On the WH-Question Intonational Domain in Fukuoka Japanese:
Some Implications for the Syntax-Prosody Interface

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1.   Introduction[1]

It is well established that the syntactic structure of an utterance influences the prosodic phrasing of that utterance. However, there are a number of competing views of just what kinds of syntactic information are relevant for prosodic structure. These views range from models in which a detailed syntactic representation is available to influence prosodic structure formation (e.g., Kaisse 1985; Odden 1987, 1990), to models that recognize only limited interaction between syntax and prosodic structure, mediated by a syntax-prosody interface component of the grammar (e.g., Nespor & Vogel 1986; Selkirk 1986; Chen 1987; Truckenbrodt 1995).

Even models that recognize a restricted syntax-prosody interface differ with respect to how much syntactic information is available at the interface. For example, Truckenbrodt (1995, 1999) proposes that constraints relating syntactic XPs to prosodic structure can be sensitive to at most one level of prosodic phrasing in a given language. But Sugahara (2003) argues that both major phrases (MaP) and minor phrases (MiP) — two distinct levels of the prosodic hierarchy — are subject to XP-edge alignment constraints in Tokyo

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Japanese. Will the investigation of XP-prosody mapping in additional languages uncover more cases in which multiple prosodic levels interact with XP-level syntactic constituents?

Another proposed restriction is that of Selkirk (2000, 2003), according to which syntax-prosody constraints on edge alignment can refer to XP and X^0 edges, but not to the location of syntactic/semantic elements such as focus features. However, Kisseberth (to appear) argues that syntactic/semantic features including negation and definiteness influence prosodic phrasing in Chimwiini. Can Chimwiini-type effects of negation and definiteness on prosodic structure be reduced to differences in focus structure, and perhaps ultimately to the kinds of focus-prominence interactions that Selkirk (2003) proposes for Bengali? Or must the syntax-prosody edge alignment constraints be sensitive to additional syntactic/semantic information as well?

Thus, the question of how much information must necessarily be accessible to syntax-prosody interface constraints remains open. This paper examines the implications of another intonational system for this ongoing debate, and suggests that some of the most restrictive models of the interface may be too strong. The focus here is an interaction between WH-questions and prosodic phrasing in Fukuoka Japanese (a dialect of northwestern Kyushu; Hayata 1985; Kubo 1989 et seq.), which has several implications for our understanding of the syntax-prosody interface. First, as established by Hayata and Kubo, one syntactic configuration that is relevant for prosodic structure formation is the span between a WH-phrase and the [+WH] complementizer that binds it — and this span, referred to below as the *WH-domain*, is not necessarily a complete syntactic constituent. But if the Fukuoka pattern forces us to propose that a [+WH] feature or feature chain is involved in the syntax-prosody mapping, this might contradict Selkirk's (2003) claim that edge-alignment constraints refer only to syntactic constituent edges. Additionally, the level of prosodic phrasing that interacts with the WH-domain appears, based on previous descriptions of the Fukuoka dialect, to be the MiP. This observation supports Sugahara's (2003) claim that not only the MaP, but also the MiP, takes part in syntax-prosody interface constraints in Japanese dialects.

The relevant Fukuoka intonational patterns are described and exemplified in §2 below, and some of their implications for the nature of the syntax-prosody interface are discussed in §3. In §4, an alternative approach to Fukuoka WH-questions is considered: the Multiple Spell-Out account (MSO) developed by Ishihara (2004) for Tokyo Japanese. According to the MSO, the prosodic domain of certain WH-question-related intonational effects in Tokyo can be accounted for, without reference to any [+WH] features in the phonology, because the syntactic derivation is cyclic and different parts of the morphosyntactic structure become available to the syntax-phonology interface at different cycles. If this same mechanism were able to derive the size and location of the WH-domain in Fukuoka, then complicating the syntax-prosody interface with additions such as reference to [+WH] features, or alignment constraints on MiP edges, might not be necessary. However, §4 also presents several reasons why the MSO cannot be successfully extended to the Fukuoka pattern. Therefore, some of the proposals that strongly restrict the kinds of

syntactic and prosodic information available to the syntax-prosody interface may need to be weakened to some extent. (Future work planned in collaboration with Tomoyuki Kubo will continue to explore the questions raised here.)

## 2.	The intonational phonology of the Fukuoka WH-domain

A striking intonational characteristic of Fukuoka Japanese is a flat high tonal contour that appears in WH-questions (and also in certain quantificational expressions built from WH-elements, such as *WH...mo* 'no matter WH...'; see Kubo (1989 et seq.) for details). The H-tone span stretches between a WH-element and its associated [+WH] complementizer, a syntactic string referred to here as the *WH-domain.*

The intonational pattern of the Fukuoka WH-domain was first described by Hayata (1985: 25-27) and has been extensively investigated by Kubo (1989, 1990ab, 1992, 2001, to appear). The following examples (from Kubo 1989) illustrate the difference between a yes/no-question (1), in which the ordinary, non-WH intonational patterns are observed (to be described below; very similar to Tokyo), and WH-questions (2), which show the crucial flat high contour within the WH-domain. Here and in subsequent examples, '{ }' demarcates the WH-domain; ' ‾‾ ' indicates the H-tone span inside the WH-domain; ' ' ' indicates the location of a fall from H to L tone, that is, a pitch accent; and '↑' indicates a final rising tone. WH-phrases and their associated complementizers are marked with **bold underline**.[2]

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[2]Abbreviations for functional categories used in glosses include: NOM nominative, ACC accusative, DAT dative, TOP topic, PRF perfective, IMPF imperfective, PRG progressive, NEG negative, COP copula, NZR nominalizer.

