# **Beyond Strength and Weakness**\*

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#### 1. Introduction

The synonymous sentences in (1) illustrate a classic problem in syntax: some languages perform wh-movement overtly, while others do not:

- $(1) \quad a. \quad \frac{\mathbf{What}}{\mathbf{What}} \text{ did John buy } \underline{\hspace{0.5cm}}?$ 
  - b. John-wa <u>nani</u>-o katta? [*Japanese*]

    John TOP what ACC bought

Throughout, I will refer to the option in (1b) as 'covert movement', but in fact nothing I will say here will hinge crucially on the correct representation of this type of example. Much fruitful work has concentrated on how exactly to characterize the difference between (1a-b): should we understand Japanese as having roughly the same syntax for wh-questions as English, with a type of movement masked by some difference in the mapping of syntax onto phonology? or should we posit a different syntax for Japanese wh-in-situ, with a correspondingly different semantics for wh-words that allows them to be interpreted without movement?

While some progress has been made on these questions, comparatively little research has focused on the question of why languages differ in this way. The answer to this question that current theories standardly offer make the difference a parameter, something unpredictable about each language that must be learned by the child: in Minimalism, we speak of languages having 'strong' or 'weak' wh-features, or (more recently) of C having, or lacking, an EPP feature.

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<sup>\*</sup> Many thanks to...

In this type of theory, the overt/covert distinction for wh-movement cannot be explained; it is simply stipulated, without following from anything else. Of course, this could turn out to be the right approach. In this paper I will try, nevertheless, to find a deeper explanation; the goal here will be to predict whether a given language has wh-movement or wh-in-situ (or both). The proposal will be that the overt/covert distinction is indeed predictable from independently observable properties of languages; in particular, we can predict what a language will do with its wh-phrases from the position of its complementizer (particularly, the complementizer associated with wh-questions) and the nature of its mapping of syntactic structure onto prosody.

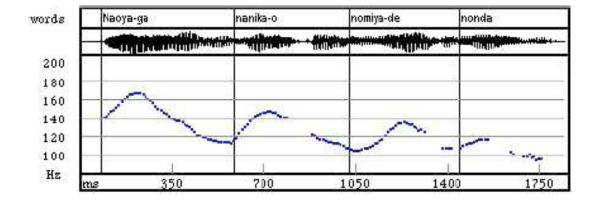
## 1.1 Japanese wh-prosody

The proposal offered here is inspired by much recent work on the prosody of Japanese whquestions (cf. Deguchi and Kitagawa 2002, Ishihara 2003, Sugahara 2003, Smith 2005, Hirotani 2005, and references cited there). Pitch tracks for a Japanese statement, and a corresponding whquestion, are given in (2) (from Ishihara 2003: 53-54):

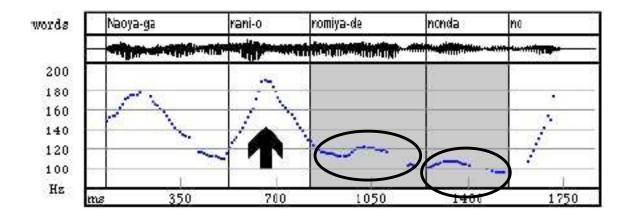
(2) a. Naoya-ga nanika-o nomiya-de nonda

Naoya NOM something ACC bar LOC drank

'Naoya drank something at the bar'



b. Naoya-ga nani-o nomiya-de nonda no?Naoya NOM what ACC bar LOC drank Q'What did Naoya drink at the bar?'



The pitch tracks in (2a) and (2b) differ in two ways. First, the wh-word direct object in (2b) has its pitch boosted; compare the lower pitch of the direct object in the statement in (2a). Second, there is a domain, starting with the wh-phrase and ending with the wh-complementizer (shaded in the pitch track in (2b), which is characterized by pitch compression: the peaks in this domain (circled) are lower than they would normally be.

Japanese wh-questions, then, involve a prosodic domain of some type which starts with the wh-phrase and ends with the complementizer. The proposal being defended here will be that all languages are attempting to do this; every language tries to create a prosodic structure for wh-questions in which the wh-phrase and the corresponding complementizer are separated by as few prosodic boundaries as possible. How languages achieve this varies from language to language, depending on where the complementizer is and on what the basic rules for prosody are.

Schematically, then, the proposal is this. Suppose we have an expression in which a whphrase and its corresponding complementizer are separted by prosodic boundaries, as in (3):

$$(3) \quad [C \quad [_{\phi} \quad ][_{\phi} \quad [_{\phi} \quad wh \quad ]]]$$

There are two ways of satisfying the universal condition on wh-prosody being proposed here. One is to change the prosody of (3), creating a prosodic domain in which C and wh are not separated by prosodic boundaries:

As we will see, the option in (4) is available for some languages but not for others (and the distinction is predictable on the basis of independently observable properties of prosody).

Another way of altering the structure in (3) to make it prosodically acceptable is to move the whphrase, so that it is closer to the C, in a position where no prosodic boundaries intervene between C and wh:

$$(5) \quad \left[ \underline{\mathbf{wh}} \, \mathbf{C} \left[ \mathbf{b} \right] \right] \left[ \mathbf{b} \quad \left[ \mathbf{b} \right] \right]$$

The examples in (4-5) represent covert and overt movement, respectively.

At this point, two comments are in order. The first is that throughout this paper I will make very unorthodox assumptions about the interaction between the syntax and the phonology; as we have just seen, the idea will be that the syntactic operation of wh-movement takes place just in case the prosody requires it. The approach therefore involves a straightforward type of look-ahead<sup>1</sup>. We have the usual array of mechanisms for avoiding this problem: for example, we could allow the syntax to choose freely whether to move or not, or have the syntax create multiple copies in all cases, with the phonology acting as a filter ruling out certain derivations or choices of copy pronunciation. One option which we can eliminate at the outset, I think, would be to make wh-movement a PF operation, taking it out of the syntax altogether. While this

<sup>&</sup>lt;sup>1</sup> We encounter a similar type of look-ahead problem in Fox' (2000) account of QR, which establishes (quite convincingly) that the syntactic operation of QR is sensitive to the possible semantic consequences, occurring only when it would meaningfully alter the LF of the sentence. Taken together, the look-ahead problems suggest that our understanding of the interfaces is flawed in some way.

