary, as has been pointed out by various researchers, the assignment of FPD to *wh*-interrogatives is the *norm* rather than an exception in Tokyo Japanese. As we saw, it is assigned not only to matrix *wh*-questions like (8) but also to embedded *wh*-questions like (3) and even to simplex *wh*-questions like (1). Moreover, FPD is a norm even when a *wh*-phrase takes matrix scope *out of a non-island declarative CP*, as in (9).

- (9) *Na'oya wa [ Ma'ri ga NAni o nomi'ya de no'nda to ]*  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>That</sub>  
*i'mademo omo'tteru no?*  
 even.now think COMP<sub>Wh</sub>  
 'What<sub>1</sub> does Naoya still think that Mari drank t<sub>1</sub> at the bar?'

If, on the other hand, Local FPD is assigned to the same sentence as in (10) below (with the post-focal reduction terminating at the subordinate COMP), the prosody of the entire sentence becomes quite unnatural and its interpretation becomes quite difficult since the *wh*-phrase must

now be associated with the declarative complementizer *to* ‘COMP<sub>That</sub>’ within a declarative complement clause. (# on the example indicates that the sentence is unacceptable with the indicated prosody.)

- (10) #*Na'oya wa [ Ma'ri ga NA'ni o nomi'ya de no'nda to ]*  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>That</sub>  
*I'mademo oMO'tteru no?*  
 even.now think COMP<sub>Wh/Y-N</sub>  
 '\*Does Naoya still think what<sub>1</sub> Mari drank at the bar t<sub>1</sub>?'

Global FPD, in other words, is required for all scope-extraction, even out of a non-island.<sup>7</sup>

It therefore is a mistake to regard FPD as an exceptional intonational pattern that is adopted *only in order to override the Subjacency condition* in cases like (8).

To recapitulate, we have given an overview of the following properties of *wh*-interrogatives in Japanese pointed out in the literature. First, *wh*-interrogative sentences in Tokyo Japanese are generally accompanied by FPD. Second, when a *wh*-sentence is potentially ambiguous in its scope interpretation as in (2), the grammar permits it to be disambiguated by the contrast between Global FPD (for matrix *wh*-scope) and Local FPD (for subordinate *wh*-scope), which are phonetically distinguished (most consistently) by the distinct pitch contours of the post-COMP item in the matrix clause. Thus, Global FPD is a legitimate focus-prosodic pattern for a *wh*-interrogative sentence and should not be regarded as a special "stopgap" measure to override a Subjacency violation (though it is more marked than Local FPD, as will be discussed shortly). Finally, since many speakers find it possible for a *wh*-phrase to take matrix scope from within the *wh*-clause when Global FPD is assigned as in (4) and (8), it becomes difficult to maintain the hypothesis that the so-called "Subjacency effects" in Japanese arise from ungrammaticality. Proposals made in the literature attempting to identify the source of the judgments behind the reported Subjacency effects will be introduced and discussed in the next subsection.

### 2.3 *Extra-grammatical biases*

Once we start suspecting that the scope interpretations of *wh*-in-situ in Japanese may in fact not be constrained by the Subjacency condition as a grammatical principle, this newly-acquired perspective urges us to ask a distinct kind of question. First, *why* have Subjacency effects

involving *wh*-in-situ been reported in the literature on Japanese syntax in the first place? Second, why is the detection of matrix *wh*-scope in question so subtle, unstable, and variable? We now ask, in other words, why is it difficult for the native speakers of Japanese to assign Global FPD to the Subjacency construction and obtain its matrix scope interpretation?

When we attempt to answer these questions, it should be emphasized first that the primary concern of Tomioka (1997), Deguchi and Kitagawa (2002), Ishihara (2003), and Kitagawa (2005) discussed in the previous section was how the *grammar* encodes the correspondence between the domain of focus prosody and that of *wh*-scope. They all reached the conclusion that such a correspondence is induced when a *wh*-focus and a specific COMP come to be associated with each other in a synchronized fashion between PF and LF in the grammar.

Such prosody-scope synchronization as the grammar makes possible, however, may not necessarily be always reflected in linguistic *performance*. Miyamoto and Takahashi (2002), Kitagawa and Fodor (2003), Kitagawa and Fodor (2006), and Kitagawa and Hirose (2012), among others, identified various extra-syntactic and extra-grammatical factors which create bias toward the *subordinate wh*-scope interpretation in scopally-ambiguous sentences, i.e. dispreference of a matrix *wh*-scope interpretation out of a *wh*-island.

First, Kitagawa and Fodor (2003) argued that Global FPD is phonologically more marked than Local FPD, especially when either of the two can be assigned to a potentially ambiguous sentence as in (2) (repeated below as (11)). One of the prosodic characteristics of FPD is that its post-focal reduction substantially compresses the pitch range (and hence the rise to H tones) in every word appearing in the post-focal domain. This tends to create a long string of rhythmically and tonally undifferentiated material, which is generally dispreferred in natural languages as captured by the "Principle of Rhythmic Alternation" (Selkirk 1984: 12).<sup>8</sup> The contrast between Local and Global FPD in this respect can be clearly observed when we compare, for example, the length of post-focal reduction in (3) and that in (4) (repeated below as (12) and (13)) — the latter is much longer than the former and hence is dispreferred.

- (11) *Na'oya wa [ Ma'ri ga na'ni o nomi'ya de no'nda 'ka ]*  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>Wthr/Wh</sub>  
*i'mademo obo'eteru 'no?*  
 even.now remember COMP<sub>Wh/Y-N</sub>

- (12) ... [ ... NA'nio nomi'ya de no'nda ka ] I'mademo oBO'eteru 'no?  
 ... what ACC bar at drank COMP<sub>Wh</sub> even.now remember COMP<sub>Y/N</sub>  
 'Does Naoya still remember [ what Mari drank at the bar ]?'
- (13) ... [ ... NA'nio nomi'ya de no'nda ka ] i'mademo obo'eteru 'no?  
 ... what ACC bar at drank COMP<sub>Wh</sub>thr even.now remember COMP<sub>Wh</sub>  
 'What<sub>1</sub> is it that Naoya still remembers [ whether Mari drank it<sub>1</sub> at the bar ]?'

Perhaps even more importantly, Kitagawa and Fodor (2006) also argued that this markedness relation is bound to be reflected in the acceptability judgments of *wh*-questions in Japanese on *written* stimuli in accordance with the *Implicit Prosody Hypothesis* (Fodor (2002a)). Based upon the results of psycholinguistic experiments conducted on various linguistic phenomena in various languages, it has been argued by many researchers that language users actually assign a specific prosodic pattern to a sentence in their minds even when they process it by way of silent reading, i.e. even when they do not actually pronounce it aloud. It has also been argued that when more than one prosodic pattern can be assigned to a sentence, readers have a strong tendency to mentally project a *default* prosodic pattern for that construction in their silent reading, which may influence the way they parse the sentence.<sup>9</sup> It then is predicted that when a potentially ambiguous sentence like (11) is read silently, the reader projects Local FPd as the default prosodic contour and will prefer the syntactic analysis corresponding to this implicit prosody. As such, when syntactic judgments are made on *written* examples, as they often are, Local FPd in (12) as a default prosody would create a bias toward subordinate *wh*-scope, causing the matrix *wh*-scope reading to be dispreferred. Kitagawa and Fodor (2006) support this analysis with the results of an experiment investigating participants' incremental parsing of sentences similar to (9), which contain a subordinate *declarative* COMP *to*. They found that the participants accepted such sentences accompanied by *Global* FPd more often when listening to them than when reading them silently. In the latter case, the readers projected Local FPd as a default prosodic contour and forced themselves to syntactically associate the *wh*-in-situ with the *declarative* COMP in the subordinate clause, giving rise to anomaly.

Second, Kitagawa and Fodor (2003) argue that the bias in question is also at least partly ascribable to the semantico-pragmatic handicap that the dispreferred (matrix) *wh*-scope has. They note that satisfaction of the presuppositions necessary for the matrix *wh*-scope interpretation from

within a *wh*-clause tends to require a very specific (and sometimes unusually elaborate) pragmatic context. Such a specific pragmatic context, however, is typically not met in the null discourse context in which sentences are often presented for acceptability judgment. The subordinate scope reading in (12), for instance, would involve the presupposition (or 'epistemic bias') in (14a) below, while the matrix scope reading in (13) would involve the one in (14b) in addition to that in (14a).

- (14)     a.     There exists some X that Mari drank at the bar.  
          b.     Naoya still remembers whether Mari drank X at the bar.

It is not too difficult here to see that the satisfaction of both presuppositions in (14a-b) would require a more elaborated pragmatic context (for example, like the story fabricated in Footnote 3 above) than that of a single presupposition in (14a). It therefore seems reasonable to consider that the interpretation involving matrix *wh*-scope in a potentially ambiguous sentence like (11) is the more marked option of the two available interpretations.

Kitagawa and Fodor (2003) also pointed out that a matrix *wh*-scope interpretation out of a *wh*-island is dispreferred because this scope interpretation would have to be established in defiance of the locality restriction imposed on the processing of *wh*-in-situ. Locality restrictions in sentence processing in fact have long been discussed in the literature. It has been pointed out, for instance, that in English *wh*-questions involving more than one possible gap position (for *wh*-traces), the parser always prefers to associate the fronted *wh*-phrase (under CP) with the gap that is encountered first. Frazier (1987) proposed the Active Filler Strategy to capture this phenomenon, which was later developed into more generalized processing principles such as de Vincenzi's (1991) Minimal Chain Principle. Extending this line of approach further, Miyamoto and Takahashi (2002) argued that a similar locality effect is observed in Japanese between a *wh*-in-situ and its associated interrogative COMP (COMP<sub>wh</sub>). According to Kitagawa and Fodor (2003), all of these findings can possibly be summarized as generally as the following:

- (15)     Minimize Dependencies Strategy (in parsing):  
          Resolve all dependencies as soon as possible (perhaps to reduce strain on working memory).

In the present context, the relevant locality effect occurs between an in-situ *wh*-item and its

associated COMP, as argued for by Miyamoto and Takahashi (2002) based upon their experimental results. During the on-line processing of a *wh*-COMP dependency in a sentence like (11), for example, the matrix scope interpretation as in (13) would force language users to skip the closer COMP, thereby disobeying the general parsing strategy in (15). Thus, if such a processing strategy is indeed operative, it would naturally urge them to settle for subordinate *wh*-scope rather than matrix scope, giving rise to the clear markedness asymmetry between the two scope interpretations.

Finally, Kitagawa and Hirose (2012) argued that *speaker-listener asymmetries* in the use of prosodic cues in on-line processing may also make the *wh*-scope extraction out of a *wh*-island somewhat difficult. In their production and comprehension experiments, they observed that all *speakers* made use of *the pitch of the post-COMP item* in encoding *wh*-scope more consistently than the pitch of the *wh-item*. The majority of *listeners*, on the other hand, relied more heavily on *the pitch of the wh-item* in decoding *wh*-scope. In other words, listeners can be sensitive to prosodic cues that are less critical to speakers. Moreover, while listeners relied on *both wh-items and post-COMP items* in detecting the *subordinate wh*-scope interpretation, they relied *solely* on the pitch of the *wh-item* in detecting the *matrix wh*-scope interpretation. This suggests that the association of matrix *wh*-scope and high pitch on a *wh-item* in comprehension would involve a somewhat special mental activity. This observation is quite compatible with the view presented above that the scope extraction out of a *wh*-island is multiply discouraged by prosodic, semantico-pragmatic, and processing factors and hence is hard to obtain.

If all such extra-syntactic and extra-grammatical factors conspire to create a discomfort with the matrix scope reading for the *wh*-phrase located in a *wh*-clause, language users attempting to comprehend the sentence like (7), whether listening or reading, must be inclined to settle for the subordinate *wh*-scope interpretation accompanied by *Local FPD* as in (16) below, in which the FPD is terminated at the end of the subordinate clause (as indicated by the retention of the high tones in *siRITAGA'tteiru* 'wants to know').

- (16) #Zyon wa [ Mearii ga NA'ni o katta 'kadooka ] siRITAGA'tteiru no?  
 John TOP Mary NOM what ACC bought COMP<sub>Wthr</sub> want.to.know COMP<sub>Y/N</sub>  
 'Does John want to know [ **whether** Mary bought **what** ]?'

Under this analysis, the sentence now is clearly unacceptable. The *wh*-phrase *NA'ni o* 'what ACC' is urged to be associated with the subordinate COMP *-kadooka* 'whether or not', but for most

speakers of Japanese, *-kadooka* cannot be associated with a *wh*-phrase.<sup>10</sup> This causes clear discomfort, thereby inducing the acceptability judgment that can be easily mistaken as ungrammaticality arising from a Subjacency violation

It obviously is impossible to entirely eliminate all of the handicaps for the matrix *wh*-scope interpretation out of a *wh*-island discussed above. We can, however, at least reduce them and make such an interpretation reasonably acceptable when we assign proper FPD to a sentence, either explicitly or implicitly, with clear *wh*-focus prominence and post-focal reduction and interpret the sentence in an appropriate pragmatic context.