(1)   Fukuoka yes/no-question: Ordinary pitch accents and phrasing appear[3]

Omae kyo'-nen Kyo'oto it-ta to' ya Ø ↑ ?
you   last-year Kyoto go-PRF NZR COP C$_{+Q}$
'Did you go to Kyoto last year?'
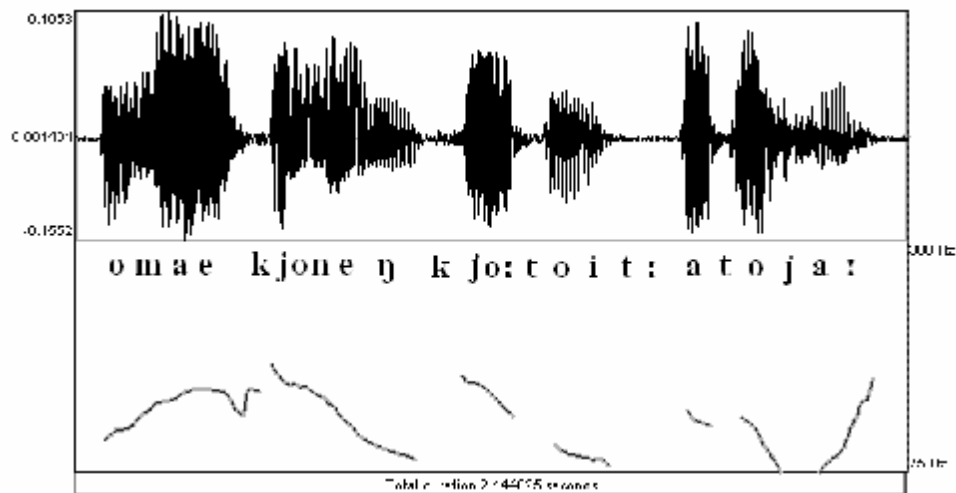
[3]The recordings from which the pitch tracks in (1) and (2) have been generated were originally intended as audio illustrations of the example sentences in Kubo (1989). Therefore, they were not designed with f_0-tracking in mind — they contain voiceless obstruents and other segments that disrupt the f_0 contour. Even so, differences between (1) and (2a) are readily apparent, especially with respect to the absence of pitch accents (H*+L contours) in (2a); likewise, the end of the H-tone span at *ka* in (2b) is clearly visible. Pitch tracks contrasting yes/no and WH-questions in Fukuoka (and in Pusan Korean) are also given in Kubo (2001).

(2)   Fukuoka WH-questions

(a) Matrix question: Flat high tonal contour to end of matrix clause

{ **<u>Dare</u>**-ga kyo-nen Kyooto it-ta to ya **Ø** ↑ } ?
who-NOM last-year Kyoto go-PRF NZR COP C$_{+WH}$
'Who went to Kyoto last year?'
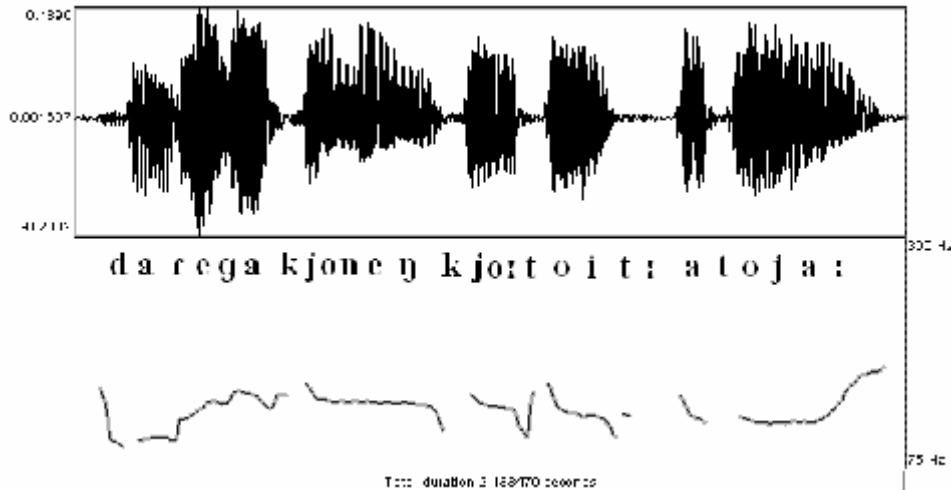
(b) Embedded question: H-tone span ends at [+WH] complementizer *ka*