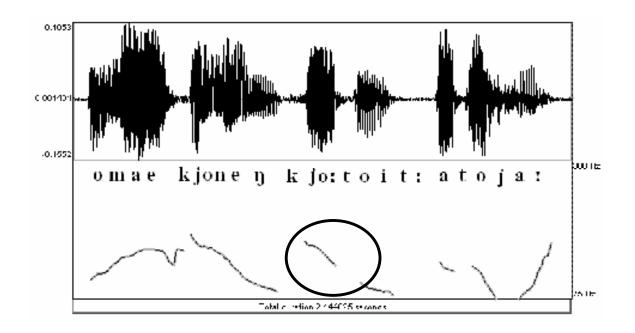
would solve the look-ahead problem, I think the evidence that wh-movement is syntactic is quite overwhelming. Choosing among the remaining options is not at all straightforward, however. For most of what follows I will simply ignore the issue, returning to it only at the end, once the theory has been fully fleshed out.

The other comment has to do with the nature of the prosodic domain that we see in whquestions in some languages (the example given above was from Japanese). The theory here will
crucially constrain the distribution of prosodic boundaries, but it will have nothing to say about
how these prosodic boundaries are realized as conditions on the rise and fall of pitch. In
Japanese, as we have seen, the "wh-domain" is characterized by pitch compression, but there is
no reason to expect this to be universal. In fact, we can see that it is not universal, without even
leaving Japan. The pitch tracks discussed above were from Tokyo Japanese, but as Smith (2005)
discusses, the facts are quite different in Fukuoka Japanese. Like Tokyo Japanese, Fukuoka
Japanese has a special prosodic domain connecting wh-phrases with the complementizers where
they take scope, but in Fukuoka Japanese the relevant prosodic domain is associated not with
pitch compression but with a high tone. Pitch tracks for a non-wh-question and a wh-question
are given in (6):

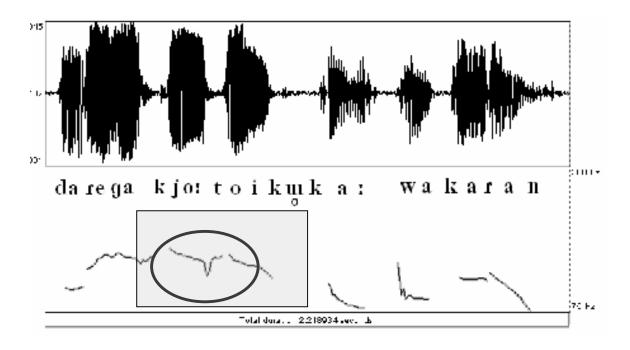
(6) a. Omae kyonen Kyooto itta to ya?

you last.year Kyoto went NLIZER COP

'Did you go to Kyoto last year?'



b. Dare-ga Kyooto iku ka wakaran.who NOM Kyoto go Q know-NEG'I don't know who's going to Kyoto'



The pitch track for the word *Kyooto* 'Kyoto' is circled in both examples, and the wh-domain is shaded in (6b). As the pitch tracks show, wh-questions in Fukuoka Japanese involve not pitch compression but a high tone, starting at the beginning of the wh-domain and decaying somewhat toward the end. In the non-wh-question in (6a), *Kyooto* exhibits a dramatic fall, while in (6b), *Kyooto* is comparatively level and high<sup>2</sup>.

Thus, the claim being defended here is specifically related to the distribution of prosodic boundaries; as we will see, the claim will be that some but not all languages are capable of creating a "wh-domain" that captures the wh-phrase and the associated complementizer in a single domain, and these are the languages that can have wh-in-situ. What kind of effect these wh-domains have on pitch is not part of the theory: wh-domains might involve pitch compression, a high tone, or (in principle) no prosodic effects at all.

#### 2. Prosody, and wh-prosody

In order to understand why some but not all languages can derive the universally required prosody for wh-questions without moving the wh-phrase, we will first need to consider the conditions on prosody, and understand the ways in which mappings from syntax to prosody can differ from language to language.

Following much work on the syntax-phonology interface (see, for example, Selkirk (1980, 1984), Nespor and Vogel (1986), Truckenbrodt (1995), Wagner (2005), and much other work), I will assume that prosodic representations are constructed by mapping certain syntactic boundaries onto prosodic boundaries. For instance, we might have a language in which the Left edge of every DP is associated with a prosodic domain boundary. An SOV sentence in a

 $^{2}$  The dip in the middle of the pitch track for *Kyooto* in (6b) is associated with the voiceless stop in the middle of the word.

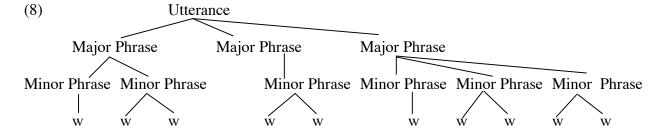
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language of this kind is schematically represented in (7a), and the corresponding prosodic structure is given in (7b):

(7) a. 
$$\begin{bmatrix} TP \\ DP \\ DNP \end{bmatrix} \begin{bmatrix} VP \\ DNP \end{bmatrix} \begin{bmatrix} VP$$

In (7), the Left edges of DPs (circled) are mapped onto prosodic boundaries, yielding a structure with two prosodic domains: the first consists entirely of the first DP, and the second of the second DP and the following verb.

(7b) shows the lowest level of phonological phrasing (what is sometimes called the *Minor Phrase* in the literature on prosody), and work on prosody generally seems to agree that there are a number of domains of different sizes, which may be hierarchically organized, with Minor Phrases combining to form larger phrases (sometimes called *Major Phrases*), which in turn combine to form the Utterance:



Whether (8) is the correct picture for prosodic structure is a matter that will not greatly concern us; the only level of importance to us will be the Minor Phrase, the phrase which immediately dominates the prosodic words.