### 3. Further empirical implications

Many other conundrums have been discussed and many interesting and influential theoretical proposals have been made in the literature concerning the interpretive restrictions imposed on the *wh*-interrogatives in Japanese. In this section, we will re-examine some of those cases from the new perspective introduced in the previous section.

#### 3.1 Additional *wh*-effects

Watanabe (1992: 263) reports a contrast in the acceptability judgments indicated in (17) below, which is often referred to as “additional-*wh* effects” in the literature. The indicated acceptability judgments are from the original source, and they are declared to have been adjusted to “the judgment of the relevant speakers” (p. 262).

- (17) a. ??*Zyon wa* [<sub>CP</sub> *Mearii ga nani o katta kadooka*] *Tomu ni*  
 John TOP Mary NOM what ACC bought COMP<sub>Wthr</sub> Tom DAT  
*tazuneta no?*  
 asked COMP<sub>Wh</sub>  
 ‘What<sub>i</sub> is it that John asked Tom whether Mary bought it<sub>i</sub>?’
- b. *Zyon wa* [<sub>CP</sub> *Mearii ga nani o katta kadooka*] *dare ni*  
 John TOP Mary NOM what ACC bought COMP<sub>Wthr</sub> who DAT  
*tazuneta no?*  
 asked COMP<sub>Wh</sub>  
 ‘Who did John ask whether Mary bought what?’

- c. ??*Zyon wa* [<sub>CP</sub> *dare ga nani o katta kadooka*] *Tom ni*  
 John TOP who NOM what ACC bought COMP<sub>Wthr</sub> Tom DAT  
*tazuneta no?*  
 asked COMP<sub>Wh</sub>  
 ‘Who<sub>1</sub> is it that John asked Tom whether he<sub>1</sub> bought what?’

First, it was reported that the familiar Subjacency violation allegedly detected in (17a) is obviated in (17b) when an additional *wh*-phrase (*dare ni* ‘who DAT’) is introduced in the matrix. Second, it was also reported that when a similar additional *wh*-phrase (*dare ga* ‘who NOM’) is introduced within a *wh*-island as in (17c), it allegedly fails to obviate the Subjacency effect.

When we pay close attention to the prosody in *wh*-questions, we can provide a new angle from which we can examine this paradigm. First, Deguchi and Kitagawa (2002) pointed out that multiple *wh*-questions in Japanese exhibit their prosody-scope correlation in a very specific way. Prosodically, they are accompanied by “Compound Fpd”, in which more than one Fpd is combined and terminated at the same COMP<sub>Wh</sub>, as shown in (18a) below. Semantically, the multiple *wh*-phrases are interpreted as “paired (or set) *wh*-questions” with their scope synchronized.

To begin with, Compound Fpd seems necessary in order to interpret multiple *wh*-questions properly, as can be seen from the contrast between (18a) and (18b) (Kitagawa 2006b).

- (18) a. DA're ga asokode NA'ni o katta 'no?  
 who NOM there what ACC bought COMP<sub>Wh</sub>  
 ‘Who bought what there?’  
 b. #DA're ga asokode *na'ni* o katta 'no?  
 who NOM there what ACC bought COMP<sub>Wh</sub>

When Compound Fpd is assigned as in (18a), the prosody is natural, each of the *wh*-phrases receiving focus prominence and followed by post-focal reduction in contrast to (18b), in which only one of the *wh*-phrases receives focus prominence and the interpretation of the sentence remains obscure. While we can answer (18a) by providing either single paired answers (e.g. *John bought an umbrella there*) or multiple paired answers (e.g. *John bought an umbrella and Bill bought a raincoat there*), (18b) would remain unanswerable since the unfocused *wh*-phrase *nani o* ‘what ACC’ seems to remain uninterpretable.<sup>11</sup>



Compound FPd can apply either locally or globally and induce subordinate or matrix scope of paired *wh*-questions accordingly, as in (19a) and (19b-c), respectively. Note that matrix scope of paired *wh*-questions is possible whether the second *wh*-phrase is outside the subordinate clause as in (19b) or inside that clause as in (19c).

- (19) a. *Keisatu wa [ ano ban DA're ga DA're to atteita ka ]*  
 police TOP that night who NOM who with seeing COMP<sub>Wh</sub>  
*miNNA' ni tazuneta no?*  
 everyone DAT asked COMP<sub>Y/N</sub>  
 'Did the police ask everyone who was seeing whom that night?'
- b. *Keisatu wa [ ano ban Mearii ga DA're to atteita ka ]*  
 police TOP that night Mary NOM who with seeing COMP<sub>Wthr</sub>  
*DA're* *ni tazuneta no?*  
 who DAT asked COMP<sub>Wh</sub>  
 'Whom did the police ask *whether* Mary was seeing whom that night?'
- c. *Keisatu wa [ ano ban DA're ga DA're to atteita ka ]*  
 police TOP that night who NOM who with seeing COMP<sub>Wthr</sub>  
*kimi ni tazuneta no?*  
 you DAT asked COMP<sub>Wh</sub>  
 'Who<sub>1</sub> is it that the police asked you whether he<sub>1</sub> was seeing whom that night?'

Thus, the sentence in (19a) is interpreted as a yes-no question embedding paired *wh*-questions and answered, for example, as in (20a) below. (19 b-c), on the other hand, are interpreted as *matrix* paired *wh*-questions and the identity of both *wh*-phrases must be provided in the answers, for example, as in (20 b-c), respectively.

- (20) a. *Soo. [ dare ga dare to atteittaka ] zen'in ga tazuneraretano.*  
 yes who NOM who with seeing COMP<sub>Wh</sub> everyone NOM was. asked  
 'Yes. They asked everyone who was seeing whom that night.'
- b. *Kanozyo ga Zyon to atteitta ka(dooka) Biru ni tazuneta-mitai.*  
 she NOM John with seeing COMP<sub>Wthr</sub> Bill DAT asked-seem  
 'They seem to have asked Bill whether she (= Mary) was seeing John.'

- c. *Mearii ga Zyon to atteittaka(dooka) tazuneraretandayone.*  
 Mary NOM John with seeing COMP<sub>Wthr</sub> was. asked  
 ‘I was asked whether Mary was seeing John that night.’

Returning now to the “additional *wh*-effect” paradigm (17), let us assign “Global” FPDs — simplex FPD as in (21a) below and Compound FPD as in (21b-c) — and attempt to interpret the multiple *wh*-questions there accordingly.

- (21) a. *Zyon wa* [<sub>CP</sub> *Mearii ga* NA’ni *o katta kadooka* ]  
 John TOP May NOM what ACC bought COMP<sub>Wthr</sub>  
*To’mu ni tazuneta no?*  
 Tom DAT asked COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is it that John asked Tom whether Mary bought it<sub>1</sub>?’
- b. *Zyon wa* [<sub>CP</sub> *Mearii ga* NA’ni *o katta kadooka* ]  
 John TOP Mary NOM what ACC bought COMP<sub>Wthr</sub>  
DA’re *ni tazuneta no?*  
 who DAT asked COMP<sub>Wh</sub>  
 ‘Who did John ask whether Mary bought what?’
- c. *Zyon wa* [<sub>CP</sub> DA’re *ga* NA’ni *o katta kadooka* ]  
 John TOP who NOM what ACC bought COMP<sub>Wthr</sub>  
*To’mu ni tazuneta no?*  
 Tom DAT asked COMP<sub>Wh</sub>  
 ‘Who<sub>1</sub> is it that John asked Tom whether he<sub>1</sub> bought what?’

As we have already confirmed with (13), a sentence like (21a) does not exhibit a Subjacency effect to begin with and is legitimately interpreted as a matrix *wh*-question, as long as it is accompanied by Global FPD. Similarly, multiple *wh*-questions accompanied by Global Compound FPD as in (21b-c) can be interpreted as “paired” *wh*-questions in the matrix clause regardless of whether one or both of the *wh*-phrases are located within a *wh*-island. Note that multiple *wh*-questions in (21b-c) are completely parallel to those in (19b-c) in construction. The alleged Subjacency violation, in other words, does not arise even when the “additional *wh*-phrase” is located within the *wh*-island as in (21c).

When the sentence in (21c) is accompanied by *Local* Compound FPD as in (22) below, on the

other hand, the sentence becomes uninterpretable.

- (22) #*Zyon wa* [CP **DA're** *ga* **NA'ni** *o* *katta* **kadooka** ]  
 John TOP who NOM what ACC bought COMP<sub>Wthr</sub>  
 TO'mu ni tazuneta no?  
 Tom DAT asked COMP<sub>Wh</sub>  
 'Did John ask Tom whether who bought what?'

Presumably, the problem involved here is exactly the same as that observed in (16), the alleged case of a Subjacency violation we re-examined with Local FPd assigned in the previous subsection. In fact, the presence of an "additional *wh*-phrase" in the matrix clause does not permit *wh*-scope extraction out of a subordinate clause if *Local* FPd is assigned in the subordinate clause in addition to the *Global* FPd in the matrix, as in (23) below. Note the post-COMP rise in *ZYO'n* 'John', which indicates the termination of Local FPd at the subordinate COMP.

- (23) [ *Mearii ga* **NA'ni** *o* *katta* **ka** ] *ZYO'n wa* **DA're** *ni* *tazuneta no?*  
 Mary NOM what ACC bought COMP<sub>Wh</sub> John TOP who DAT asked COMP<sub>Wh</sub>  
 'Whom did John ask [ what<sub>1</sub> Mary bought t<sub>1</sub> ]?'

Since the sentence in (23) is accompanied by two "simplex" FPds rather than Compound FPd, the two *wh*-phrases are not required to take synchronized scope.

In short, as long as the sentences in the "additional *wh*-effect" paradigm in (17) are accompanied by appropriate prosody, they do not yield the alleged "Subjacency" contrasts, whether or not an "additional *wh*-phrase" appears and also wherever it may appear in the sentence. This suggests that the "additional-*wh* effect" in Japanese in fact may not be a grammatical phenomenon.

### 3.2 *Adjunct scope extraction*

Attention to prosody and semantics/pragmatics also provides us with a fresh and useful viewpoint on other types of interpretive restrictions observed on adjunct *wh*-phrases. Island effects as in (24)-(26) below, for example, have been reported by Huang (1982) on *weisheme* 'why' in Chinese and by Lasnik and Saito (1984) on *naze* 'why' in Japanese. The examples and

their judgments are from Saito (1994: 204-205).

(24) Complex NP Island:

\**Zyon wa* [<sub>NP</sub> [<sub>IP</sub> *sono hon o naze katta*] *hito*] *o sagasiteru no?*  
John TOP that book ACC why bought person ACC looking.for COMP<sub>Wh</sub>  
'Why<sub>1</sub> is John looking for [ the *person* who bought that book *t*<sub>1</sub> ]?'

(25) Adjunct Island:

\**Zyon wa* [<sub>CP</sub> *Mearii ga sono hon o naze katta kara*] *okotteru no?*  
John TOP Mary NOM that book ACC why bought since angry COMP<sub>Wh</sub>  
'Why<sub>1</sub> is John angry [ *because* Mary bought that book *t*<sub>1</sub> ]?'

(26) Wh-island:

\**Kimi wa* [<sub>CP</sub> *Mearii ga naze sono hon o katta kadooka*]  
you TOP Mary NOM why that book ACC bought COMP<sub>Wh</sub>  
*siritai no?*  
want.to.know COMP<sub>Wh</sub>  
'Why<sub>1</sub> do you want to know [ *whether* Mary bought that book *t*<sub>1</sub> ]?'

The alleged ungrammaticality in these and similar examples has been assimilated to that in English observed in (27).

(27) \***Why**<sub>2</sub> do [<sub>IP</sub> you wonder [<sub>CP</sub> **what**<sub>1</sub> [<sub>IP</sub> John bought *t*<sub>1</sub> *t*<sub>2</sub> ]]]?]<sup>12</sup>

With the assumption that *wh*-in-situ undergoes covert movement at LF, it is claimed that the trace of *naze* 'why' extracted out of a *wh*-island in (24)-(26) violates the Empty Category Principle (ECP: Chomsky 1981), failing to be antecedent-governed (i.e. not bound by its antecedent within the island or  $\theta$ -marked by any syntactic head).

Although Saito (1994: 234, footnote 16) considers that examples like (24)-(26) are straightforwardly and uniformly rejected by virtually every Japanese speaker as ungrammatical, Kitagawa (2006a) argues that this is not the whole picture, especially when we control the prosody and pragmatic contexts of the sentences. Just as in the Subjacency examples discussed in Section 2.3 above, the semantics/pragmatics involved in the scope extraction out of an island are

rather complex and require somewhat elaborate, specific types of pragmatic contexts, which are typically not provided in a null discourse context. When the embedded *wh*-phrase questions about 'reasons' as in (24)-(26), the situation even worsens, as described in (28) below.

- (28) a. (24): The speaker believes there is some specific reason such that John is looking for the person who bought the book for it (= that reason), and wants the hearer to identify the reason for which this is true.
- b. (25): The speaker believes there is some specific reason such that John is angry because Mary bought the book for it (= that reason), and wants the hearer to identify the reason for which this is true.
- c. (26): The speaker believes there is some specific reason such that the hearer wants to know if Mary bought the book for it (= that reason), and wants the hearer to identify the reason for which this is true.