{ **<u>Dare</u>**-ga Kyooto ik-u ' **<u>ka</u>** } wakar-a'n
who-NOM Kyoto go-IMPF C$_{+WH}$ know-NEG
'I don't know who's going to Kyoto.'
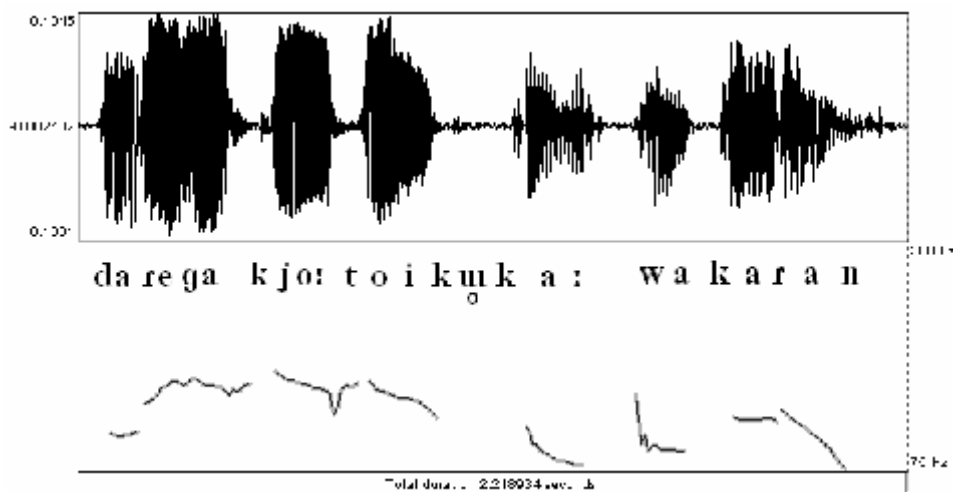
For present purposes, the significance of the flat high tonal contour is in what it reveals about prosodic phrasing in Fukuoka WH-questions. It has been extensively argued

for other dialects of Japanese, especially Tokyo, that intonational patterns serve as diagnostics for prosodic constituents of various levels (McCawley 1968; Poser 1984; Beckman & Pierrehumbert 1986; Pierrehumbert & Beckman 1988; Selkirk & Tateishi 1988, 1991; Nagahara 1994; Sugahara 2003, to appear; Selkirk, Shinya, & Kawahara 2004; Kawahara & Shinya this volume). For example, in Tokyo, the MiP, which is a phrasal constituent one level above the prosodic word (PrWd), is the domain of so-called "initial lowering," a LH rise that occurs during approximately the first and second moras of the phrase. The next higher prosodic level is the MaP, which is the domain of downstep: that is, successive pitch-accent H tones have progressively lower f_0 within a single MaP, but there is a pitch-reset effect to a higher f_0 level at a new MaP boundary. As yet, there has been no detailed instrumental investigation of the intonational patterns of the Fukuoka dialect, but the careful impressionistic descriptions in Hayata (1985) and Kubo (1989 et seq.) suggest considerable similarity with the Tokyo dialect,[4] as these authors note.

Much like Tokyo, in Fukuoka Japanese each word may have at most one fall from H to L; the location of this pitch fall is unpredictable for nouns but predictable for words of other categories; and once the location of the pitch fall is specified, several other tonal characteristics of the word or phrase are predictable (Hayata 1985). Thus, Fukuoka appears to have the same H*+L pitch accent as is found in Tokyo (and many other Japanese dialects). Examples of H*+L pitch accents can be seen in the illustrative pitch tracks given above: *kyo'nen, Kyo'oto, to' ya* in (1) and *wakara'n* in (2b) (' ' ' in text examples marks the location of the pitch fall).

Crucially, however, no accents appear inside the WH-domain, except on the penultimate mora of an embedded WH-clause (*itta' ka* in (2b)). Except for the clause-initial DP, the same lexical items appear in (2a) as in (1), but no pitch fall occurs on *kyonen, Kyooto, to ya* in (2a) because these now occur within the span bounded by the WH-element *dare* and its associated (null) complementizer.

Another characteristic of Fukuoka intonation is that within a phrase, moras to the left of the accent (if any) are H except for a phrase-initial L mora, and moras to the right of the accent (if any) are L. Unaccented phrases start with a L mora and subsequent moras are H. This is closely analogous to the intonational contour of the MiP in Tokyo, including the "initial lowering" effect that, in Tokyo, has been argued to mark the left edge of a MiP.

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[4]Although the Fukuoka and Tokyo dialects seem to have very similar intonational systems, it is not the case that they are closely related dialects. The lexical pitch accents of genetically related nouns often differ between the two dialects; the default accent-location rules for verbs and adjectives are different in the two dialects (compare Fukuoka *tabe'-ta,* Tokyo *ta'be-ta* 'eat-PRF'); and only Fukuoka has a requirement that all verbs and adjectives *must* bear a pitch accent. Additionally, there are major lexical differences between the two dialects, especially with respect to inflectional morphology and sentence-final particles; notably, Hayata and Kubo provide 'standard' (~Tokyo) Japanese glosses for many of the Fukuoka examples in their papers. Furthermore, Fukuoka and Tokyo are geographically quite distant, and typologically distinct accent zones intervene between the two.