I will follow Kubozono (2006) (and see Sugahara 2004 for much relevant evidence) in dealing with the facts of intonation in Japanese wh-questions by allowing Minor Phrases to be recursive, with multiple Minor Phrases being composed into a single, overarching Minor Phrase:

The algorithm for constructing these larger Minor Phrases will be the following:

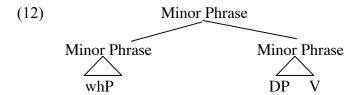
- (10) a. For one end of the larger Minor Phrase, use a Minor Phrase boundary which was introduced by a wh-phrase.
- b. For the other end of the larger Minor Phrase, use any existing Minor Phrase boundary. Because the two Minor Phrases referred to in steps (9a) and (9b) need not be the same, the result of applying this algorithm will be a Minor Phrase which may (though it need not) consist of multiple smaller Minor Phrases. Suppose we consider again the phrasing given in (7), repeated here as (11), with the first DP changed to a wh-phrase:

(11) a. 
$$[_{TP}(\widehat{D}_{\mathbf{P}} \text{ whP} ] [_{VP}(\widehat{D}_{\mathbf{P}} D \text{ NP} ] V ]]$$
  
b.  $[_{TP}(\widehat{D}_{\mathbf{P}} D \text{ NP} ] V ]$ 

As we saw before, the rule "insert a Minor Phrase boundary at the Left edge of every DP" gives the Minor Phrasing in (7b), with the first Minor Phrase consisting of the first DP, and the second Minor Phrase consisting of the second DP and the following verb. Applying the process in (10) to the phrasing in (11b) would involve keeping the Minor Phrase boundary introduced by the Left edge of the wh-phrase, and the right boundary at the end of the utterance, yielding the larger Minor Phrase in (11'c):

(11') a. 
$$[_{TP} [_{DP} \text{ whP}] [_{VP} [_{DP} D \text{ NP}] V]$$
  
b.  $(\text{whP}) (D \text{ NP} V)$   
c.  $(\text{whP}) D \text{ NP} V$ 

The structure in (11') could be represented with the tree structure in (12):



The prosodic effects associated with Japanese wh-questions, discussed in section 1.1 above, would then apply to the larger Minor Phrase, thus allowing the wh-phrase and the complementizer at the end of the clause to share a Minor Phrase. I will refer to these larger Minor Phrases which languages construct via the algorithm in (10) as "wh-domains"

The proposed condition on wh-prosody is then given in (13)<sup>3</sup>:

(13) Given a wh-phrase α and a complementizer C where α takes scope, α and C must be separated by as few Minor Phrase boundaries as possible, for some level of Minor Phrasing.

How languages satisfy the condition in (13) will depend on how they distribute their Minor Phrase boundaries. Languages which have Minor Phrase boundaries placed in such a way as to be able to use the procedure in (10) to create larger Minor Phrases containing both the wh-phrase and the complementizer will be able to leave wh in situ. Languages which cannot do this will try to improve the structure with movement operations, arranging for the wh-phrase and its complementizer to be closer together.

There will be two main points of cross-linguistic variation which will be relevant for us.

One will be the position of the complementizer: complementizers may either precede or follow their complements. The other has to do with the placement of Minor Phrase boundaries, which can be either to the Left or to the Right of certain maximal projections. These two binary parameters leave us with four logical possibilities, which we will spend the rest of this section

<sup>3</sup> This is hopefully a special instance of a more wide-ranging constraint. For a similar claim about the scope of negation, see Błaszczak and Gärtner (2005).

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outlining schematically. The next section will go on to investigate in more depth the prosodic properties of one language of each type.

# 2.1 Final C, Minor Phrase boundaries at Left edges of XPs

The first possibility is the one sketched in the beginning of this section; a language with a final complementizer which places Minor Phrase boundaries at left edges of certain maximal projections. Such a language, as we saw, would associate the syntactic structure in (14a) with the Minor Phrasing in (14b). It would also be able to create a larger Minor Phrase containing the wh-phrase and the associated complementizer, by keeping the Minor Phrase boundary associated with the left edge of the wh-phrase (circled), and skipping the immediately following one, as in (14c):

(14) a. 
$$[_{DP}] [\mathbf{whP}] [_{DP}] V C$$
b.  $( )( )( )( ) )$ 

A language like this would therefore be able to leave wh in situ. We will see that Japanese is a language of this kind.

### 2.2 Final C, Minor Phrase boundaries at Right edges of XPs

A language like this would differ from Japanese in that it marks not left edges, but right edges of certain maximal projections with a Minor Phrase boundary:

(15) a. 
$$[_{DP} ][\mathbf{whP}][_{DP} ] V C$$
  
b.  $( )( )( )( )( )$ 

As a result, it would be unable to create wh-domains of the type that Japanese uses. Recall that our algorithm for creating larger Minor Phrases says to take the boundary projected by the wh-phrase as one boundary for the larger Minor Phrase, and to use any Minor Phrase boundary on

the other side as the other boundary. The Minor Phrase boundary associated with the wh-phrase (circled in (15) above) will always be to the right of the wh-phrase. Since the complementizer is final, a procedure that starts with keeping the boundary projected by the wh-phrase will be unable to improve the prosodic status of the wh-question; regardless of where the left boundary of the bigger Minor Phrase is, all the right boundaries intervening between the wh-phrase and the complementizer will be left intact. In the particular case of (15) (repeated as (15')), our algorithm allows for the construction of the larger Minor Phrase in (15'c), which fails to improve the structure at all with respect to the condition on wh-prosody in (13):

(15') a. 
$$[_{DP}][\mathbf{whP}][_{DP}] V C$$

b.  $()()()()()$ 

c.  $()()()()()$ 

A language like this, then, cannot create wh-domains; it will have to resort to wh-movement in order to improve the prosodic status of the structure. In particular, it will have to do everything possible to get the wh-phrase further to the right, thus bringing it closer to the complementizer. We will see that this is the behavior of Basque.

### 2.3 <u>Initial</u> C, Minor Phrase boundaries at <u>Left</u> edges of XPs

The third case of interest is that of a language which is the mirror image of Basque; in this language, both the complementizer and Minor Phrase boundaries will precede wh-phrases. Just as in Basque, this language will be unable to create wh-domains, and for the same reason: our procedure for creating wh-domains starts by keeping the Minor Phrase boundary projected by the wh-phrase, and in this case that Minor Phrase boundary is between the wh-phrase and the complementizer, with the result that creating a larger Minor Phrase boundary will not improve the prosodic structure, as far as the conditions on wh-prosody are concerned. A sample syntactic

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structure and its Minor Phrasing are given in (16a-b), with the boundary projected by the whphrase circled; (16c) shows the results of applying our procedure to create a larger Minor Phrase:

(16) a. 
$$C = [DP][\mathbf{whP}][DP]$$

b.  $( )( )( )( )( )$ 

c.  $( )( )( )( )( )$ 

As (16) shows, creating a larger Minor Phrase does not improve the structure; in particular, the wh-phrase is separated from C by just as many Minor Phrase boundaries in (16c) as in (16b). This language therefore cannot leave wh in situ; it will have to resort to wh-movement of the familiar type, moving wh-phrases to put them closer to C. We will see later that Tagalog is a language of this type.