The readers should try to imagine an appropriate pragmatic context for each case and feel how difficult a task it is. Among the three, the cases involving a complex NP island and a *wh*-island are especially hard, which seems to be reflected in the difficulty of their intended interpretations. The speaker's presupposition of the existence of some specific reason worthy of note in each case perhaps is one of the main culprits of the difficulty, since a *wh*-phrase seeking to identify a reason, especially with the use of *naze*, is usually asked without such a specific presupposition involved.

Though not an easy task, we can manage to improve similar *wh*-questions significantly by enriching the pragmatic context and adding appropriate prosody, i.e. Global FPD, as in (29)-(31).

- (29) Complex NP island:  
 [ *Maitosi nannin-mono sensyu ga puro-yakyuu-kai o satte-ikimasuga,* ]  
 'Every year, numbers of players leave professional baseball,'  
 [NP [IP NA'ze *yameteiku* ] *sensyu* ] *ga itiban-ooi ka* siTTEMA'su ka?  
 why quit player NOM most COMP<sub>Wh</sub> do.you.know COMP<sub>Y-N</sub>  
*Kega desuyo, kega.*  
 injury it.is injury  
 'Do you know for what reason the number of the players who quit professional baseball for that reason is the largest? It is injury!'

(30) Adjunct island:

[ *Mondai wa nani o sita ka zyanakute naze sore o sita ka nandayo.* ]

‘What is important is not what you did but why you did it.’

[<sub>CP</sub> *Omae ga* NA'ze *sonna koto o sita kara*] *oyazi ga annnani okotta ka*

you NOM why such thing ACC did since Dad NOM that.much angry COMP<sub>Wh</sub>

*oMAE NI 'wa wakaru ka?*

you DAT TOP understand COMP<sub>Y-N</sub>  
‘Do you understand for what reason your dad is that much angry because you did such a thing for that reason?’

(31) *Wh*-island:

[ Context: A law professor lecturing on court cases says:

*Ippan-teki ni saiban de wa kagaisya ga naze tumi o okasitesimattano ka ga totemo zyuuyooona pointo ni narimasu ga, sono saiban no syurui niyotte donoyoona dooki ga zyuuyooosi-sareru ka wa matimati desu. Tatoeba, keizi saiban de wa ... ]*

‘Generally speaking, in any trial, why the assailant committed a crime becomes a very important point, though what kind of motive is considered to be the most important differs depending on the type of the trial. For instance, in criminal cases, ...’

< The lecture on criminal cases continues for a while ... >

*Dewa, minzi-saiban de wa* [<sub>CP</sub> *kagaisya ga*  
then civil-case in TOP defendant NOM

NA'ze *tumi o okasitesimatta ka*] *ga mottomo zyuuyooosi-sareru ka*

why crime ACC committed COMP<sub>Wh</sub> NOM most viewed.important COMP<sub>Wh</sub>  
*to iIMA'suto ...*

that if.I.say

‘Then, what reason is regarded as most important if the defendant committed a crime for that reason? I would say ...’

Among over 40 speakers to whom these sentences were presented, the most popular reaction was that (30) is most naturally and immediately acceptable while interpreting (29) and (31) requires some pondering. There were some speakers, though, who remain uncomfortable with the use of *naze* in all of these contexts and would prefer to use an alternative adjunct expression *doo-yuu*

*riyuu de* 'for what kind of reason' instead. It probably is true that *doo-yuu riyuu de* more perfectly and easily fits the presuppositions involved in these contexts as described in (28) than *naze*. Probably, some additional pragmatic factor that we do not understand fully at this point is in effect here. Nonetheless, it is important that many speakers come to accept at least some of the sentences that are alleged to involve an ECP violation. While full-fledged discussion on ECP goes beyond the scope of this work, these observations suggest that some serious re-examination of the factual bases of the past studies on this topic would be advisable.

### 3.3 Rigidity/Anti-superiority effects

Saito (1982) also reports a contrast as in (32) below concerning the use of *naze* in multiple *wh*-questions. (The examples and indicated acceptability judgments are from Saito (1994: 195). As seems to have been the case in the literature, we pay attention solely to multiple-pair (or pair-list) interpretations for the time being.)

- (32) a. *Zyon wa nani o naze katta no?*  
 John TOP what ACC why bought COMP<sub>Wh</sub>  
 'What did John buy for what reason?'  
 b. \**Zyon-wa naze nani o katta no?*  
 why what ACC  
 'For what reason did John buy what?'

Saito (1982) and A. Watanabe (1992) both consider the alleged ungrammaticality in (32b) to arise from an ECP violation induced by some thematic condition — “rigidity condition” in Saito’s approach and “anti-superiority” in Watanabe’s. Both conditions have the effect of requiring the c-command relation between the two *wh*-phrases to be inherited from overt syntax to covert syntax, and this eventually disallows the LF-trace of *naze* from being antecedent-governed in (32b). The judgment reported here, however, has been acknowledged to be varied and unstable, which is often referred to as “idiolectal variation”. For instance, Saito (1994: 233, footnote 1) states “There seem to be equally many people who accept examples like (1b) and (2b) [= examples like (32b) above]. I will basically ignore this idiolect in the discussion in the text but will come back to it from time to time in footnotes, simply to show that its existence does not necessarily affect the main conclusions of this paper.”<sup>13</sup>

One thing we immediately notice when we try to interpret these sentences is that it is rather difficult to imagine a pragmatic context in which (32b) is felicitously interpreted compared to (32a). As pointed out by Kuno (1982), the interpretation of multiple *wh*-questions is required to reflect their relative hierarchical order in a sentence in such a way that the information denoted by a lower *wh*-phrase is sorted out in accordance with that denoted by a higher *wh*-phrase functioning as the “sorting key”. Perhaps as Kuno and Takami (1993: 115-118) and S. Watanabe (2000) point out, speakers detect awkwardness in a multiple *wh*-question like (32b) when they have difficulty imagining a situation in which purchased items are sorted out on the basis of the reasons for which they were purchased. When such difficulty is overcome and *naze* can be interpreted as a “sorting key” naturally, the sentence becomes interpretable much more easily, for instance as in (33) below, especially when it is appropriately accompanied by Compound FPd.

- (33) *Itiryuuno kyattya wa siai-no-naka-de*  
 first.rate catcher TOP in.the.game  
NA'ze DO'noyoona *tama o yookyuusita ka*  
 why what.kind.of ball ACC required COMP<sub>Wh</sub>  
*SU'bete kioku-siteiru-monodesu.*  
 all remember  
 ‘A first-rate catcher would remember why he required the pitcher to throw what ball  
 for every pitch in the game.’

Note that a sensible catcher in the baseball does often think of the hitter's weakness and then determines what type of ball he should require the pitcher to throw. In this context, a reason can be naturally regarded as a sorting key for a type of ball. With such careful control of pragmatics and prosody, the sentence becomes straightforwardly acceptable to many speakers including those who find some contrast between the two sentences in (32), which suggests that we are dealing with something more than mere idiolectal variation.

As the following examples indicate, *naze* can also appear comfortably in a position higher than another *wh*-phrase when multiple *wh*-questions can exhibit a clear single-pair interpretation:



- (34) [ A conversation at the CIA: *Kinoo siryoositu kara issyun no suki o tuite nanika o nusumooto siteita KGB no supai o tukamaeta soodana.* ]

‘I heard that we captured a spy from KGB yesterday, who tried to steal something from our record room in a very brief unattended moment.’

*Soitu ga NA'ze NA'ni'o nusumoo-to-siteita ka*  
 that.brat NOM why what ACC tried.to.steal COMP<sub>Wh</sub>  
*goOMON-NI-KA'kete hakasero.*  
 torture.and make.confess

‘Torture him and make him confess why he was stealing what.’

- (35) [ In a detective story, a detective says: ]

*Mondai wa (ittai)*

question TOP what.on.earth

*NA'ze DA're ga kono heya ni sinobikomu hituyoo ga attano ka*  
 why who NOM this room into sneak.in need NOM existed COMP<sub>Wh</sub>  
*toYUU-KOTO'-desu.*

it.is.the.fact.that

'The question is for what reason who needed to sneak into this room.'

Thus, we should consider that the pragmatic restriction in question is imposed not just on "sorting keys" for multiple-pair interpretations but on the "anchor" information denoted by the first *wh*-phrase on which the interpretation of the second *wh*-phrase is contingent in single-pair readings of multiple *wh*-questions (Kitagawa, Roehrs and Tomioka 2004).<sup>14</sup> Again, these observations suggest that some serious re-examination of the factual bases of the past work on the anti-superiority/rigidity effects would be advisable. We should especially investigate the nature of idiolectal variation in grammaticality judgment allegedly involved in this phenomenon.<sup>15</sup>

### 3.4 Higher *wh*-effects by LF-adjunction

Saito (1994: 204-206) offers an alternative account of the rigidity effects, extending the observations to island effects. He reports a contrast between a pair of sentences as in (36)-(38). (The indicated acceptability judgments are from the original source.)

(36) Complex NP Island:

- a. \**Zyon wa* [<sub>NP</sub> [<sub>IP</sub> *naze nani o katta*] *hito*] *o sagasiteiru no?*  
 John TOP why what ACC bought person ACC looking.for COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is the reason John is looking for [ the *person* that bought what for that reason<sub>1</sub> ]?’
- b. ??*Zyon wa* [<sub>NP</sub> [<sub>IP</sub> *nani o naze katta*] *hito*] *o sagasiteiru no?*  
 John TOP what ACC why bought person ACC looking.for COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is it that John is looking for [ the *person* that bought it<sub>1</sub> for what reason ]?’

(37) Adjunct Island:

- a. \**Zyon wa* [<sub>CP</sub> *Mearii ga naze nani o katta*] *kara*] *okotteiru no?*  
 John TOP Mary NOM why what ACC bought since angry COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is the reason John is angry [ *because* Mary bought what for that reason<sub>1</sub> ]?’
- b. ?*Zyon wa* [<sub>CP</sub> *Mearii ga nani o naze katta*] *kara*] *okotteiru no?*  
 John TOP Mary NOM what ACC why bought since angry COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is it that John is angry [ *because* Mary bought it<sub>1</sub> for what reason ]?’

(38) *Wh*-island:

- a. \**Kimi wa* [<sub>CP</sub> *naze dare ga sono hon o katta kadooka*] *siritai no?*  
 you TOP why who NOM that book ACC bought COMP<sub>Whthr</sub>  
 want.to.know COMP<sub>Wh</sub>  
 ‘What<sub>1</sub> is the reason you want to know [ *whether* who bought that book for that reason<sub>1</sub> ]?’
- b. ??*Kimi wa* [<sub>CP</sub> *dare ga naze sono hon o katta kadooka*] *siritai no?*  
 you TOP who NOM why that book ACC bought COMP<sub>Whthr</sub>  
 want.to.know COMP<sub>Wh</sub>  
 ‘Who<sub>1</sub> is it that you want to know [ *whether* (s)he<sub>1</sub> bought that book for what reason ]?’

Here, the island effects in (36a), (37a), and (38a) are considered to arise when *naze* 'why' is extracted out of an island and its trace induces a (rigidity-induced) ECP violation. On the other hand, a similar sentence in each of (36b), (37b), and (38b) escapes this problem because another *wh*-phrase appears in a position higher than *naze*. To account for this "higher-*wh* effect", Saito (1994: 206-207) proposes an analysis in which *naze* in a lower position as in (36b), (37b), and (38b) adjoins *nani/dare* in a higher position at LF and derives a complex *wh*-phrase of the form “[NP<sub>Adv P</sub> *naze* ] [NP {*nani/dare*} ]”. *Naze* then gets a free ride to Spec-CP when the derived complex *wh*-phrase is extracted out of an island, leaving behind the trace of the *wh*-cluster as a whole. Since what is left behind by this LF-movement is an argument trace rather than an adjunct trace, the ECP is not violated. Similar LF-movement in (38a), on the other hand, would leave an adjunct trace of “[<sub>Adv P</sub> [NP {*nani/dare*} ]] [<sub>Adv P</sub> *naze* ]” within the *wh*-island, which would violate the ECP. This account makes it unnecessary to postulate the rigidity condition.

Note, however, that the contrast reported on each pair of sentences in (36)-(38) also involves the pragmatic issue discussed on the rigidity paradigm in (32). That is, (36a), (37a), and (38a) are pragmatically handicapped because *naze* as a higher *wh*-phrase must be interpreted as the “anchor” for the lower *wh*-phrase in these sentences. The situation in fact is even more complicated because the multiple *wh*-questions in these sentences are located within an island — a complex NP, an adjunct CP, and an interrogative CP, respectively. Roughly, (36a), (37a), and (38a) involve complex semantico-pragmatic interpretations as summarized in (39a-c).

- (39)
- a. (36a): The speaker presupposes the existence of a specific reason-object pair such that John is looking for the person who bought that object for that reason, and the speaker wants the hearer to identify this reason-object pair, where the identity of the object is contingent on the reason.
  - b. (37a): The speaker presupposes the existence of a specific reason-object pair such that John is angry because Mary bought that object for that reason, and the speaker wants the hearer to identify this reason-object pair, where the identity of the object is contingent on the reason.
  - c. (38a): The speaker presupposes the existence of a specific reason-person pair such that the hearer wants to know if the book was purchased by that person for that reason, and the speaker wants the hearer to identify this reason-person pair, where the identity of the person is contingent on the reason.