Examples of initial lowering in Fukuoka can also be seen in the pitch tracks: *omae* (**LHH**) and *itta* (**L(H)H**) in (1), *dare* (**LH**) in (2ab), and *wakara'n* (**LHHL**) in (2b).

As with pitch accents, there are differences in initial lowering between the basic intonational pattern and the intonation of the WH-domain. As described by Hayata (1985) and Kubo (1989 et seq.), there is no initial lowering internal to the WH-domain (except in cases where a second WH-element is bound by the same [+WH] complementizer; see Kubo (1989, to appear) for discussion). The illustrative WH-questions in (2ab) accord with this description. In neither case is there any initial lowering between *dare* and its associated complementizer, namely, the sentence-final null complementizer in (2a) or the embedded complementizer *ka* in (2b). Also, a difference can be seen between the non-WH case in (1), where there is initial lowering at *itta*, and the analogous WH-question in (2a), where there is not. Additional evidence that phrase breaks are not possible inside the WH-domain is provided by Kubo (1989: 75-76): the particle *-kusa,* which can be broadly characterized as an emphatic particle, must be followed by a phrase break, and this particle cannot appear inside the WH-domain.

In summary, instrumental analysis of Fukuoka intonation is needed to fully confirm the generalizations made by Hayata and Kubo on the basis of their impressionistic studies, but from the evidence available thus far, the following characteristics seem to hold of the WH-domain in Fukuoka.

(3)   Intonational characteristics of the WH-domain (Hayata 1985; Kubo 1989 et seq.)

   (a) Lexically specified pitch accents on nouns, and the predictable pitch accents on verbs and adjectives that are ordinarily assigned on the (syllable containing the) penultimate mora, consistently fail to appear inside the WH-domain.

   (b) The WH-domain has a default tonal shape: LH* for a matrix clause, and LH*L for an embedded clause.

   (c) No initial lowering occurs inside the WH-domain.

While Hayata's and Kubo's earlier descriptions of Fukuoka WH-questions refer to the formation of a single "phonological phrase" without specifying exactly which level of the prosodic hierarchy is involved, Kubo (to appear) explicitly proposes that the WH-domain has the prosodic structure of a MiP. This proposal is consistent with a major diagnostic of the MiP in Tokyo, and, apparently, in Fukuoka: the MiP has initial lowering at the left edge, but not internally. Analyzing the WH-domain as a single MiP is also consistent with the absence of pitch accents in this domain, since (again, at least in Tokyo) at most one accent is permitted to occur per MiP.

The remainder of this paper is primarily concerned with the factors that are involved in determining the extent — size and location — of the MiP that constitutes the

WH-domain, rather than with the factors that determine the pitch contour internal to this MiP. In particular, the difference between the LH* contour of the WH-domain in matrix WH-questions and the LH*L of embedded questions will not be considered in detail. For now, it can be noted that these pitch contours are compatible with an analysis in which a default pitch accent appears on the (syllable containing the) penultimate mora in the embedded case, but no pitch accent appears in the case of a matrix WH-question. From this assumption, the other details about the LH* vs. LH*L contours of the WH-domain follow in accordance with the regular mechanisms of Fukuoka intonational phonology. No explanation is immediately apparent as to why only the matrix-WH case is unaccented, but Kubo (1992: 269) notes that this may be related to certain other Fukuoka structures in which a discourse-oriented sentence-final rising tone seems to trigger deletion of a phrase-final accent (as illustrated in (2a) above, matrix WH-questions typically have a final rising tone).

In conclusion, then, intonational patterns indicate that the WH-domain in Fukuoka obligatorily corresponds to a MiP, whose left edge is determined by the location of the WH-element, and whose right edge is determined by the associated complementizer (if the matrix complementizer is null, by the end of the clause).

3.   Mapping the WH-domain to a MiP

The phonology of the Fukuoka WH-domain as described in the previous section has implications for two proposals concerning the nature of constraints that regulate the syntax-prosody interface, given in (4).

(4)   Proposed restrictions on syntax-prosody interface constraints

(a) Syntax-prosody mapping constraints refer to Utterance, Intonational Phrase, MaP, and PrWd, but **not to other levels of the prosodic hierarchy**, including MiP.
(Truckenbrodt 1995: 28)

(b) Prosodic constituent edges are subject to Alignment constraints that relate them to syntactic constituent edges, but **not to Alignment constraints that relate them directly to non-edge elements**, such as morphosyntactic Focus marking.
(Selkirk 2003: 307)

If it is determined that the WH-domain in Fukuoka Japanese can only be derived by means of constraints that map *a [+WH] feature* to the left or right edge *of a MiP,* this will indicate that the claims in (4) need to be weakened.