### 2.4 Initial C, Minor Phrase boundaries at Right edges of XPs

Finally, we arrive at a language which is the mirror image of Japanese, with complementizers and Minor Phrase boundaries on opposite sides of wh-phrases; in this case, the complementizer is initial, and Minor Phrase boundaries follow their maximal projections. Just like Japanese, this type of language will be able to leave wh in situ, by creating a larger Minor Phrase containing both the wh-phrase and its associated complementizer; in this case, the Minor Phrase will begin with the complementizer and end with the wh-phrase:

(17) a. 
$$C = [DP][\mathbf{whP}][DP]$$
  
b.  $(C = (C = C)$ 

The language of this type to be discussed below will be Chicheŵa.

### 2.5 Predictions, and a hedge

In section 3 we will move on to outline the prosodic systems of Japanese, Basque, Tagalog, and Chicheŵa, and will see that they do indeed fall where I have put them in the typology above.

Before we do that, however, we are already in a position to make at least two typological predictions.

One has to do with the relation between the position of the complementizer and the behavior of wh-phrases. Sections 2.1 and 2.2 above discussed the two logically possible types of complementizer-final languages. What we have seen is that such languages will either leave wh in situ or will take whatever steps they can to bring wh-phrases further to the right. In other words, they will not have wh-movement of the traditional kind, moving wh-phrases to the left periphery of the clause. This seems to be correct; verifiably complementizer-final languages seem to universally lack traditional leftward wh-movement:

- (18) a. Taroo-wa <u>nani -o</u> katta no? [*Japanese*]

  Taroo TOP what ACC bought Q

  'What did Taroo buy?'
  - b. Bkrashis-lags-gi **gare** gzigs-gnang-pa -red pas? [*Tibetan*]

    Tashi HON ERG what buy do PAST AGR Q

    'What did Tashi buy?'
  - c. C'am<sup>w</sup>it <u>mir</u> cək<sup>w</sup>ərəcnim? [Chaha]

C'am<sup>w</sup>it what cooked

'What did C'am<sup>w</sup>it cook?'

d. Qiaofong mai -le <u>sheme</u> (ne) [Chinese]

Qiaofong buy ASP what Q

'What did Qiaofong buy?'

Moreover, it does appear to be the complementizer which is the best predictor of wh behavior; wh-phrases remain in situ in complementizer-final languages, regardless of whether those languages are generally head-final (18a-c) or not (18d).

Another prediction has to do with optionality of wh-movement. We have now seen two basic approaches to forming wh-questions; leaving the wh-phrase in situ, and moving it to put it closer to the complementizer. Some languages lack the prosodic means to leave wh-phrases in situ, and must do wh-movement. But for languages which have the option of leaving wh in situ, what we now expect is that, all other things being equal, wh-movement ought to also be an option. Given that wh-movement and wh in situ both create prosodically acceptable structures, unless we add something to the theory to make one of these options preferable, both ought to be available, in principle. This seems to be the right result. It is most straightforwardly visible in complementizer-initial languages; what we expect is that even in those complementizer-initial languages that allow wh-in-situ (languages of the type discussed in section 2.4 above), wh-movement will also be an option. As far as I know, this is the case:

- (19) a. qel Saali štara <u>?eeh</u> ? [Egyptian Arabic]
  uncle Ali bought what
  'What did Ali's uncle buy?'
  - b. **?eeh** štara qel Saali?

(20) a. Tu as vu **qui**? [French]

you have seen who

'Who did you see?'

#### b. **Qui** tu as vu?

Finally, let me end this section with a hedge. In the discussion of prosody above I have used the language of Selkirk's (1980, 1984) work and its many descendants, suggesting that languages may pick either right or left edges of certain maximal projections for mapping onto prosodic boundaries. I picked this particular approach since it is a fairly influential one, and one which allows the predictions above to be outlined fairly straightforwardly. Even if it is at least partly incorrect, however (and it is far from being the only approach in the literature: see Nespor and Vogel (1986), Truckenbrodt (1995, 1999), Seidl (2000), Wagner (2005), and references cited there for much discussion), I believe that the results discussed above should still stand. All that is necessary for this theory to work, as far as I can see, is an approach to prosody which has a notion of prosodic domains, and which maps some but not all syntactic boundaries onto prosodic boundaries, and which allows this mapping to vary cross-linguistically. The claim made above is essentially that wh-in-situ is a privilege reserved for languages which routinely project prosodic phrase boundaries on a particular side of wh-phrases and which have the complementizer on the opposite side of the clause. The world of prosodic systems need not be as neatly symmetrical as described above for this to be true; there may be more types of prosodic systems than I have just outlined. If it turns out, for example, that some languages routinely mark both sides of maximal projections with prosodic boundaries, we would expect these languages to allow wh-in-situ, since the complementizer and a Minor Phrase boundary are on opposite sides of the wh-phrase. If there are languages that do not routinely associate either edge of wh-phrases with prosodic

boundaries, then we expect these languages to ban wh-in-situ, since there is no boundary to take as one edge of the wh-domain.

In fact, in the case studies to follow, we will often encounter one particular type of complication; the Selkirk-style approach will work well for most types of phrases, but will fail for verbs or for verb phrases, which will turn out to have their own special phrasing. In some cases (e.g., Tagalog, Chichewa), phrase boundaries that we would expect to find in the neighborhood of the verb will be unaccountably absent; in others (e.g., Basque, Bangla), a special phrase boundary will be introduced to separate the verb from adjacent material with which it would otherwise be phrased. I will leave these mysteries as mysteries for now, hoping that at some point they will turn out to be instructive about the syntax of the clause, perhaps being related to verb movement in some way<sup>4</sup>. More research into the typology of prosodic systems should allow us to address these questions. For the time being, I will continue to work with the typology discussed above.

#### 3. Case Studies

In what follows we will discuss the four types of languages outlined above in more depth.

**3.1 Japanese:** <u>final</u> complementizer, Minor Phrase boundaries to the <u>left</u> of certain XPs Japanese prosody is the subject of a rich and ongoing literature; see Poser 1984, Selkirk and Tateishi (1988, 1991), Ishihara (2003), Sugahara (2003), and references cited there for much discussion. Here I will rely heavily on the work of Selkirk and Tateishi (1988, 1991).