Since (36a), (37a), and (38a) all require quite elaborate, specific types of pragmatic contexts, their interpretation is naturally difficult and low acceptability is liable to arise when they are presented in a null discourse context. On the other hand, (36b), (37b), and (38b) are somewhat easier to interpret since the interpretation of *naze* in these sentences is contingent on that of an entity-denoting *wh*-phrase (*nani* ‘what’ or *dare* ‘who’) as the anchor, which is pragmatically much more common than the reverse (i.e. assigning identity from reason to object).

Again, it is not an easy task to overcome such heavy handicaps, but we can improve sentences similar to (36a), (38a), and (38a) by appropriately controlling pragmatics and assigning Compound FPD, as in (40)-(42). (See also (35), which is similar to (40) in construction.)

(40) Complex NP island:

[ A sports broadcaster interviewing the catcher of a winning baseball club says: ]

*Kyoo-no-siai-no-naka-de* [<sub>NP</sub> [<sub>IP</sub> *pittya ni*

today's-game.in pitcher DAT

*NA'ze* *DO'noyoona* ] *tama o yookyuusita ] daseki ]ga itiban-no pointo-desita ka?*

why what ball ACC required at.bat NOM biggest point-was COMP<sub>Wh</sub>

‘What reason was such that [<sub>NP</sub> the at-bat you required the pitcher to throw

what kind of ball for that reason ] was the biggest point of today's game?’

(41) Adjunct island:

[ At the beginning of a broadcast of an ongoing baseball game, a sportscaster says: ]

*Goran-noyooni, hudan-nara raito-o mamotte-iru Itiroo-sensyu-ga kantoku-ni*

*totyuu-kootai-sase-rare, sudeni benti-ni hikkonde-imasu.*

‘As you can see, Ichiro, who is usually at the right field has been already taken out of the game by the manager and is sitting in the dugout.’

[<sub>CP</sub> *NA'ze* *DO'noyoona* ] *puree o sita kara ] kae-rarete-simatta-no ka*

why what.kind.of play ACC did since was.replaced COMP<sub>Wh</sub>

*kyoo-no komenteetaa no Egawa-san ni kaisetusi-temoraimasyoo.*

today's commentator GEN Mr. Egawa DAT let.explain

‘Let's ask today's commentator Mr. Egawa to explain for what reason he was taken out of the game because he had done what kind of play for that reason.’

- (42) Wh-island:  
 [ Context: An employee at some pharmaceutical company asked his colleague: ]  
*Uti-no syatyoo wa*  
 our president TOP  
 [CP NA'ze DO'no *seihin ga kooroo-syoo no oikari-ni-hure-yasinai ka* ]  
 why which product NOM ministry.of.health GEN make.angry-lest COMP<sub>Wthr</sub>  
*sinpai-siteiru no?*  
 worried COMP<sub>Wh</sub>  
 ‘For what reason is our president concerned lest the Ministry of Health and  
 Welfare should become angry at which merchandise of ours for that reason?’

These questions can be answered, for example, as in (43a), (43b), and (43c), respectively.

- (43) a. *Saisyuu-kai ni daburu puree o neratte naikaku-no syuuto o*  
 last.inning in double play ACC attempting inside screw.ball ACC  
*nage-saseta tokoro kana.*  
 throw-madescene perhaps  
 ‘I would say when I made him throw an inside screwball, attempting to make a  
 double play in the last inning.’
- b. *Saikuru hitto o tasseis-itakute san-rui made boosoosita-no ga*  
 cycle hit ACC achieve-wanted third.base to recklessly.running NOM  
*mazukatta-ndesyoo-nee.*  
 probably.was.blunder  
 ‘Craving to hit for the cycle, he recklessly ran all the way to the third base,  
 which I would say was a blunder.’
- c. *Rinsyoo siken no kekka ga imaiti-datta kara-nee,*  
 clinical test GEN result NOM was.not.perfect because  
*atarasii kooatuzai-no dioban no-koto o sinpai-siteiru rasii.*  
 new antihypertensive Diovan about ACC worrying seems  
 ‘Since the results of the clinical test was less than perfect, he seems to be  
 worried about Diovan, our new antihypertensive drug.’

Among these, the *wh*-island in (42) seems to require the most effort from us to imagine an

appropriate pragmatic context. Such a pragmatic situation in fact is difficult enough to imagine even when we reverse the order of *naze* 'why' and *dono seihin* 'which merchandise' in (42).<sup>16</sup>

Again, these observations suggest that some serious re-examination of the factual bases of the past work on the higher *wh*-effects would be advisable.

### 3.5 Overt *wh*-movement in Japanese

Takahashi (1993) claimed that when a *wh*-phrase in Japanese is dislocated across a clause boundary in a long-distance fashion, it should be analyzed as having undergone *wh*-movement rather than long-distance scrambling (henceforth *LD-scrambling*). This analysis starts with his report that interpretive asymmetry exists between (44a) and (44b).

- (44) a. *Zyon wa* [<sub>CP</sub> *Mearii ga nani o tabeta ka*] *siritagatteiru no?*  
 John TOP Mary NOM what ACC ate COMP<sub>Wh/Wthr</sub> want.to.know COMP<sub>Wh/Y-N</sub>  
 ‘What<sub>t1</sub> is it that John wants to know whether Mary ate it<sub>1</sub>?’  
 or  
 ‘Does John want to know what Mary ate?’
- b. *Nani o*<sub>1</sub> *Zyon wa* [<sub>CP</sub> *Mearii ga t<sub>1</sub> tabeta ka*] *siritagatteiru no?*  
 what ACC

In (44a), the *wh*-phrase located in the subordinate clause may be interpreted either as a direct question in the matrix CP or as an indirect question in the subordinate CP. On the other hand, when the same *wh*-phrase is LD-scrambled as in (44b), it is reported to be interpretable only as a direct question in the matrix. Takahashi (1993: 658) argues that this observation can be accounted for if we follow Saito (1989) and assume that scrambling is a movement rule that does *not* create an operator-variable relation and hence can be "undone" at LF. The dislocated *wh*-phrase cannot take subordinate scope in (44b) because it has not been moved by LD-scrambling but by *wh*-movement, which by nature establishes an operator-variable relation and hence does not permit "undoing" at LF.

As was pointed out above, however, each of the ambiguous interpretations in (44a) is associated with one specific prosodic pattern. That is, the matrix scope for a direct question is accompanied by Global FPd as in (45a) below, and the subordinate scope for an indirect question is accompanied by Local FPd as in (45b). Note that the post-focal reduction is extended to the end

of the entire utterance in (45a) but it is terminated at the end of the subordinate clause in (45b), as marked by the post-COMP rise in *siRITAGA'tteiru* 'want.to.know'.

- (45) a. *Zyon wa* [<sub>CP</sub> *Mearii ga* NA'ni*o* *tabeta ka*] *siritagatteiru* **no?**  
           what ACC           COMP<sub>Wthr</sub>                           COMP<sub>Wh</sub>
- b. *Zyon wa* [<sub>CP</sub> *Mearii ga* NA'ni*o* *tabeta ka*] *siRITAGA'tteiru* **no?**  
           what ACC           COMP<sub>Wh</sub>                           COMP<sub>Y-N</sub>

Crucially, then, when we let the sentence in (44b) be accompanied by each of these prosodic patterns, we can reproduce similar results, as Deguchi and Kitagawa (2002) noted. That is, not only the matrix scope but also the subordinate scope of the LD-scrambled *wh*-phrase becomes available, the former with Global Fpd and the latter with Local Fpd as illustrated in (46). Note again the different terminating points of the post-focal reduction in (46a) and (46b).

- (46) a. NA'ni*o* *Zyon wa* [<sub>CP</sub> *Mearii ga* *tabeta ka*] *siritagatteiru* **no?**  
           what ACC   COMP<sub>Wthr</sub>                           COMP<sub>Wh</sub>
- b. NA'ni*o* *Zyon wa* [<sub>CP</sub> *Mearii ga* *tabeta ka*] *siRITAGA'tteiru* **no?**  
           what ACC   COMP<sub>Wh</sub>                           COMP<sub>Y-N</sub>

Identifying what scope interpretations the *grammar* permits in accordance with the analyses as in (46), however, is only the first step since it also raises an explanatory question that needs addressing: Why does the subordinate scope interpretation associated with Local Fpd as in (46b) have a tendency to be overlooked by some when (44b) is analyzed? Kitagawa and Fodor (2003) and Kitagawa and Fodor (2006) point out that Takahashi's rejection of the subordinate scope interpretation in (44b) in fact has some grounds since the Local Fpd assigned as in (46b) gives rise to some conflict between prosody and syntax, whether the prosody is perceived overtly in speech or assigned implicitly in silent reading. The crucial observation is that in the (indisputable) LD-scrambling construction, when a *wh*-phrase is moved to the left periphery of the matrix clause, it precedes some element in the matrix clause (in the present case, the matrix topic *Zyon wa* 'John TOP'), and this matrix item is inevitably trapped in the domain of the post-focal reduction created by the dislocated *wh*-focus, as can be observed in (46a-b). As a result, a mismatch arises when the matrix element *Zyon wa* is included in the domain of Local Fpd as in (46b), which terminates at the end of the subordinate clause. This offends a very general preference for congruence between

prosodic and syntactic structure, which encourages perceivers to assume a simple transparent relationship between prosody and syntax wherever possible.<sup>17</sup> When Local FPD as in (46b) is perceived *overtly*, the listeners find such a prosody-syntax mismatch in on-line processing at the time they encounter the post-COMP rise in *siRITAGA'tteiru*, which is bound to induce some amount of awkwardness. Some of our informants in fact report that accepting the subordinate scope interpretation with overt Local FPD in (46b) urges them to somehow send the interpretation of the matrix topic *Zyon wa* to the background, marginalizing its role in the utterance. Note that such a mismatch does not arise when Global FPD is assigned as in (46a) and the matrix *wh*-scope interpretation is more easily obtained.

When the sentence in (44b) is perceived in silent reading, on the other hand, the readers may initially attempt to project Local FPD as a default prosody (avoiding a long string of post-focal reduction). When the “accidental” trapping of the matrix topic in its post-focal reduction ensues, however, they now guess instead that Global FPD must be assigned as in (46a). Local FPD as in (46b) thus tends to be avoided in silent reading and with it the subordinate *wh*-scope interpretation, although such prosody-scope association is permitted by the grammar. This explains Takahashi’s rejection of the subordinate scope reading in (44b) while reconciling it with the (conditional) availability of such a reading when it is forced by overt Local FPD as in (46b).

### 3.6 Superiority effects with LD-scrambling

In his attempt to motivate overt *wh*-movement in Japanese, Takahashi (1993: 664) also reports awkwardness induced by LD-scrambling of a *wh*-phrase as in (47).

- (47)    ??*Nani*<sub>1</sub> *o*    *Zyon ga*    *dare ni* [CP *Mearii ga*    *t*<sub>1</sub> *tabeta to*]    *itta no?*  
           what ACC John NOM who DAT    Mary NOM | ate COMP<sub>That</sub> said COMP<sub>Wh</sub>  
           ↑ \_\_\_\_\_ |  
           ‘What<sub>1</sub> did John say to whom that Mary ate it<sub>1</sub>?’

He claims that this awkwardness arises due to the Superiority effect induced by the interaction of the overt *wh*-movement of *nani o* ‘what ACC’ and the in-situ *wh*-phrase *dare ni* ‘who DAT’.

In footnote 6 on p. 665, however, he also reports (48).



- (48) "If the *wh*-in-situ in [(47)] receives **heavy stress**, then the examples sound **acceptable**. In that case, however, the stressed *wh*-phrase may be discourse-oriented, so that it could escape the Superiority effect for some reason. ..."  
[Emphasis added by YK]

Extrapolating from this statement, the prosodic pattern involving “heavy stress” mentioned here is like (49a) while the prosody that has been assigned originally to (47) is like (49b).<sup>18</sup>

- (49) a.  $\boxed{NA'ni}$  *o* *Zyon wa*  $\boxed{DA're}$  *ni* [<sub>CP</sub> *Mearii ga* *t*<sub>1</sub> *tabeta to*] *itta no?*  
 what ACC | COMP<sub>That</sub> COMP<sub>Wh</sub>  
 |-----|  
 b. # $\boxed{NA'ni}$  *o* *Zyon wa dare ni* [<sub>CP</sub> *Mearii ga* *t*<sub>1</sub> *tabeta to*] *itta no?*  
 what ACC | COMP<sub>That</sub> COMP<sub>Wh</sub>  
 |-----|

Note then that, as pointed out by Kitagawa (2006b), the contrast in (49) parallels that in (18) (repeated here as (50), which we examined in Section 3.1.