For example, if — as expected on the basis of existing descriptions of this dialect — instrumental analysis of the intonational phonology of Fukuoka WH and non-WH utterances confirms that the WH-domain is prosodically a MiP, then this may (depending

on the precise nature of the constraints involved) indicate that syntax-prosody edge-mapping constraints can refer to the MiP as well as to the MaP, counter to the claim in (4a). Such a result would in fact have a precedent in the literature on prosodic structure in Japanese. Sugahara (2003: 317) presents evidence from the Tokyo dialect that, in addition to a constraint aligning syntactic XPs with MaPs, there is a constraint aligning XPs to MiPs.

At this point, it is not possible to determine whether or not the Fukuoka pattern will provide a counterexample to the proposed restriction in (4b). If it turns out that the phonology of the WH-domain in Fukuoka can be analyzed in terms of focus features that interact with prosodic prominence (Selkirk 2000, 2003), then there may be no need to weaken the statement in (4b). However, Kubo (1992, to appear) gives some indication that the phonology of focus in Fukuoka shares some attributes with, but is nevertheless distinct from, the phonology of WH-questions. If this is so, it may be necessary to posit constraints that align the edge of a [+WH]-feature chain with the edge of a MiP, which would require that the claim in (4b) be weakened. For now, this question is left for future research.

In any case, another potential way to avoid having to weaken the proposed restrictions in (4) is to find an indirect method of deriving the Fukuoka WH-domain, one that does not crucially rely on syntax-prosody mapping constraints at all. This point is pursued in the following section.

4.   The MSO: Attempting to derive the WH-domain indirectly

If the intonational pattern of the Fukuoka WH-domain could be analyzed without constraints that directly make reference to [+WH] features or feature chains, this would provide support for models of the syntax-prosody interface that restrict the amount of syntactic and prosodic information needed to characterize the interface constraints (Selkirk 1995, 2003; Truckenbrodt 1995, 1999). One potential alternative approach to the Fukuoka pattern that, if successful, might achieve this result is the Multiple Spell-Out Account (MSO).

The MSO was developed by Ishihara (2004) to handle a prosodic effect of WH-scope in Tokyo Japanese that is very similar to the Fukuoka pattern, in that the linear string bounded by a WH-element and its associated complementizer forms a special intonational domain (see also Ishihara 2002, 2003 and Deguchi & Kitagawa 2002 for related discussion).[5] The fundamental idea behind the MSO is that the relevant intonational

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[5]It should be noted that there is some debate over whether the MSO really does fit the Tokyo pattern. Hirotani (2003, 2004ab) has shown in production and perception experiments with Tokyo speakers that the WH-scope/intonation correlation is a *preference* rather than an absolute requirement. Based on these findings, Hirotani argues that the Tokyo pattern arises from a processing strategy and is not a matter for the formal grammar of the syntax-phonology interface. However, the WH-scope/intonation correlation in Fukuoka does seem to be unambiguous (T. Kubo, p.c.), and thus a matter for the grammar — so even if the MSO turns out not to be appropriate for Tokyo, it is still potentially applicable to the Fukuoka pattern.

contour is initiated at the left edge of a WH-element, and then simply continues *to the end of the utterance* — but under certain conditions, there is an intermediate stage of the syntactic derivation at which only the embedded clause is available to the phonology, and in such cases the "end of the utterance" is effectively the location of embedded complementizer. Under this approach, the fact that the WH-related intonational contour extends as far as whichever complementizer binds the WH-element is an indirect consequence of syntactic cyclicity, not a direct MiP-to-[+WH] mapping effect.

This section evaluates the ability of the MSO to account for the extent (size and location) of the Fukuoka WH-domain. As it turns out, the MSO is successful in capturing the intonational distinction between main and embedded WH-scope, and in predicting the difficulty of scrambling a WH-element out of an embedded question. However, the MSO is less successful in accounting for other aspects of the Fukuoka pattern, especially the (marginal) acceptability of scrambling a *non*-WH element out of an embedded question, and the relationship between the WH-element and the left edge of the WH-domain. These characteristics of the Fukuoka dialect, and their relevance for the MSO account, are discussed in §§4.1-4.4.

4.1   Main vs. embedded WH-scope

From the earliest descriptions of the Fukuoka WH-domain (Hayata 1985, Kubo 1989), it has been observed that the WH-domain ends where the syntactic/semantic WH-scope ends, i.e., at the [+WH] complementizer that binds the WH-element initiating the WH-domain. This effect is exemplified in (2) above, repeated here as (5).

(5)   WH-domain correlates with WH-scope (data from Kubo 1989)

     (a)   Matrix question: WH-domain continues to end of matrix clause

              { **<u>Dare</u>**-ga kyo-nen Kyooto it-ta to ya **<u>Ø</u>** ↑ } ?
               who-NOM last-year Kyoto go-PRF NZR COP C_{+WH}
               'Who went to Kyoto last year?'