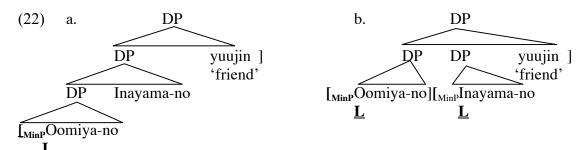
Japanese Minor Phrase boundaries are signalled by a Low tone on the first mora of the phrase, a phenomenon known as Initial Lowering. Minor Phrasing is determined by several factors, of which the most syntactic in nature is a requirement that Left edges of certain maximal

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<sup>&</sup>lt;sup>4</sup> For some discussion of related phenomena, see Seidl (2000), McGinnis (2001), Ishihara (2001).

projections (including DPs) be mapped onto Minor Phrase boundaries<sup>5</sup>. This requirement can be illustrated with the ambiguous string of words in (21), which has either of the meanings in (21a) or (21b); in other words, *Oomiya-no* 'from Oomiya' can be taken to modify either *Inayama* '(Mr.) Inayama' or *yuujin* 'friend'. These readings correspond to the trees in (22a) and (22b) respectively:

- (21) Oomiya-no Inayama-no yuujin Oomiya GEN Inayama GEN friend
  - a. 'the friend of [Mr. Inayama from Oomiya]'
  - b. 'Mr. Inayama's [friend from Oomiya]'



'the friend of [Mr. Inayama from Oomiya]'

'Mr. Inayama's [friend from Oomiya]'

The trees in (22) are annotated with their Minor Phrasing. The tree in (22b) must have a Minor Phrase break (and hence a Low boundary tone, realized on the first mora of the following word) between *Oomiya-no* and *Inayama-no*. The tree in (22a), by contrast, need not have such a prosodic break.

Selkirk and Tateishi (1988, 1991) propose that we capture this distinction between the trees in (22) by making reference to left edges of maximal projections. In (22b), but not in (22a), a Left edge of a DP (namely, *Inayama-no*) intervenes between *Oomiya-no* and *Inayama-no*, and

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<sup>&</sup>lt;sup>5</sup> In fact, what Selkirk and Tateishi say is that Left edges of maximal projections are mapped onto <u>Major</u> phrase boundaries. Since Major Phrases are always completely decomposed into Minor Phrases, this has the effect that every edge of a Major phrase boundary is also the edge of a Minor Phrase boundary, which makes the statement in the text an accurate one. I am concentrating on the distribution of Minor Phrases because these are the phrases whose construction differs in theoretically useful ways between Japanese and Basque.

this Left edge is mapped onto a Minor Phrase boundary. Note that Left and not Right edges must be crucial; in both of the trees in (22), the Right edge of a DP (namely, *Oomiya-no*) appears in this position.

This mapping from maximal projection boundaries to prosodic boundaries is not the only condition on Minor Phrasing, but the other conditions seem less syntactic in nature. One of the conditions has to do with the distribution of lexical accent. Japanese has lexically accented words and lexically unaccented words, and one requirement on Minor Phrases is that they cannot contain more than one lexically accented word. Minor Phrase boundaries are therefore always inserted in such a way as to avoid this, whenever the situation might arise, regardless of whether the positioning of these boundaries marks edges of maximal projections. Minor Phrases are also subject to a length restriction; the specifics of this seem to vary from speaker to speaker and to be at least partly dependent on speech rate, but for some speakers, at least, Minor Phrases may not be more than three words long.

We have seen that Japanese is a language that routinely inserts Minor Phrase boundaries at Left edges of certain maximal projections; it also inserts Minor Phrase boundaries in some other positions, arguably positions which are not determined by the syntax. Japanese is also, famously, a head-final language, and in particular has final complementizers. In other words, Japanese places its Minor Phrase boundaries and its complementizers on opposite sides of potential wh-phrases. Given the theory outlined in section 2, this means that Japanese ought to be able to leave wh-in-situ; Japanese is a language which can create prosodic 'wh-domains' by merging Minor Phrases to create superordinate Minor Phrases, which will begin with a Minor Phrase boundary projected by a wh-phrase and end at the complementizer where that wh-phrase takes scope. As we have seen, this is indeed the case.

**3.2** Basque: <u>final</u> complementizer, Minor Phrase boundaries to the <u>right</u> of certain XPs

In my discussion of Basque I will rely on Elordieta's (1997) analysis of the facts; see also Arregi 2002, Gussenhoven 2004 for discussion.

Basque Minor Phrases are like their Japanese counterparts in that they begin with a Low tone, in this case realized on the first syllable of the first word of the Minor Phrase. Their distribution is quite different, however, as we will see. It will perhaps be easiest to discuss the Basque system by contrasting it with the Japanese one.

We saw in section 3.1 that Japanese always puts Minor Phrase boundaries at left edges of certain projections, including DPs. This is very far from being true in Basque; a Basque sentence may have a number of successive DPs with no Minor Phrase boundaries between them, regardless of the domination relations between them. All of the material before the verb in the examples in (23), for example, consists of a single Minor Phrase:

- (23) a. [umiari] [normalian] [urà] [emoten dotzágu] child-DAT normally water give AUX 'Normally, we give water to the child'
  - b. [Sure [erriko [alkatia]]] [Iruñara] [allaga da] (Gussenhoven 2004)
     our town's mayor Iruña-at arrived AUX
     'The mayor of our town has arrived in Iruña'

Both of these examples contain a DP in preverbal position which is c-commanded but not dominated by a preceding DP; in other words, these two DPs are linearly separated by both a Left edge of a DP (the second one) and the Right edge of a DP (the first one). Despite this, no Minor Phrase boundary intervenes between the two DPs. Neither a Left or a Right edge of a DP,

then, is reliably mapped onto a Minor Phrase boundary in Basque. Instead, Minor Phrase boundaries appear in two types of positions.

Like Japanese, Basque distinguishes between lexically accented and lexically unaccented words. Unlike in Japanese, accented words in Basque must always be <u>followed</u> by a Minor Phrase boundary:

The DPs in (24a') and (24b') have the minor phrasing in (24a) and (24b); because *lagúnen* 'friend (Genitive Plural)' in (24b') is lexically accented, it must be followed by a Minor Phrase boundary (with the result that the first syllable of *dirua* 'money' receives a low tone in (24b')).

In Japanese, by contrast, lexically accented words need not be followed by Minor Phrase boundaries. Selkirk and Tateishi (1988) offer the phrasings in (25a<sup>1</sup>) and (25a<sup>2</sup>) as possible prosodic structures for the string of words in (25a), which begins with an accented word:

Here Minor Phrasing is essentially free, dictated only by the need to make Minor Phrases sufficiently short. Thus, accented words in Japanese can be followed by a Minor Phrase break, but need not be.