- (50) a.  $\boxed{DA're}$  *ga* *asokode*  $\boxed{NA'ni}$  *o* *katta* *'no?*  
 who NOM there what ACC bought COMP<sub>Wh</sub>  
 ‘Who bought what there?’  
 b. # $\boxed{DA're}$  *ga* *asokode* *na'ni o* *katta* *'no?*  
 who NOM there what ACC bought COMP<sub>Wh</sub>

Recall that we need to assign Compound Fpd to multiple *wh*-questions in Japanese in order to ensure their synchronized scope and attain a proper pair-wise interpretation. If any of the multiple *wh*-phrases fails to receive focus prominence as in (50b), on the other hand, this *wh*-phrase remains uninterpretable and the semantics of the sentence would remain obscure. Thanks to Compound Fpd, we can easily pair the two *wh*-phrases in (49a) and succeed in obtaining a pair-wise interpretation in the matrix clause. Due to the lack of focus prominence on the second *wh*-phrase, on the other hand, the interpretation of (49b) would have to remain obscure. Presumably, the only way a perceiver can avoid complete failure in interpreting this sentence is to somehow marginalize the interpretation of the unfocused *wh*-phrase *dare ni* ‘who DAT’ and

interpret the sentence as if it involved only a single *wh*-question. This, however, is a rather awkward mental activity and it must create some discomfort, as reported. The awkwardness reported on (47) therefore seems to arise when a perceiver fails to assign Compound FPd, either overtly or implicitly, to the involved multiple *wh*-questions, which may have nothing to do with Superiority effects.

All the considerations provided above in Sections 3.5 and 3.6 will lead us to rethink the status of the *wh*-movement analysis of LD-scrambling of *wh*-phrases in Japanese.

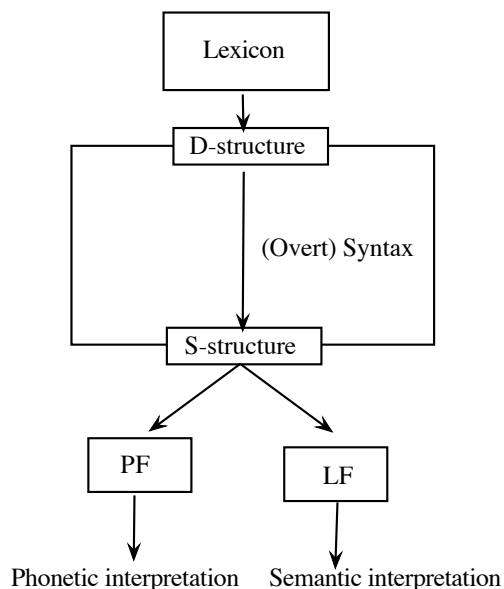
## 4. Theoretical implications

The investigations in the previous sections suggest that we should incorporate aspects of prosody into our formal syntactic analyses of *wh*-questions in Japanese. It, however, is not immediately clear how exactly we can carry out such a research strategy under the model of generative grammar. Pursuit of this mission in fact turns out to pose serious challenges, especially to the widely accepted Minimalist Program. In this section, after giving a brief overview of the major tenets of the Minimalist Program, we will point out the theoretical problems the prosody-scope synchronization of *wh*-interrogatives in Japanese poses to the Minimalist Program and discuss how those problems can be solved.

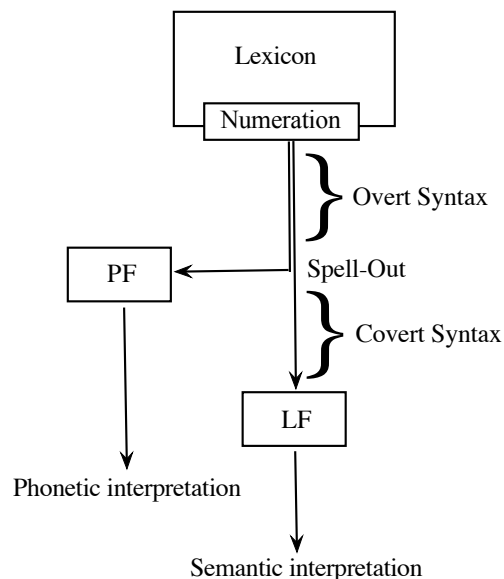
### 4.1 *The minimalist thesis and their achievements*

Arguably, the most significant achievement of the Minimalist Program (Chomsky 1993, Chomsky 1995) has been to provide adequacy conditions (or guiding intuition) of grammar which led us to shift our attention from hypothetical *interim* syntactic levels of representation (D-structure and S-structure) to only the input and output of grammar, i.e. lexical items listed in the Numeration and the interface representations (PF and LF). It had the effect of minimizing the role of syntax, which now is narrowed down to the proper mapping of the information on the lexical items onto the instructions for linguistic performance of sounds and meanings expressing an utterance — nothing more and nothing less. The difference between the Government and Binding (GB) model of grammar and the Minimalist model of grammar can be graphically illustrated in (51).<sup>19</sup>

(51) a. GB Model:



b. Minimalist Model:



The minimalist program imposed restrictions on grammar by postulating the following three core working hypotheses. First, the input to the grammar should be nothing but the information encoded in lexical items (“Inclusiveness”). Second, the information in lexical items should be completely split so that each of the interface representations (PF and LF) consists solely of the information legible to the performance systems of sounds and meanings, respectively (“Legibility”). Third, syntactic derivation should be induced only by an “immediate interface need” to derive legible PF and legible LF (“Economy”).<sup>20</sup> In this chapter, we will also take the position that these restrictions must always be imposed on grammar in our efforts to pursue its optimal solution to satisfy the interface conditions.

#### 4.2 Deviation from a minimalist thesis — Overt movement as look-ahead

The “minimalist theses” described above, however, have not always been met in the pursuit of the minimalist syntax in the literature. A problem which has long been noted, at least unofficially, is the very existence of “overt movement”. Overt movement must apply before the syntactic derivation splits toward PF and LF (at Spell-Out) because it affects both sounds and meanings. The early (pre-interface) application of overt movement therefore gives rise to a prototypical look-ahead problem. (A look-ahead problem arises when a *global* rather than local scanning of a derivation in the grammar would be required for the generation of a well-formed sentence.) In



phrase to move *overtly* (i.e. before Spell-Out) to become the specifier of a *semantically motivated* head like Topic, Focus, or *Wh*, so that the moved phrases can be interpreted as topic, focus, *wh*-interrogative, and so on. Chomsky (2013) also claims that when a phrase is externally merged with another phrase and generates a new syntactic object  $\beta$  without a head, one of the phrases must *overtly* move out of  $\beta$  before Spell-Out so that  $\beta$  can be “labeled” via projection from the remaining phrase, which would be necessary for the *semantic* interpretation of  $\beta$ , again causing a “look-ahead” problem.

## 5. The syntax of sound-meaning synchronization

### 5.1 Typology of *wh*-interrogatives as a look-ahead problem

A different type of a look-ahead problem arises when we start to understand the way prosody interacts with syntax. For instance, Richards (2010) attempts to advocate the view that some syntactic operations are motivated (or licensed) by phonology, proposing typological classification of *wh*-interrogatives in the languages of the world as follows. Whether a language syntactically derives a *wh*-question through overt *wh*-movement or whether it does so through *wh*-in-situ can be predicted by the interaction of the universal condition on *wh*-prosody as in (53) below with the linear direction of prosodic boundaries and that of COMPs permitted in each language as in (54a-b):

- (53) The *wh*-phrase and the corresponding complementizer are separated by as few prosodic boundaries (of Minor Phrases) as possible. (p. 145, See also p. 151.)
- (54) a. Whether prosodic representations in the language are constructed by mapping the left boundary or the right boundary of a syntactic phrase onto the boundary of a prosodic category, in particular of Minor Phrase.
- b. Whether the language is COMP-initial or COMP-final.

For example, when the prosodic boundary of the “*wh*-domain” (as a type of Minor Phrase which is established by a *wh*-phrase) is placed on the left but COMP appears on the right as in (55a) below, the *wh*-phrase may remain *in-situ*.

- (55) a. Japanese: [Prosodic *wh*-domain *wh* ... COMP ]  
 b. English: [ *wh* COMP ... [Prosodic *wh*-domain ~~*wh*~~ ... ]  
 ↑ \_\_\_\_\_ ]

On the other hand, when both the prosodic boundary and COMP appear on the left as in (55b), the universal condition (53) urges a *wh*-phrase to *overtly move* toward the COMP across the intervening prosodic boundary. The generalization offered in this approach thus is that overt *wh*-movement applies only when a language fails to supply a prosodic *wh*-domain within which the *wh*-phrase and COMP can be successfully paired, and that the position of COMP plays an important role in this syntactic choice. Whether or not one pursues this typological generalization in the exact way Richards does, it inevitably induces a look-ahead problem in the minimalist model of grammar since the applicability of overt *wh*-movement in syntax is determined directly by interface incentives at PF.<sup>21</sup>

## 5.2 Prosody-scope synchronization as a look-across problem

Underlying Richards' proposal was the view we introduced in Section 2.1 above — there is a close association between the semantic scope of a *wh*-interrogative and the domain of focus prosody in Tokyo Japanese (and Fukuoka Japanese, among others). We have seen that the potentially ambiguous sentence in (2) (repeated below as (56)), for instance, can be disambiguated with the two distinct prosodic patterns indicated in (57) and (58) in Tokyo Japanese.

- (56) *Na'oya wa [ Ma'ri ga na'ni o nomi'ya de no'nda 'ka ]*  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>Whr/Wh</sub>  
*i'mademo obo'eteru 'no?*  
 even.now remember COMP<sub>Wh/Y-N</sub>

- (57) ... [ ... NA'ni *nomi'ya de no'nda ka* ] Post-COMP rise  
 ...what ACC bar ↑ at drank COMP<sub>Wh</sub> even.now remember COMP<sub>Y/N</sub>  
Post-Focal Reduction

'Does Naoya still remember [ what Mari drank at the bar ]?'

- (58) ... [ ... NA'nio nomi'ya de no'nda ka ] i'mademo obo'eteru 'no?  
 ... what ACC bar at drank COMP<sub>Whr</sub> even.now remember COMP<sub>Wh</sub>  
 'What<sub>1</sub> is it that Naoya still remembers [ whether Mari drank it<sub>1</sub> at the bar ]?'

Discovering the existence of such prosody-scope synchronization is an important first step to take in our research. If, however, we merely point out that a certain prosodic pattern is responsible for producing a specific semantic effect (or vice versa) without elucidating how such a correlation is grammatically derived, that creates a new problem for generative grammar to solve. Since a prosody-semantics correlation is merely viewed in terms of the direct association of a PF with an LF *skipping syntax*, the prosody-semantics correlation would involve “look-across” in a grammar, as illustrated in Figure 5 below. Note that this situation induces a need for a *global* rather than local scanning of a derivation in order to capture the well-formed association of PF and LF, which we may regard as another type of problem in maintaining local economy.

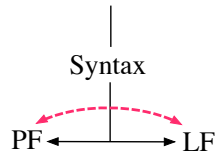


Figure 5 Look-across problem in generative grammar

Hirota (2005), for instance, attempts to capture the prosody-scope synchronization as in (57)-(58) and its distortion by the extra-grammatical bias toward the subordinate *wh*-scope interpretation by making a crucial appeal to prosodic phrasing at surface. She claims that a subordinate *wh*-scope interpretation arises only when the right boundary of a Major Phrase (MaP) created by the subordinate *wh*-focus is recognized due to the existence of the pitch range reset (i.e. a post-COMP rise) at the beginning of the following MaP, as illustrated in (59).

- (59) ... (MaP NA'nio nomi'ya de no'nda ka) (MaP I'mademo ...)  
⤴ Pitch range reset

She then claims that the comprehension of the *wh*-phrase is guided by the prosodic phrasing of the sentence, as specified in her Scope Prosody Correspondence (60) below, which she describes as “a general principle that listeners use when they process sentences containing all and only scope

relevant items” (p. x) and induces “the preferred correspondence relation between scope and the prosodic structure of the sentence.” (p. 7)

- (60) The Scope Prosody Correspondence (SPC): (Hirotani 2005: 256)  
When a term X requires a c-commanding licenser, Y, X should be contained in the same Major (phonological) Phrase (MaP) as Y.

Since this approach discusses only how prosodic phrasing and semantic scope are associated with each other in sentence processing without taking into consideration syntax, it poses a typical “look-across” problem in the framework of generative grammar.<sup>22</sup>

Ishihara (2003: 92-93), on the other hand, claims that multiple transfer applying at Chomsky's (2001) phase achieves the prosody-scope synchronization of *wh*-interrogatives in Japanese in the course of syntactic derivation, which avoids such a “look-across” problem. We consider the core idea of his analysis to be correct and pursue a version of the multiple transfer approach below. We will discuss an aspect of this phase approach below and compares it to our analysis to be described in the next section.

## 6. Encoding and decoding the sound-meaning synchronization

### 6.1 Physical/logical feature complexes

The task that the grammar must undertake in both look-ahead and look-across cases is the same — it must somehow find a way to guarantee the synchronization of a specific PF effect and a specific LF effect without involving any global scan of grammatical derivations, and at the same time it must identify an *independent* interface motivation to produce each of such effects.

We would like to argue in the remainder of this chapter that these seemingly independent issues of “look-ahead” and “look-across” can be resolved in the same way, i.e. with an appeal to the same grammatical mechanisms. The key to the solution is to strictly observe the three minimalist constraints imposed on grammar mentioned above — Inclusiveness, Legibility, and Economy.