     (b)   Embedded question: WH-domain ends at [+WH] complementizer[6]

              { **<u>Dare</u>**-ga Kyooto ik-u ' **<u>ka</u>** }   wakar-a'n
               who-NOM Kyoto go-IMPF C_{+WH} know-NEG
               'I don't know who's going to Kyoto.'

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[6]As noted above in §2, the intonational contour assigned to a WH-domain is that of an unaccented MiP (LH*) for a matrix [+WH] complementizer, but that of a MiP with a default (penultimate-mora) pitch accent (LH*L) for an embedded [+WH] complementizer. Accordingly, a pitch fall appears in the WH-domain in (5b), but not in (5a).

This distinction is one that is exactly predicted by the MSO. As described in Ishihara (2004), the MSO is based on Chomsky's proposal (2000, 2001ab) that CP is a *phase* of the syntactic derivation, and that the sister of the head of each phase is sent to Spell-Out once its structure has been assembled — even if the full syntactic derivation is not yet complete. A phase is any subpart of a clause that constitutes "the closest syntactic counterpart to a proposition: either a verb phrase in which all θ-roles are assigned or a full clause including tense and force" (Chomsky 2000: 106). In a derivation that will eventually converge, "all selectional requirements are satisfied" in each phase (Chomsky 2000: 107).

According to the MSO, a WH-scope/intonation correlation appears because the WH-related intonational contour is created cyclically, phase by phase (Ishihara 2004: 7). That is, the WH-related intonational contour is obligatorily formed within the lowest CP in which the appropriate conditions are met for Spell-Out. On the assumption that an unchecked [+WH] feature (e.g., a WH-element that is not bound by a [+WH] complementizer) prevents an embedded CP from sending its TP to Spell-Out, this provides a way to distinguish between the matrix and embedded WH-scope cases.

Specifically, an embedded WH-element that is associated with the C of the embedded clause will have its [+WH] feature checked (satisfied) inside the embedded clause. As a result, the embedded TP must be sent to Spell-Out. At Spell-Out, the WH-element triggers the formation of a WH-related intonational contour. However, the right edge of this intonational domain can extend no further than the right edge of the embedded TP,[7] because morphosyntactic material that is not included in this phase cannot be phonologically manipulated at this instance of Spell-Out. A structure of this type is shown in (6).

[7]Ishihara (2004: 7, note 6) points out that because it is TP, not CP, that is sent to Spell-Out, this account would seem to predict, incorrectly, that the complementizer itself is excluded from the WH-related intonational domain. He suggests that complementizers and other WH-particles are phonologically cliticized to the preceding prosodic word (PrWd), and therefore surface phonologically as part of that PrWd's intonational contour.

(6)   Embedded wh-phrase and embedded [+wh] complementizer
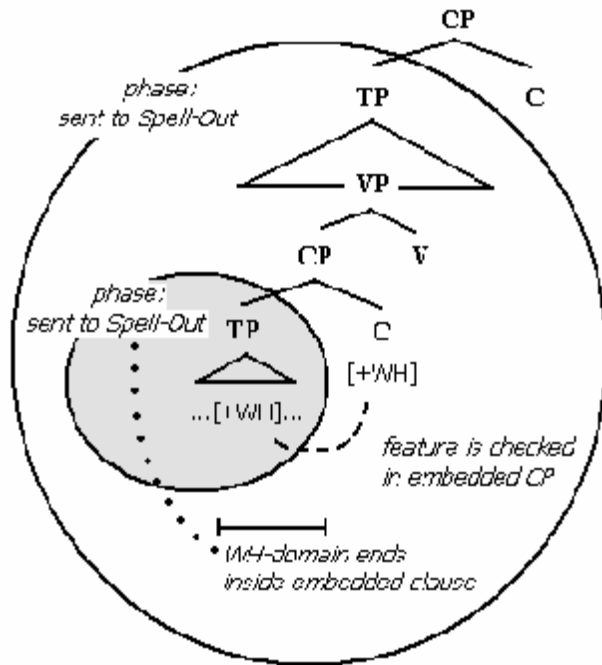
On the other hand, when an embedded wh-element is associated with a [+wh] complementizer in a *higher* clause, the as-yet-unchecked [+wh] feature on that wh-element will prevent the embedded clause from being sent to Spell-Out on its own. Spell-Out happens for the first time at the level of the matrix CP, so when the wh-related intonational domain is created, material from both the embedded and matrix clauses is present. In this case, there is no right-edge bound on the intonational domain, so it extends into the matrix CP, as shown in (7).