The other position where Minor Phrase boundaries are required in Basque is immediately before the verb; that is, the first syllable of the verb must have the Low tone which signals the beginning of a new Minor Phrase. Here, again, Basque differs from Japanese, which places Minor Phrase boundaries at Left edges of certain maximal projections, allowing the verb to phrase together with a preceding DP. The upshot of this is that for an SOV sentence consisting entirely of unaccented words, Basque and Japanese have the contrasting Minor Phrase structures in (26-27):

Basque, then, is unlike Japanese, in that it does not routinely place Minor Phrase boundaries at the Left edges of maximal projections. If anything, it seems to place its boundaries at the Right edges of certain projections (in particular, after lexically stressed words). Since Basque, like Japanese, is head-final, this means that Basque also differs from Japanese in that the complementizer is not routinely on the opposite side of wh-phrases from the Minor Phrase boundaries associated with those wh-phrases. Consequently, Basque ought to be unable to create the wh-domains that we find in Japanese. Recall that our algorithm for creating wh-domains begins by preserving the Minor Phrase boundary introduced by the wh-phrase; in Basque, if there is such a boundary, it will intervene between the wh-phrase and C, preventing the creation of a single Minor Phrase containing them both.

What should Basque do instead? What it in fact does is arrange for wh-phrases to be immediately preverbal:

- (28) a. Mirenek <u>séin</u> ikusi rau? (Arregi 2002)

  Miren-ERG who-ABS see-PRF AUX.PR

  'Who has Miren seen?'
  - b. \* <u>Séin</u> Mirenek ikusi rau?

    who-ABS Miren-ERG see-PRF AUX.PR
- (29) a. Jon <u>señek</u> ikusi rau?

  Jon-ABS who-ERG see-PRF AUX.PR

  'Who saw Jon?'
  - b. \* <u>Señek</u> Jon ikusi rau?

    who-ERG Jon-ABS see-PRF AUX.PR

This requirement is expected under our theory. Consider, for example, the wh-phrase *séin* 'who-ABS' in (28). In (28b), where *séin* is not the immediately preverbal phrase, it is separated from the clause-final complementizer by two Minor Phrase boundaries: the one immediately following the lexically accented word *séin*, and the one right before the verb. In (28a), by contrast, only one Minor Phrase boundary (which is both immediately after *séin* and immediately before the verb) intervenes between the wh-phrase and the complementizer. The preference for the word order in (28a) over that in (28b) therefore follows.

On the other hand, we might expect to be able to improve the prosodic structure even more. If we take the facts about Basque prosody discused above to indicate that Minor Phrase boundaries are established at Right edges of certain syntactic projections in this language, then we might expect Basque to move wh-phrases to post-complementizer positions. The result would be a string like the one in (30):

 $(30) \quad \dots \quad V \qquad C \qquad \mathbf{wh})$ 

In (30), the wh-phrase, with its following Minor Phrase boundary, follows the complementizer, with the result that we ought to be able to construct a wh-domain linking the complementizer to the wh-phrase.

In fact, Basque is indeed capable of moving phrases to positions following the V-T-C complex (Elordieta 1997, 29):

(31) eweldi onà emon dábe mariñerúak weather good give AUX fishermen-ERG

'The fishermen have predicted good weather'

In (31), the DP *mariñuerúak* 'fishermen-ERG' follows the verb, and the attached complementizer. However, Elordieta (1997) such postverbal material is always associated with radical pitch compression. In other words, postverbal material in Basque is already subject to conditions on prosody, which might be incompatible with the conditions on wh-prosody being explored here<sup>6</sup>.

If we assume that movement to a post-verbal position is ruled out on independent grounds, then the behavior of Basque is explained on the theory given here. The universal conditions on wh-prosody require Basque to minimize the number of Minor Phrase boundaries intervening between the wh-phrase and the associated complementizer. Unlike Japanese, Basque cannot achieve this simply by manipulating the prosody, for reasons that we have now derived from the basic rules for prosody in Basque; unlike Japanese, Basque does not routinely place Minor Phrase boundaries at Left edges of maximal projections, and therefore is not in a position to create a new Minor Phrase beginning with the wh-phrase and ending with the complementizer.

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<sup>&</sup>lt;sup>6</sup> It would be comforting to have a less Basque-specific answer to this question, however, since rightward whmovement seems to be cross-linguistically very uncommon, at least in spoken languages. More research into the prosodic consequences of rightward movement may help address this problem.

Basque must therefore resort to movement, arranging for the wh-phrase to immediately precede the verbal complex where the complementizer is located.

The Basque case is a potentially illuminating one for the nature of the prosodic requirements on wh-questions. As we saw above in (28-29), Basque wh-phrases must be immediately preverbal. Arregi (2002) argues that this is accomplished by leftward scrambling of non-wh-phrases. Consider (29), repeated as (32):

- (32) a. Jon <u>señek</u> ikusi rau?

  Jon-ABS who-ERG see-PRF AUX.PR

  'Who saw Jon?'
  - b. \* <u>Señek</u> Jon ikusi rau?

    who-ERG Jon-ABS see-PRF AUX.PR

According to Arregi, the well-formed (32a) is created by scrambling the object *Jon* to the left of the subject *señek* 'who-ERG'. In other words, if Arregi is right, then the wh-phrase is put in the position required by the prosody, not by movement of the wh-phrase, but by movement of the non-wh-phrase. Basque does have scrambling, even in non-wh-questions, so the operation Arregi posits requires no new stipulations about Basque grammar.

In the account given here of Basque, this 'altruistic' scrambling succeeds in improving the prosodic structure, though it does not make it perfect; there is still one Minor Phrase boundary between the wh-phrase and the corresponding complementizer. The condition on prosody will thus have to be stated as an economy condition, requiring the grammar to "do its best" to minimize the number of Minor Phrase boundaries between the wh-phrase and the complementizer; for reasons having to do with how Basque prosody works, Basque cannot fulfill this requirement perfectly, but the availability of scrambling allows the structure to be improved.

The prosodic requirements do not empower the syntax to perform operations it cannot otherwise perform; it cannot move wh-phrases rightward into positions that are not there, or head-move the complementizer to a non-existent initial position, for example.

Hypothetically, then, we might expect to find languages that are prosodically like Basque but differ from Basque in that they lack scrambling. Such a language would then be unable to improve the prosodic structure of its wh-questions at all; it would leave wh-phrases in situ (since moving them leftward would only make the situation worse), but would be unable to scramble non-wh-phrases out of the way to bring the wh-phrase closer to C.