The proposed approach begins with the hypothesis that the synchronization of sounds and meanings in general is established by a feature complex of the form  $[f_P, f_L]$ , where  $f_P$  is a feature relevant to PF and  $f_L$  to LF (Kitagawa 2013). The paired features  $[f_P, f_L]$ , which we call a “PL-complex” (short for physical/logical feature complex), represent two different interface



aspects of a single linguistic phenomenon. Some of the PL-complexes are inherently specified in lexical items but some others are added to them just as other formal features like Case and  $\Phi$ -features, when a Numeration (or Lexical Subarray) is formed.<sup>23</sup> For instance, when a Numeration is formed for the utterance in (61) below, various extra features (among others) are added to the lexical items, as indicated in (62).

(61) [As an answer to the question ‘Who does John love?’]  
He loves **MÁRY**.

(62) Numeration: {*he* (NOM), *loves* (PRES, 3P/SG), *Mary* (ACC, [FOC<sub>P</sub>, FOC<sub>L</sub>])}

Here, because of its focused status, the lexical head of the object  $N_{\max/\min}$  *Mary* is assigned the PL-complex [FOC<sub>P</sub>, FOC<sub>L</sub>]. This PL-complex consists of two distinct types of features: the focus feature FOC<sub>P</sub> (which eventually becomes relevant to phonetic interpretation) and the focus feature FOC<sub>L</sub> (which eventually becomes relevant to semantic interpretation). When a language user decides what lexical items are to be used in generating an utterance, he or she also determines, consciously or unconsciously, what informational role should be assigned to each of them in accordance with the appropriate information packaging strategy for a given context. This decision leads to the introduction of PL-complexes to particular lexical items. The PL-complex [FOC<sub>P</sub>, FOC<sub>L</sub>] was added to *Mary* in (62) in this way so that *Mary* comes to properly represent the concept of focus both at PF and LF, *in a synchronized way but separately*.<sup>24</sup> As such, the paired features [FOC<sub>P</sub>, FOC<sub>L</sub>] are naturally bound to be completely split in the course of computation.

One may have gotten the impression that “PL-complex” is a novel theoretical device but it actually is not. Recall that lexical items in general are nothing but a bundle of phonologico-phonetic and/or semantico-pragmatic features, to which formal features may be added (e.g. *he*: /hi/, [3P, SG, M], NOM), and all of these features must be properly assorted and sent separately to PF and LF when the computation splits. Simply put, the PL-complexes of the form [f<sub>P</sub>, f<sub>L</sub>] are only some specific instances of such features. This means that no extra device or new hypothesis needs to be added to the standard minimalist assumptions in order to capture the synchronization of sounds and meanings.

The matter of what particular lexical items are selected into the Numeration is not determined by purely grammatical factors alone but by various extra-grammatical factors like register and style as well — as in the selection from *angry*, *mad*, and *pissed off*. As such, we consider the

Numeration to be an interface between the computational component of the minimalist grammar and other cognitive systems. Since information packaging, i.e. how we convey a message, rather than what we convey, is also determined partly by extra-syntactic factors like discourse and pragmatics, we consider Numeration to be the appropriate level for the introduction of PL-complexes like  $[FOC_P, FOC_L]$ .<sup>25</sup> It should also be noted that Numeration should *not* be regarded as a mere list of lexical items but as the blueprint of a particular utterance. It presumably indicates which particular lexical items are to be combined into an utterance in order to express the intended meanings. We therefore may consider that syntactic derivations start with some semantic content even in the Minimalist Program.

## 6.2 *Physical legibility and logical legibility*

Let us now establish some terminology that clearly labels the concepts we pursue. The role of PL-complexes as characterized above is to guarantee that the linguistic expression they are assigned to represents a specific linguistic concept (e.g. focus) properly both at PF and LF. PF and LF then must provide cues that can eventually be interpreted as appropriate instructions for linguistic performance. When such interface cues are established, a linguistic expression can be said to become “legible” at each interface — “physically legible” at PF (henceforth “P-legible”) and “logically legible” at LF (henceforth “L-legible”).

We now illustrate how “P-legibility” and “L-legibility” are established when the prosody-scope synchronization for *wh*-interrogatives in Japanese is captured with an appeal to PL-complexes. First, we hypothesize that the notion “*wh*-focus” is introduced into the Numeration by a *wh*-word and  $COMP_{wh}$  as a pair (henceforth “*wh*-C pair”), which is specified, presumably inherently, with a PL-complex of the form  $[wh_P, wh_L]$  and  $[C_P, C_L]$ , respectively, as exemplified in (63).<sup>26</sup>

$$(63) \quad \text{Numeration: } \{ \dots \textit{dare} ([wh_P, wh_L]) \dots \textit{ka/no}/\emptyset_{ka} ([C_P, C_L]) \dots \}$$

who
 $COMP_{wh}$

This hypothesis amounts to the claim that, at the time language users make the blueprint of an utterance by forming a Numeration, they already encode the way *wh*-interrogation is incorporated into that utterance by indicating which item is interpreted as focus and under which projection it takes scope. That is, when a *wh*-word and its associated complementizer are introduced into the

syntax, it is already specified how they must be represented at PF and at LF. The idea of encoding grammatical information as two independent elements that come to be associated as a single unit is not novel to generative syntax. For instance, in English, perfective aspect, progressive aspect, and passive voice are often analyzed as one unit consisting of both an auxiliary verb and a verbal inflection (i.e. *have* + *-EN*, *be* + *-ING*, and *be* + *-EN*, respectively).

The P-features of a *wh-C* pair make the *wh*-word and  $\text{COMP}_{\text{Wh}}$  become *P-legible* in the manner described in (64) below in *wh-in-situ* languages.

(64) P-legibility of *wh-in-situ*:

A *wh*-phrase and  $\text{COMP}_{\text{Wh}}$  become *P-legible* when their P-features  $[\text{wh}_P]$  and  $[\text{C}_P]$  define a unique domain of focus prosody (FPd) in such a way that:

- (i)  $[\text{wh}_P]$  physically marks the *initiation* of FPd, and
- (ii) the *end* of the maximal projection headed by  $[\text{C}_P]$  physically marks the *termination* of FPd.<sup>27</sup>

While the PF of *wh-in-situ* in general becomes P-legible as specified in (64), the way FPd is *phonetically implemented* varies from language to language, presumably within the range of options made available by Universal Grammar. The most common pattern seems to involve indicating the *wh*-focus word with a distinctively high or low pitch, followed by a stretch of relatively level pitch that terminates at the end of CP (thus marking the end of FPd) (Kitagawa 2013).

Independently of such licensing at PF, the *wh-C* pair must be made *L-legible* at LF in the manner described in (65).

(65) L-legibility of a *wh*-question:

A *wh*-phrase and a  $\text{COMP}_{\text{Wh}}$  become *L-legible* when their L-features  $[\text{wh}_L]$  and  $[\text{C}_L]$  define a unique domain of interpretation for focus in such a way that:

- (i)  $[\text{wh}_L]$  identifies the item to be interpreted as *wh-focus*, and
- (ii) the maximal projection headed by  $[\text{C}_L]$  is identified as this item's *scope domain*.

How legibility is implemented at PF and LF in a potentially ambiguous *wh*-question (66) below in Tokyo Japanese is illustrated in (67). Observe how FPd at PF and a *wh*-focus scope domain at LF are aligned when the legibility of a *wh*-phrase and a  $\text{COMP}_{\text{Wh}}$  is established in

accordance with (64) and (65).

- (66) [CP *Keisatu wa* [CP *ka'nozyo ga ano ban da're to a'tteita ka* ]  
 police TOP she NOM that night who with seeing COMP<sub>Wthr</sub>  
*kakunin-siyo'oto-siteiru no* ]?  
 confirm-trying.to COMP<sub>Wh</sub>
- 'Who<sub>1</sub> is it that the police are trying to confirm [*whether* she was seeing him<sub>1</sub> that night]?'

- (67) [CP ... [CP ... **DA're** to a'tteita *ka* ] kakunin-siyo'oto-siteiru *no* ]?  
 | **who** **COMP<sub>Wh</sub>**  
 PF: | **↳FPd-initial** **FPd-terminal ↙**  
 LF: **↳Focus scope domain** **↳wh-focus** **Head of focus scope domain ↙**

Note that prosody and *wh*-scope come to be indicated separately at PF and LF, but their effects are synchronized. Since Fpd in (67) *does not correspond to a syntactic constituent*, the PF-LF correspondence here would be difficult to capture in terms of syntactic structure (or prosodic structure derived from syntactic structure).<sup>28</sup> PL-complexes, on the other hand, can properly fulfill such prosody-scope synchronization without “look-across”.

Presumably, [Wh<sub>L</sub>] can be considered as an interpretable feature that provides *wh*-focus content, while [C<sub>L</sub>] is an uninterpretable feature that gets deleted when its maximal projection comes to be identified as the interpretive domain of focus. As for the P-features, [Wh<sub>P</sub>] in *wh*-in-situ languages can be considered an interpretable feature that provides a phonological tone target that marks the initiation of Fpd at PF. In contrast, [C<sub>P</sub>] is an uninterpretable feature that marks the termination of Fpd. This feature is deleted when it is identified as marking the end of the post-focal pitch pattern at the end of the relevant maximal projection. Since [C<sub>P</sub>] and [C<sub>L</sub>] of a *wh*-C pair are uninterpretable features, their failure to make the *wh*-C pair visible is expected to induce ungrammaticality. While [wh<sub>P</sub>] and [wh<sub>L</sub>] are interpretable features, they must also play a role in making the *wh*-C pair legible at the interface by being associated with [C<sub>P</sub>] and [C<sub>L</sub>], respectively. Such association will allow the focus prosody starting with a distinctively high or low pitch of a *wh*-word to be properly terminated, and will also allow the focus value of a *wh*-word (in the sense of Rooth 1992) to be elevated to the ordinary semantic value.<sup>29</sup>

Given the interface requirements on  $[wh_P, wh_L]$  and  $[C_P, C_L]$  just described, the “paired” inclusion of a *wh*-phrase and  $COMP_{wh}$  in the Numeration will probably be guaranteed even without any external specification. Since a *wh*-*C* pair in Japanese as in (63) collectively establishes legibility at PF and LF, if one of them fails to be introduced in the Numeration, the derivation will crash at the interface level. Note that creation of the Numeration per se may be carried out freely without involving any constraint. A well-formed derivation results only when the entire lexical entry in the Numeration can properly establish legibility at the interface and other derivations are filtered out. Thus, the creation of the Numeration would not require any “look-ahead”. Presumably, the situation involved here is quite similar to what takes place in the syntax of aspects and passive voice in English. As is well-known, each of the auxiliary-participle pairs in these constructions must co-occur in English, for example, as in (68).

- (68) a. \*He **is** go\_\_.  
 b. \*He \_\_ **going**.

We can also ascribe this obligatory periphrasis to the legibility they must establish *as a pair* but separately at PF and LF.

### 6.3 Typology of *wh*-interrogatives

While the scope of *wh*-focus represented at LF is synchronized with a specific prosodic pattern represented at PF in *wh*-in-situ languages, a similar PF-LF correspondence is established by *overt* displacement in “*wh*-movement languages”. Richards (2010), in fact, offered this generalization on the prosody-based typology of *wh*-interrogatives: that overt *wh*-movement to the specifier position of CP applies when a language fails to supply an appropriate prosodic *wh*-domain for successful *wh*-COMP association. It then seems not too far-fetched for us to consider that overt movement, or more precisely, *the displacement effect observed at PF*, plays essentially the same role as *wh*-prosody. We then are prompted to extend the view of interface licensing developed above from *wh*-in-situ languages to *wh*-movement languages. At the core of this approach lies Wachowicz's (1978) idea that all languages must provide some form of *surface physical cue* for marking *wh*-questions. Elaborating further on this view, let us now hypothesize that whatever method of physical marking may be adopted for *wh*-questions (assigning a distinctive *wh*-prosodic pattern or displacing a *wh*-phrase to the periphery of CP, etc.), its primary

purpose is to indicate both: (i) the item to be interpreted as focus, and (ii) the constituent that serves as its scope domain. The two types of languages then may be unified by appealing to the notion P-legibility with the cross-language variation in the method of establishing P-legibility as specified in (69i-ii).

- (69) (i) In *wh*-in-situ languages:  
 A *wh*-*C* pair become *P-legible* when their [*wh*<sub>P</sub>] and [*C*<sub>P</sub>] define a *unique FPD* in such a way that the [*wh*<sub>P</sub>] *initiates* FPD and (the maximal projection headed by) the [*C*<sub>P</sub>] *terminates* it.
- (ii) In *wh*-movement languages:  
 A *wh*-*C* pair become *P-legible* when their [*wh*<sub>P</sub>] and [*C*<sub>P</sub>] jointly *initiate* a unique CP in such a way that the [*wh*<sub>P</sub>] is *located at the left periphery of the CP headed by the [*C*<sub>P</sub>]*.

The P-legibility in (69ii) is illustrated in (70) with an English examples.