(7)   Embedded WH-phrase and matrix [+WH] complementizer
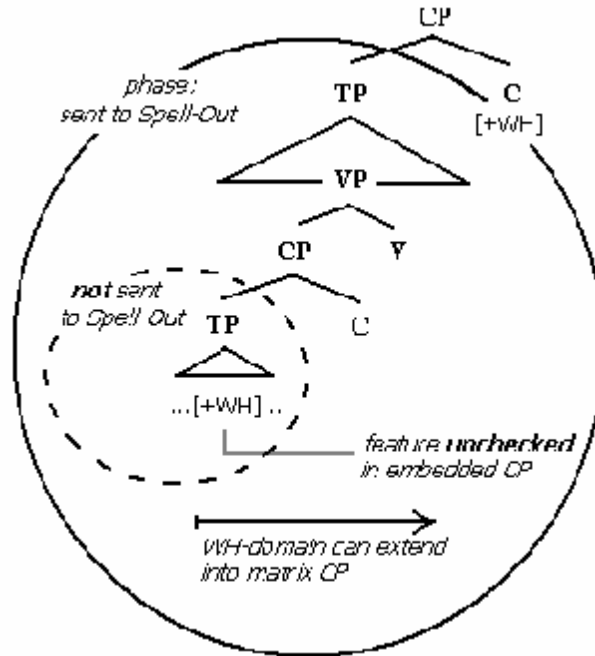
       Thus, the MSO correctly predicts that the WH-related intonational contour extends into the matrix clause only if the matrix complementizer is the one that binds the WH-element.

4.2   WH-scrambling out of embedded WH-domain

Another characteristic of the Fukuoka WH-domain that is handled well by the MSO is the fact that the ability to scramble an embedded WH-phrase up into the matrix clause correlates with the presence of a WH-domain that extends to the end of the matrix clause.

(8)   Scrambling of an embedded WH-phrase into the matrix clause

      (a) WH-phrase bound by matrix complementizer (T. Kubo, p.c.)

          [CP {**nani**$_i$-o Tomoyuki-wa [CP Taroo-ga Hanako-ni t_i okut-ta to] omot-t.oo to **Ø** ↑ }]
          what$_i$-ACC Tomoyuki-TOP [Taro-NOM H.-DAT t_i send-PRF C] think-PRG NZR C$_{+WH}$
          'What does Tomoyuki think [that Taro sent to Hanako]?'

      (b) WH-phrase bound by embedded complementizer (Kubo to appear)

     * [CP { **nani**$_i$-o Tomoyuki-wa [CP Taroo-ga Hanako-ni t_i okut-ta ' **ka** }] sit-t.oo to Ø ↑]
         what$_i$-ACC Tomoyuki-TOP [Taro-NOM H.-DAT t_i send-PRF C$_{+WH}$] know-PRG NZR C$_{+WH}$

The MSO correctly distinguishes between these two cases. In (8b), at the stage where only the embedded CP has been formed and no scrambling has yet taken place, the [+WH] features have already been checked. The embedded TP is therefore sent to Spell-Out, as evidenced by the fact that the WH-relevant intonational contour extends only to the end of the embedded clause. If being sent to Spell-Out makes the TP ineligible for further syntactic movement operations, as is generally assumed, then scrambling the WH-phrase out of that embedded TP into the higher clause is not possible.

In (8a), however, the [+WH] feature of the WH-phrase remains unchecked inside the embedded CP, so the embedded TP is not sent to Spell-Out (which is why the WH-related intonational contour extends to the end of the matrix clause). Therefore, scrambling from inside the lower CP remains possible later in the derivation.

In summary, the MSO correctly predicts that matrix WH-scope correlates both with a WH-domain that extends to the end of the matrix clause, and with the possibility of scrambling an embedded WH-element up into the matrix clause. The MSO also correctly predicts that embedded WH-scope correlates both with a WH-domain that ends at the embedded complementizer, and with a ban on scrambling an embedded WH-element outside the lower CP. However, the next two points to be discussed pose problems for the MSO as an account of the Fukuoka WH-domain.

4.3 *Non-WH scrambling out of embedded WH-domain*

The MSO is successful in predicting the difference between (8a) and (8b) above because it incorporates the assumption that Spell-Out of the embedded clause blocks any later scrambling from the embedded CP. However, this same assumption renders the MSO account unable to explain why, in the following pair of sentences, (9a) is better than (9b).

(9)   Scrambling of a non-WH phrase out of an embedded question

    (a) WH-related intonational contour contained in embedded CP

  ? [CP Yumi-ni$_i$ Naoya-wa [CP Mari-ga t_i { **<u>nani</u>**-o okut-ta ' **<u>ka</u>** }] sit-t.oo to Ø ↑]
    Yumi$_i$-DAT Naoya-TOP [Mari-NOM t$_i$ *what-ACC send-PRF C$_{+WH}$] know-PRG NZR C$_{+WH}$*
    'To Yumi, what does Naoya think [that Mari sent]?'