We predict, then, that languages that require the wh-phrase to occur as far right as possible (or, in strictly head-final languages, in the immediately preverbal position) will always be languages with scrambling. In addition, we expect that wh-in-situ languages without scrambling (languages like Chinese, for example) might have the prosodic properties either of Japanese or of Basque; either is consistent with the approach developed here. Ultimately, of course, we hope to avoid stipulating that a given language either has or lacks scrambling, predicting this contrast from independently observable differences; for the time being, however, we will concentrate on developing a theory of this kind for wh-movement, leaving other types of movement for future work.

3.3 Tagalog: <u>initial</u> complementizer, Minor Phrase boundaries to the <u>left</u> of certain XPs Tagalog prosody has been the subject of comparatively little work (though see Schachter and Otanes (1972), Kaufman (2005) for some discussion). What follows will be some of the results of a pilot study I recently conducted<sup>7</sup>.

Various interesting properties of Tagalog will play no role in what follows. In particular, Tagalog verbs bear a type of morphology which has been the object of a great deal of study (see

<sup>&</sup>lt;sup>7</sup> Thanks to Jeff Leopando, Lawrence Maligaya, and Joshua Monzon for participating in the study.

Richards 2000, Rackowski 2002, Aldridge 2004, and references cited there for discussion), which refers to one of the arguments of the verb; it has sometimes been called 'voice' morphology, I think somewhat misleadingly. Following Rackowski (2002), I represent this morphology with glosses like NOM (verbal agreement with the nominative argument), ACC, DAT, etc. Nominals typically begin with case particles, glossed here with the relevant Tagalog morphemes ANG (nominal with which the verb agrees), SA (dative), NG (other).

Tagalog complementizers are initial, as we can see in the embedded clause of (33):

(33) Hindi ko alam [kung sumayaw si Maria]
not NG-I know whether NOM-danced ANG Maria
'I don't know whether Maria danced'

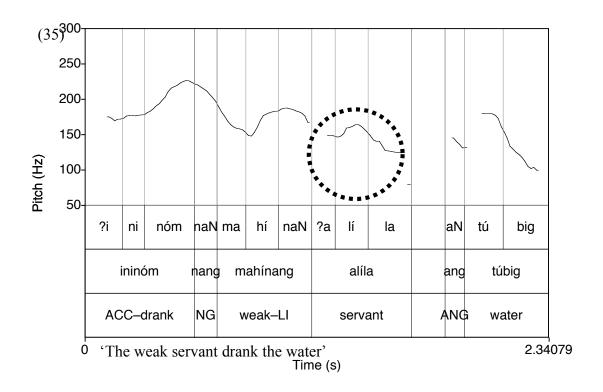
Also (and usefully for what is to follow) attributive adjectives in Tagalog may either precede or follow the noun they modify; a morpheme sometimes called the 'linker', which I will gloss with LI, appears between them:

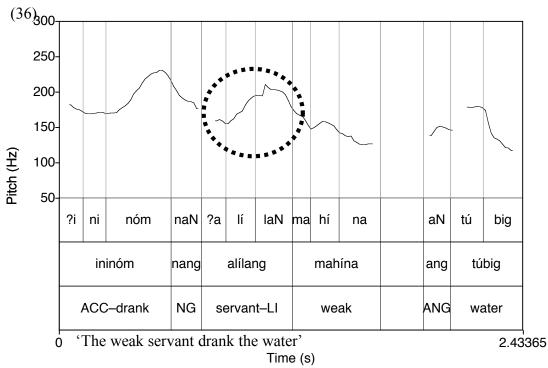
- (34) a. Sumayaw ang lolang mayaman

  NOM-danced ANG grandmother-LI rich

  'The rich grandmother danced'
  - b. Sumayaw ang mayamang lolaNOM-danced ANG rich-LI grandmother

We can begin our study of Tagalog intonation by studying the pitch tracks in (35) and (36). These two sentences both mean 'the weak servant drank the water', and differ only in the order of the adjective *mahina* 'weak' and the noun *alila* 'servant':





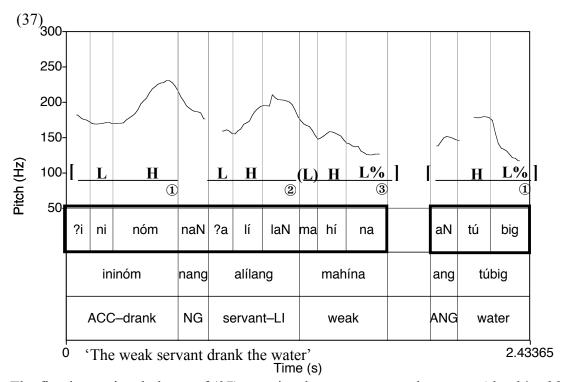
If we focus on the pitch track for the word *alila* 'servant' (circled in these examples), we can see that a given word need not always have the same intonation. In (35), *alila* has a peak on the

second syllable, with the third syllable lower than the second. In (36), by contrast, the peak is on the third syllable. A similar effect can be seen on the adjective *mahina* 'weak', which has a clear fall in (36) that starts at the second syllable and continues through the third, while in (35) the pitch does not begin to fall until the end of the word.

Tagalog words, then, may either end in a fall or a rise; the final syllable may be either higher or lower than the preceding one. Considering the other words of these sentences, we can see that the verb *ininom* 'drank' consistently ends in a rise, while *tubig* 'water' consistently ends in a fall.

Since *tubig* 'water' is clearly phrase-final (since it is utterance-final), we might take the final-rise/final-fall distinction to distinguish between phrase-final and non-phrase final words. On this theory, there is a phrase boundary just before *ang tubig* 'the water'. Phrases are marked in Tagalog by a phrase-final Low boundary tone, which causes phrase-final words to end in a fall. Thus, whatever word is just before *ang tubig* 'the water' in these examples is phrase-final, and must end in a fall. Non-phrase-final words, by contrast, end in a rise.

This assignment of phonological phrases also accounts for a pattern of downstep that we can see in these examples. The first three peaks in each example are successively downstepped, with each peak slightly lower than the preceding one. The last peak, the one on *tubig* 'water', is comparatively higher. Phrase boundaries, then, are apparently points of downstep reset in Tagalog. The preceding examples, then, have the phrasing represented by the dark boxes in (37), with the verb and the subject phrased together, and a second phrase consisting just of the object:



The first intonational phrase of (37) contains three content words, *ininom* 'drank', *alilang* 'servant-LI', and *mahina* 'weak'. The first two of these have their intonation peaks on the last syllable, but for the last one, the phrase-final Low boundary tone pushes the peak back to the second syllable. The second intonational phrase of (37) has only the content word *tubig* 'water'; being phrase-final, this word also has a penultimate pitch peak. This peak also exhibits downstep reset; each of the peaks in the first phrase is lower than the preceding one, but the peak of the second phrase is higher than the preceding one.