- (70) [CP<sub>1</sub> I don't know [CP<sub>2</sub> which book<sub>1</sub> C<sub>2</sub> she bought ~~which book~~<sub>1</sub>]]
- |            |                           |                            |
|------------|---------------------------|----------------------------|
| <b>PF:</b> | ↓                         | ↳ CP <sub>2</sub> -initial |
| <b>LF:</b> | <b>Focus scope domain</b> | ↳ <i>wh</i> -focus         |

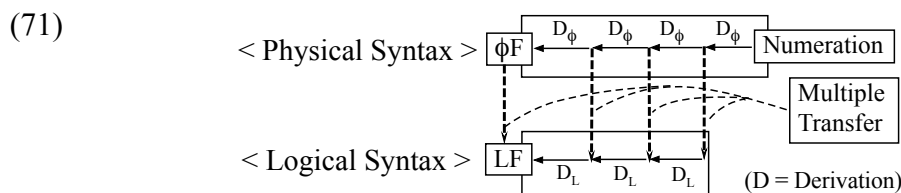
The crucial distinction between the two types of languages then is that the *wh*-word and COMP<sub>Wh</sub> become P-legible separately with division of their labor as indicated in (69i) or the two must become locally associated to jointly become P-legible as indicate in (69ii).<sup>30</sup>

We believe, on the other hand, that the *L-legibility* of *wh*-questions is established in the same manner (as described in (65)) for both *wh*-in-situ languages and *wh*-movement languages.<sup>31</sup>

#### 6.4 *Overt syntax extended*

How can we solve the “look-ahead” problem of overt movement discussed in Sections 4.2 and 5.1 above? The “P/L-legibility” analysis of overt *wh*-movement sketched out above could be regarded as advocating the view that overt *wh*-movement is PF-movement that also induces synchronized LF-effects. This analysis would solve the look-ahead problem in question at least partly since physical (and hence overt) dislocation of phonetic content now takes place in the

course of the derivation toward PF after Spell-Out, and its application can be motivated strictly by an interface requirement if we adopt PL-complexes along with it.<sup>32</sup> While this approach is feasible, we can in fact take a step further and bring overt movement back into syntax with only small revisions of the minimalist model of syntax, as indicated in (71) below. The fact that the current minimalist model of syntax cannot achieve overt movement without inducing a look-ahead problem suggests, in itself, a need to redesign the model.



The crucial revision here is that overt syntax (now called “physical syntax”) and covert syntax (now called “logical syntax”) *do not overlap*. They are completely separate and operate in the following order. Physical syntax starts with the generation of linguistic expressions by merging the features encoded in lexical items and their projections. The goal of physical syntax is to derive a well-formed physical form ( $\phi F$ ), at which the P-legibility of linguistic expressions must be achieved. An operation in physical syntax is enacted solely for this purpose, triggered by the  $f_P$  of a PL-complex. At any derivational stage of physical syntax, the semantico-pragmatic properties of lexical items (L-features) and the structure they make up may be extracted away from P-features and fed into logical syntax 'as needed' for L-legibility. This can be achieved by multiple transfer, applying in the way proposed by Epstein, et al. (1998). Logical syntax then attempts to derive a well-formed LF, at which L-legibility of linguistic expressions must be achieved.<sup>33</sup>

When PL-complexes are combined with the model of syntax in (71), we can guarantee prosody-scope synchronization while making sure that each of them is independently established with a separate motive in physical syntax and logical syntax, respectively. That is, prosody does not directly induce scope, or vice versa, in a look-across fashion.

How do PL-complexes trigger overt movement in this model of syntax? A  $[wh_P]$  feature assigned to the head of a *wh*-argument in English, for example, requires this argument to achieve its P-legibility in accordance with (69ii) and hence to undergo movement.  $[wh_P]$  here plays a role similar to that of the “I need to be a spec” *wh*-feature argued for by Bošković (2007), and inherits its virtue of inducing successively cyclic movement in a self-serving manner.<sup>34</sup> If  $[wh_P]$  is not located at the periphery of the projection of  $[C_P]$  and remains “in-situ” (in the base-generated

position or in the intermediate Spec-CP position), it fails to become P-legible, and hence must move every time merge applies. This way, a *wh*-phrase continues to move until it eventually reaches the left periphery of a CP headed by [ $C_P$ ] without involving look-ahead.<sup>35</sup> A transfer to logical syntax at that point will also achieve L-legibility of the *wh*-C pair in accordance with (65), both of [ $wh_L$ ] and [ $C_L$ ] being located under the same CP.

While the proposed reorganization of syntax in (71) may appear to be drastic at first sight, the revisions are in fact relatively small-scale. First, the proposed reorganization has simply decomposed traditional overt syntax by untangling and separating its PF-effects and LF-effects, while permitting them to be synchronized with an appeal to PL-complexes. Second, multiple transfer merely applies in the opposite way to Spell-Out, stripping away L-features rather than P-features from the feature complexes of lexical items. If such small-scale revisions permit us to account for the synchronization of sounds and meanings while avoiding the serious theoretical problems involving “look-ahead” and “look-across”, they are certainly worth trying.

The model in (71) should not be misunderstood as the manifestation of the claim that sound is more fundamental to language than meaning. On the contrary, it hypothesizes that an utterance starts with the rough ideas about meaning, postulating the Numeration as the starting point of the derivation. It also hypothesizes that the generative procedure advances step-by-step, with entirely local determination of the exact physical form which turns the blueprint of partial linguistic meanings into its (interim) logical form. Then the arising interface information will be utilized in actual semantic interpretation and phonetic interpretation.<sup>36</sup>

In this interface licensing approach, *both prosody and displacement* are regarded as physical (or *overt*) effects at PF to be synchronized with LF effects, and such synchronization is achieved by separate but paired derivations in physical and logical syntax. In a sense, then, both cases of synchronization can be regarded as involving syntax with overt effects. As such, it is practically useful to use “overt syntax” to refer to both. We thus use the term “overt syntax” as a cover term to refer to *a grammatical procedure that achieves the synchronized PF- and LF-effects encoded by PL-complexes*. Under this new definition, the synchronization of *wh*-prosody and *wh*-semantics can be regarded as a product of overt syntax, just as the synchronization of *wh*-movement and *wh*-semantics is. Put differently, overt movement also involves a type of PF-LF synchronization achieved by PL-complexes.

As mentioned at the end of Section 5.2, Ishihara (2003) claims that Chomsky's (2001) “derivation by phase” can properly capture the prosody-scope synchronization of *wh*-interrogatives in Japanese. While this approach successfully avoids a “look-across” problem, it is



not clear to us if Chomsky's (2001) phase categories (vp/CP) indeed play any crucial role in such synchronization. In the by-now familiar scopally ambiguous sentence as in (72) below, for example, whether the prosody-scope synchronization takes place at the subordinate CP as a lower phase or at the matrix CP as a higher phase cannot be determined without examining if these CPs are headed by COMP<sub>Wh</sub> or not.

- (72) [CP *Na'oya wa* [CP *Ma'ri ga na'ni o nomi'ya de no'nda 'ka* ]  
 Naoya TOP Mari NOM what ACC bar at drank COMP<sub>Whr/Wh</sub>  
*i'mademo obo'eteru 'no* ]?  
 even.now remember COMP<sub>Wh/Y-N</sub>

This suggests that phase in this sentence must be defined “dynamically” based upon the lexical properties of COMP. Moreover, if transfer to each of the two interfaces (the “sensorimotor” system and the “conceptual-intentional” system) indeed has the freedom to take place independently at different points in the derivation as suggested by some researchers (e.g. Cecchetto 2004; Felser 2004; Marušič 2005), an extra device to ensure the prosody-scope synchronization would be necessary even in the phase approach. That is, some device that fulfills the same function as PL-complexes would likely have to be postulated in the phase approach as well. If, on the other hand, we just postulate PL-complexes and adopt multiple transfer, we can achieve not only the prosody-scope synchronization of *wh*-in-situ without involving “look-across” but also the long-distance overt *wh*-movement without involving “look-ahead”. In either case, the notion “phase” would be superfluous.

## 7. Further look-across problems in the minimalist syntax

A look-across problem neither is limited to the issue of prosody-scope association nor is an entirely new problem. It has in fact existed for a long time in generative grammar under the Principles and Parameters approach. To begin with, based upon Jean-Roger Vergnaud's observation, the well-known Case Filter as in (73) below was proposed by Chomsky (1981) and well-accepted into the Government and Binding framework.

- (73) Every **pronounced** NP needs abstract **Case at PF (or S-structure)**.  
 [Emphasis added by YK]

With the assumption that abstract Case is assigned under government, it was claimed that, typically, a subject of a sentence appears as the specifier of a finite tense and an object as the complement of a verb or a preposition. In addition, it was claimed that the assigner and assignee of Case must be adjacent to each other at the surface (Keyser 1968, Chomsky 1980, Stowell 1981). Although “S-structure” was hypothesized to be a possible level of syntactic representation at that time, it came to be eliminated later under the Minimalist Program. The Case Filter therefore can now be characterized as an early attempt to predict the distribution of pronounced NPs at PF under the Principles and Parameters approach.

Later, in an effort to reduce the Case Filter to the  $\theta$ -Criterion, Chomsky (1981) followed the suggestion by Aoun (1979) and proposed what is known as the Visibility Condition as in (74).

- (74) Arguments must have **Case at PF** to be visible for  **$\theta$ -marking at LF**.  
[Emphasis added by YK]

Note that this statement involves a proto-typical look-across problem in the generative grammar since it attempts to directly correlate the PF distribution of argument NPs and their LF interpretations, skipping syntax. No serious attempt to implement this conjecture seems to have been offered in the literature to this date, however. Another task that must be fulfilled in the minimalist syntax therefore is to explicate how the Case- $\theta$  association can be guaranteed without “look-across”. In addition, it should be clarified where and how the Case adjacency requirement on Case marking should be captured, which is not so easy a task to achieve in the minimalist syntax, the role of Case having become increasingly more obscure.<sup>37</sup>

Kitagawa and Yoon (2011), Yoon (2012), and Kitagawa and Yoon (2012) point out that the look-across problem involved in the Visibility Condition can be resolved when we incorporate PL-complexes into the lexical entry of argument NPs at the Numeration. They argue, for example, that P-legibility of the P-feature assigned to an object NP can be achieved by one or more of the universal means selected from the list in (75) below by a particular language while L-legibility of the L-feature assigned to an object NP is achieved universally when it is properly recognized as an “internal argument” of a predicate.

- (75) a. Overt accusative marking  
b. Adjacency to a predicate

c. Specific prosodic marking

They argue that this approach explicates in a uniform fashion the following seemingly opposite and independent types of subject-object asymmetry in relation to case, among many other things. Note that case marker drop is possible from an object but not from a subject in Japanese (Kuno 1973; Saito 1985) and Korean (Ahn and Cho 2006):

- (76) a. Japanese:  
*dare* {**ga** / \* $\emptyset$ } *nani* {**o** /  $\emptyset$ } *tanonda no?*  
who NOM what ACC ordered COMP<sub>Wh</sub>  
'Who ordered what?'
- b. Korean:  
*Nwukwu* {**ka** / \* $\emptyset$ } *mwues* {**ul** /  $\emptyset$ } *sass ni?*  
who NOM what ACC bought COMP<sub>Wh</sub>  
'Who bought what?'

On the other hand, the so-called case adjacency effect is observed for an object but not for a subject in English (Kitagawa 1997):

- (77) a. Subject: **John probably** [<sub>i</sub> **has** ] read the letter.  
b. Object: \*John [<sub>v</sub> **read** ] *carefully* **the letter**.

Further pursuit of this topic, however, must be left for future research.

## 8. Summary and conclusion

Our investigations in Sections 2 and 3 suggested that the main culprit in obscuring the empirical facts on island effects in Japanese may have been the lack of attention to prosody, pragmatics, and other extra-grammatical factors. Since acceptability judgments are often solicited using only written examples, there is a danger that informants unconsciously and arbitrarily assign some specific prosodic pattern to a sentence when they are either reading it aloud or silently. They may also unconsciously feel pressed to assign a default prosodic pattern in silent reading. Either way, their syntactic analysis will be influenced in a specific way by the assigned prosody. By

neglecting prosodic factors, in other words, a researcher runs the risk of conducting a syntactic test that is not replicable, or otherwise adds noise.

Acceptability judgments also tend to be solicited with sentences presented in a null discourse context even when their proper interpretation requires rather specific elaborated pragmatic contexts. This common exercise also tends to elicit lower acceptability judgments of the sentences from the informants who may or may not make extra efforts to imagine an appropriate pragmatic context. The lowered acceptability judgments solicited in this way may be misinterpreted as ungrammaticality, and the pragmatic control arbitrarily exercised by the informants could also hinder replication of the involved syntactic test. Such lack of replicability and/or reliability of syntactic tests seems to play a significant role in the variation as well as the instability of native speaker intuitions on the island effect involving *wh*-questions in Japanese.

In Sections 4-7, we laid out the core working hypotheses of the Minimalist Program and the theoretical problems of “look-ahead” and “look-across” and pointed out that attempts to incorporate prosody into investigations of formal syntax typically induce such problems. We then spelled out an approach which allows us to capture the prosody-scope synchronization as well as overt movement without causing “look-ahead” and “look-across” problems. This approach provides a simple, unified typological grasp of *wh*-in-situ and *wh*-movement. Finally, we also hinted at a possible extension of this approach to the “look-across” problem posed by the Visibility Condition when we attempt to account for the correlation between case markings and thematic interpretations of arguments.