    (b) WH-related intonational contour extends through matrix CP

  * [CP Yumi-ni$_i$ Naoya-wa [CP Mari-ga t_i { **<u>nani</u>**-o okut-ta **<u>ka</u>**] sit-t.oo to Ø ↑ }]
    Yumi$_i$-DAT Naoya-TOP [Mari-NOM t$_i$ *what-ACC send-PRF C$_{+WH}$] know-PRG NZR C$_{+WH}$*
    (intended interpretation as in (9a))

While (9a) is somewhat less than fully acceptable, it is judged to be noticeably better than the ungrammatical (9b) (T. Kubo, p.c.). Under the MSO, however, this leads to something of a contradiction. The intonational contour in (9a) is the one that corresponds to

an intermediate Spell-Out of the embedded CP. As seen in the discussion of (8a) above, sending the embedded CP to Spell-Out is expected to prevent the scrambling of any of the embedded-CP constituents up into the matrix clause. Now, it might be feasible to account for the availability of scrambling in (9a) by proposing that scrambling is driven by some kind of discourse-related "scramble" feature that can only be checked at the left edge of the matrix CP. The presence of this as-yet-unchecked feature on some constituent in an embedded CP could then be said to prevent an intermediate Spell-Out of the embedded clause, which in turn would allow elements in the embedded clause to remain eligible for movement later in the derivation. But given this assumption, the MSO now predicts that the WH-domain should be that of the ungrammatical (9b) whenever an embedded phrase such as *Yumi-ni* is scrambled. The problem is that, without an intermediate Spell-Out of the embedded clause, the WH-related intonational contour can only be created when the entire matrix clause is sent to Spell-Out — so there is no way to make the WH-domain end at the embedded complementizer. Under the MSO, then, (9b) is incorrectly predicted to be better than (9a).

Also relevant to this point is the observation by Kubo (to appear) that in Pusan Korean, which has a very close counterpart to the Fukuoka WH-domain, the movement of a WH-element out of an embedded question with a WH-domain that ends at the right edge of the embedded clause (i.e., a construction equivalent to (8b) above) is fully grammatical. This Pusan pattern, without even a tinge of reduced acceptability, poses even a greater problem for a potential MSO-based account of WH-related intonational contours.

4.4   The left edge of the WH-domain

As seen in §§4.1-4.2 above, the MSO addresses the question of where the WH-domain ends by specifying that the WH-related intonational contour extends to the end of the utterance (and taking advantage of the fact that the "end of the utterance" visible at an intermediate application of Spell-Out may actually be the end of the embedded CP). However, a complete account of the WH-domain must also account for the fact that the WH-related intonational contour *begins* at the left edge of the WH-element.

Ishihara's (2004) application of the MSO to WH-related intonation in Tokyo is able to handle the left-edge question by treating WH-intonation as a subcase of focus intonation (a move that is well motivated for Tokyo; see Ishihara (2002, 2003, 2004) for discussion). By designating the WH-element as a bearer of focus, Ishihara (2004) is able to invoke the independently attested phonology of Post-Focus Reduction (Nagahara 1994; Sugahara 2003, to appear), which creates an intonational contour that starts at the left edge of the focused constituent.

However, as noted in §3 above, there are certain differences between the phonology of focus and that of the WH-domain in Fukuoka (Kubo 1992, to appear). Therefore, while additional investigation is needed, it does not seem likely that the strategy of reducing WH-domain phonology to focus phonology will succeed in this case. If not,

then some additional factor would have to be added to the MSO account in order to designate the correct left edge for the WH-domain — and this additional factor most likely resembles the kind of syntax-prosody interface constraints, such as ALIGN (Selkirk 1995) or WRAP (Truckenbrodt 1995, 1999) constraints, that the present exploration of an MSO-based account was intended to replace.

4.5   Summary: The MSO as an account of the Fukuoka WH-domain

The MSO is successful at deriving the basic correlation between matrix vs. embedded WH-scope and the location of the right edge of the WH-domain in Fukuoka. However, this approach predicts too tight a correlation between an embedded-clause WH-domain and a ban on scrambling anything out of the embedded clause; such a ban is appropriate for WH-phrase scrambling in Fukuoka, but incorrectly rules out non-WH-phrase scrambling in Fukuoka (as well as WH-phrase scrambling in Pusan Korean). Additionally, one of the attractive points of the MSO as an account of the Tokyo WH-domain is its ability to relate that pattern to the general phonology of focus in that dialect, and this connection does not appear to be as appropriate for the case of Fukuoka.

5.   Conclusions

Two aspects of the intonation of WH-questions in Fukuoka appear to pose a challenge to highly restrictive theories of the syntax-prosody interface: the phonological analysis of the WH-domain as a MiP, and the fact that it appears to be WH-elements and [+WH] complementizers, not syntactic constituent edges or morphosyntactic focus features, that determine the edges of the WH-domain. Since an MSO-based alternative approach was not able to account for Fukuoka WH-question phonology, it does seem that some of the restrictions on what kinds of information are available for syntax-prosody interface constraints will have to be reexamined.

One promising line of research to pursue may be to see just how much WH-intonation has in common with focus intonation in Fukuoka. While the two do not seem to be as phonologically similar in Fukuoka as they are in the case of Tokyo, the fact remains that WH-questions and focus have closely related semantic analyses. Selkirk (2000) has proposed that syntax-prosody interface constraints distinguish between presentational ("new information") focus and contrastive focus. Perhaps the intonational phonology of the Fukuoka WH-domain will prove amenable to an analysis that minimally extends existing models of the syntax-phonology interface by adding "WH-focus" to the typology of focus features.

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