This approach completely splits traditional overt syntax into P-syntax and L-syntax, each of which independently develops a syntactic derivation in order to establish interface legibility in a local fashion. In this revised execution of overt syntax, the synchronization of P-syntax and L-syntax is achieved by incorporating PL-complexes into the Numeration and their independent licensing is carried out by letting multiple transfer take place in a bottom-up fashion.

The approach also permits us to strictly observe the three minimalist theses. First, it satisfies “Inclusiveness” by appealing to PL-complexes, the information represented on lexical items from the outset of syntactic derivation. Second, “Legibility” is satisfied with the complete split of PL-complexes into the features relevant to physical form ( $\phi$ F) and those relevant to logical form (LF). Finally, both general and local “Economy” is maintained when sound-meaning synchronization is achieved solely and separately by interface needs in physical and logical syntax, respectively.

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## Notes

1. In glosses of these and other examples, each distinct function of complementizers in Japanese is indicated as  $COMP_{Wh}$  (*Wh*-scope maker),  $COMP_{Whr}$  (a polar-question complementizer),  $COMP_{Y/N}$  (yes/no question marker) and  $COMP_{That}$  (declarative complementizer).
2. One thing the readers must keep in mind in their attempt to reproduce FPD as in these figures based upon the "box-and-underline" notation in our examples is that all instances of the rise to the high tone are being substantially compressed in the post-focal domain, i.e. in the underlined portion.
3. Such prosody-scope synchronization the grammar establishes, however, may not necessarily be always reflected in linguistic performance. In fact, some Tokyo speakers might find the matrix *wh*-scope interpretation in (4) somewhat difficult to obtain, at least until they identify an appropriate pragmatic context for such an interpretation (e.g. some specific drink is at issue, which Naoya remembers his beloved wife Mari had at a bar during their first date 10 years ago, and the speaker is inquiring about the identity of such a drink). In Section 2.3 below, we will discuss various factors that impose extra-grammatical biases toward the realization of Local FPD and a subordinate *wh*-scope interpretation in potentially ambiguous *wh*-interrogative sentences like (4) above.
4. See also Choe (1984) and Pesetsky (1987), who claim that Subjacency effects are observable even in other types of islands. Throughout this work, we will distinguish the notion of "Subjacency effects" from "the Subjacency Condition". For us, the former refers to the various degrees of awkwardness language users sense in letting a subordinate in-situ *wh*-phrase take its

scope outside an interrogative clause. The latter, in contrast, refers to the grammatical constraint proposed to capture these effects.

5. For instance, Takahashi (1993: 657, fn. 3) regards a matrix *wh*-scope interpretation in a sentence similar to (7) as straightforwardly available.

6. Hwang (2011) also reports that similar prosody-scope associations are replicated in the *wh*-interrogatives of Tokyo Japanese, Fukuoka Japanese, and Kyeongsang Korean in her production and perception experiments.

7. This observation has been made by Deguchi and Kitagawa (2002: 83) and supported experimentally by Kitagawa and Fodor (2006).

8. There is an extensive literature documenting this rhythmic principle in a variety of contexts, including stress-split in English compounds (Selkirk 1984: 248-9), accent-split in Japanese compounds, and extra F<sub>0</sub> Boost in Japanese (Kubozono 1993: 51, 59).

9. See Bader (1998), Fodor (1998), Fodor (2002a), Hirose (1999), Hirose (2003), Lovric (2003), and Kitagawa, Tamaoka and Tomioka (2013), among others, for the experimental results to support the Implicit Prosody Hypothesis.

10. There apparently are some speakers who can interpret *-kadooka* as COMP<sub>Wh</sub>, and for those speakers, (16) is acceptable as a yes/no question embedding an indirect *wh*-question.

11. The only case in which the “simplex” Fpd as in (18b) may become acceptable is an echo question like (i-B) or (i-B’) below uttered as a response to the question (i-A).

- (i) A: *Zyon wa asoko-de nani o katta no?*  
 John TOP there what ACC bought COMP<sub>Wh</sub>  
 'What did John buy there?'
- B: *E? DA're ga/wa asokode na'ni o katta ka tte?*  
 Huh who NOM/TOP there what ACC bought COMP<sub>Wh</sub> COMP<sub>That</sub>  
 'Huh? What did **WHÓ** buy there?'
- B': *%E? DA're ga/wa asokode na'ni o katta no?*  
 COMP<sub>Wh</sub>

12. *Why* in this sentence is to be interpreted in the subordinate clause, i.e. as “why John bought” not “why you wonder”.
13. For example, Takahashi (1993: 666, footnote 8) apparently finds no problem with an example involving the same hierarchical order between *naze* ‘why’ and *nani* ‘what’. On the other hand, some speakers apparently find even (32a) somewhat difficult to interpret. For instance, Watanabe (1992: 266) adds one question mark to a sentence similar to (32a).
14. When a multiple-pair interpretation is intended, it is somewhat difficult to try to interpret *naze* even in a position lower than another *wh*-phrase as the “sorted” (rather than “sorting”) information. A. Watanabe's (1992) question mark on (32a) possibly reflects this tendency.
15. Variation in fact may arise in the way speakers associate sentences with pragmatic contexts rather than in grammar per se. That is, some speakers may attempt to imagine some specific and suitable pragmatic context for a sentence quite thoroughly before pinning down their acceptability judgments while others do not.
16. Furthermore, any multiple-pair interpretation seems to be prohibited in this context. See Kitagawa, Roehrs and Tomioka (2004) for the observations and the analysis of this phenomenon.
17. Such a perceptual preference for congruence between prosody and syntax in sentence processing has independently been noted for other constructions in several languages. See, for example, the Structural Interpretation of Prosody Principle of Fodor (2002b).
18. *Ga* ‘NOM’ on the matrix subject *Zyon* ‘John’ was changed to *wa* ‘TOP’ to make the information packaging of the sentence more felicitous.
19. In this chapter, the “minimalist program/approach/syntax” refers to a general program seeking “to discover to what extent minimal conditions of adequacy suffice to determine the nature of the right theory” (Chomsky 2000: 92), which has been pursued with the working hypotheses to be mentioned immediately below. Crucially, the use of the term “minimalist” in this chapter does not refer to any particular mechanics or technical details Chomsky has adopted in pursuing this program, for example, postulation of specific functional categories like AGR or *v*, an appeal to a “probe-goal relation” (or its predecessor “feature checking”) or overt Agree.
20. What is meant to be captured by “Least Effort”, “Last Resort”, “Local Economy”, and “Procrastinate” are all subsumed here.
21. Richards implies the need to modify the model of grammar to let syntactic operations directly

refer to phonology, remarking that "... the look-ahead problems suggest that our understanding of the interfaces is flawed in some way" (p. 215, fn. 1). He also mentioned briefly the possibility that multiple Spell-Out at phase boundaries (Chomsky 2001) might be capable of offering a solution if it can permit phonology to return to the syntax an object annotated for prosodic structure at each phase edge (pp. 201-2, 206). It is not clear, however, if there is any substantial difference between claiming that "phonology returns to the syntax some aspects of phonology" and claiming that "syntax can look-ahead and access aspects of phonology". See Kitagawa (2013) for other potential problems of this particular idea as well as Richards' approach appealing to general prosodic phrasing.

22. There in fact are a number of studies which suggest that focus prosody does *not* create a MaP. The validity of the prosodic phrasing in (59) therefore is questionable to begin with. See Poser (1984), Shinya (1999), Kubozono (2007), and Ishihara (2011). See also Kitagawa and Hirose (2012), who also question the legitimacy of the experimental stimuli in some of Hirotsani's (2005) experiments.

23. In Section 7 below, we will touch upon the claim that the notion PL-complex in fact should be extended to cover such formal features as well.

24. This is an extended version of Deguchi and Kitagawa's (2002) "E-agreement". Following Fuchs (1984) in spirit, we assume that, when broad focus is involved, all the lexical items within the focalized domain are assigned the PL-complex [FOC<sub>P</sub>, FOC<sub>L</sub>]. In (i-A) below, for example, it is assigned to all of the lexical items within the focalized VP, i.e. *cleaned*, *my*, and *room*.

- (i)        Q:    What did you do yesterday?  
          A:    I [VP cleaned my room ].

As has been discussed by many researchers, however, how FOC<sub>P</sub> is phonetically implemented in broad focus is a complex matter which requires further explanation. See Selkirk (1996), Schwarzschild (1999), and Buring (2006), among others, for relevant discussion.

25. See Kitagawa (2013: 343) for the comparison of PL-complexes and Jackendoff's (1972: 240) "F".

26. Some qualifications are in order here. First, these PL-complexes presumably involve the



interrogative properties associated with *wh*-*C* pairs, but we will not pay attention to them in this chapter. Second, *no* in (63) possibly is some abbreviated form of *no-desu-ka* (NMLZ-COP-COMP<sub>wh</sub>), which seems to involve some specific presupposition on the part of the speaker. We suppress this complication in this chapter. Third, we also postulate a phonetically empty COMP<sub>wh</sub> ( $\emptyset_{ka}$ ) when no overt COMP appears in *wh*-questions in Japanese. We in fact should probably consider that the PL-complex [FOC<sub>p</sub>, FOC<sub>L</sub>] for non-*wh* focus also involves a similar pairing of a focused item and a phonetically empty COMP, a hypothesis which we will not pursue in this chapter.

27. The portion “the *end* of the maximal projection headed by” in (64ii) is redundant in a COMP-final language like Japanese, but not in COMP-initial languages. See Kitagawa (2013) for the analysis of Fpd in COMP-initial *wh-in-situ* languages.

28. This also suggests that what is often labeled as an “intonational phrase” in prosodic phonology is *not* necessarily derived directly from a syntactic constituent.

29. At the same time, the post-focal materials located within Fpd at PF presumably come to be regarded as the “tail” portion of the background of the focus at LF in the sense of Vallduví (1990).

30. We may consider that *wh*-movement is a more marked strategy of physical marking than *wh*-prosody since it involves an extra process of relocating phonetic content to the periphery of a clause, while prosody is assigned to a sentence no matter what. Richards’ generalization can be regarded as the reflection of such a markedness relation between the two options in (69).

One question that is not easy to answer is if there exist languages which adopt both strategies in (69). On the one hand, Ladd (1996: 170-172) mentions Romanian and Hungarian as those permitting “the nuclear accent on the *wh*-word” even when *wh*-movement applies “so long as the sentence is fairly short”. Zubizarreta (1998: 92-93, 179), on the other hand, considers that the mixture of (69i) and (69ii) is not permitted at least in Romance and most Germanic languages, distinguishing nuclear stress and focus prominence. The pursuit of this issue must be left for future work.

31. In effect, we have identified the  $f_p$  of P-complexes as a possible locus of cross-linguistic variation while maintaining the universality of the paired  $f_L$ .

32. Another logical possibility of course is to analyze the *wh*-phrase as being externally merged at the periphery of the relevant CP and becoming P-legible there at PF.

33. Such a “derivational” mapping of physical syntax onto logical syntax can induce, for instance, various LF-reconstruction effects. We tentatively assume that multiple transfer applies also in the mapping of logical syntax onto semantics and that of physical syntax onto phonology/phonetics. Note that our  $\phi F$  is a purely syntactic representation, which is more abstract than PF. In principle, a PL-complex could come in a “simplex” form of  $[f_P]$  alone or  $[f_L]$  alone. The former then would induce, for instance, stylistic rules and the latter, covert movement. We will, however, refrain from pursuing this possibility in this work.

34. Crucially, however,  $[wh_P]$  would not require us to assign any contradictory semantic characterization to a focus feature for moved *wh*-phrases and one for in-situ *wh*-phrases as Bošković’s  $[F]$  feature does. Kitagawa (2011) also points out that EPP characterized as “a case feature that needs to be a spec” in Bošković’s approach is essentially equivalent to the property “I need to be located at the Spec-position of the target head *at PF* (i.e. must be pronounced there)”, and overt movement is assumed to apply before Spell-Out solely to achieve this anticipated displacement effect at PF.

35. If no such  $[C_P]$  is encountered in the course of derivation,  $[wh_P]$  fails to become P-legible and a crash arises.

36. We could postulate syntactic derivation in which merge generates *linearly unordered* syntactic objects as Chomsky (2013) does, and let multiple transfer map it to both physical and logical syntax. But generation of such syntactic objects would in fact give rise to redundancy since logical syntax can simply disregard linear order existing in syntactic objects when it establishes a c-command relation intra-sententially. On the other hand, logical syntax can also appeal to linear order when some discourse principle (e.g. the Novelty Condition of Heim 1982: 150-152) would call for it within a single utterance (e.g. He likes  $\{a\ cat_1 / the\ cat_1 / it_1\}$  and/while she hates  $a\ cat_{*1}$ ). It should also be made clear that (71) is proposed as a model of competence, *not* as an acquisition model.

37. Chomsky (2001: 6), for instance, has characterized Case merely as an entity ancillary to agreement, assuming that Case of a goal N is “assigned a value under agreement, then removed by Spell-Out from the narrow syntax” without playing any role in the Probe-Goal relation.

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