In these examples, then, sentences with the word order VSO are phrased with the verb and the subject in one phrase and the object in a second phrase. There is much more to be said about the placement and nature of the pitch peaks in these words, but we can ignore this for now, concentrating instead on the question which concerns us; what is the algorithm for phonological phrasing? Two algorithms that would get the phrasing observed so far are given in (38):

- (38) a. Place a phrase boundary at the right edge of every DP.
  - b. Place a phrase boundary at the left edge of every DP, except for the one immediately after the verb.

Although the second of these algorithms is more complicated, I will now try to show that it is the correct one; in general, Tagalog places phonological phrase boundaries at left edges of certain maximal projections (including DPs), with the proviso that the verb must be phrased with immediately following material.

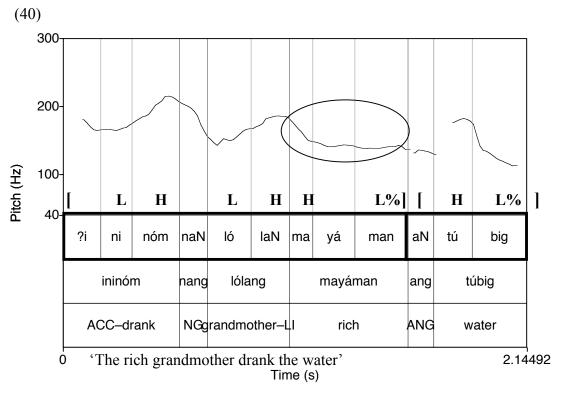
One argument for this has to do with the phrasing of postnominal possessors in Tagalog:

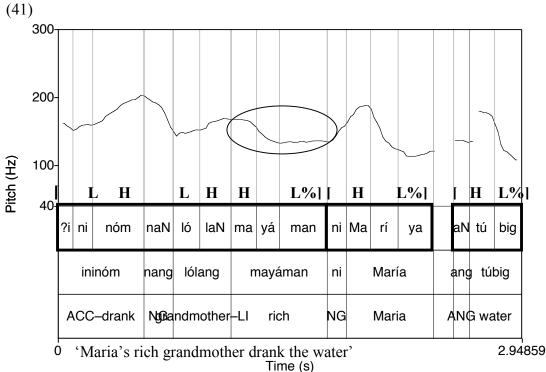
(39) Ininom [ ng lolang mayaman [ ni Maria]][ ang tubig]

ACC-drank NG grandma-LI rich NG Maria ANG water

'Maria's rich grandmother drank the water'

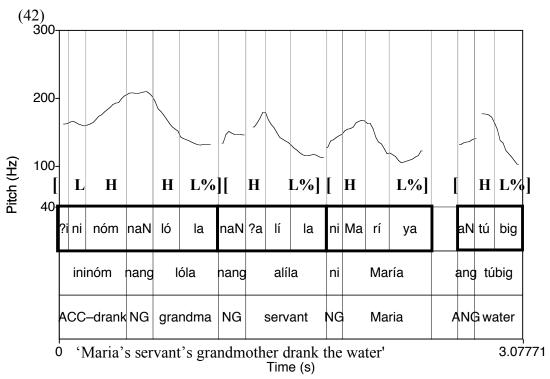
In a sentence like (39), the possessor *ni Maria* and the possessee *ng lolang mayaman* 'the rich grandmother' are separated by a left edge of a DP (namely, *ni Maria*), but not by a right edge of a DP. The algorithm in (38a), then, predicts that no phonological phrase boundary should precede *ni Maria*; the algorithm in (38b), on the other hand, predicts the presence of a phonological phrase boundary there. The second prediction is correct, as we can see by comparing the pitch tracks in (40) and (41):





(40) and (41) differ just in that (41) has a possessor, *ni Maria*, for the first DP. In both, the word just before the possessor (*mayaman* 'rich') has the pitch contour we expect in phrase-final position; its final syllable is low rather than high. In addition, the pitch peak on *ni Maria* in (41)

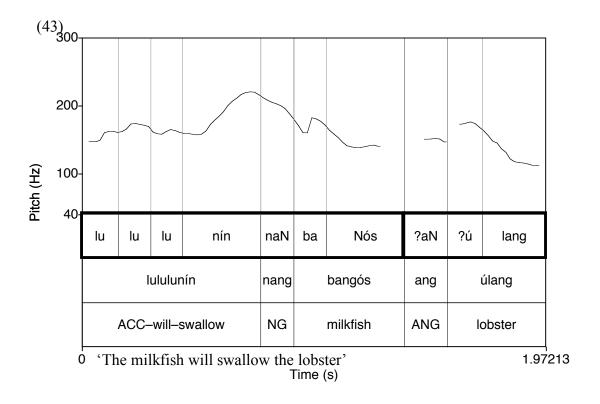
is higher than the preceding one; in other words, the possessor exhibits reset of downstep, another test for phonological phrasing. Both tests argue for the presence of a phonological phrase boundary before the possessor. Again, this phrase boundary must be due to the presence of a Left edge of a DP (namely, the left edge of the possessor, *ni Maria*), since there are no Right edges of DPs that precede the possessor. We find the same result in longer sentences with multiply nested possessors:

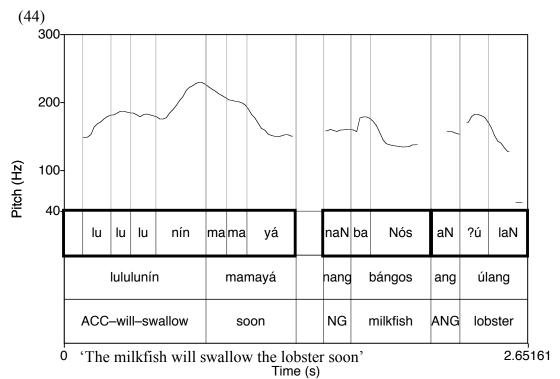


Here, *lola* 'grandmother', *ng alila* 'servant', and *ni Maria* all exhibit phrase-final prosody, characterized by their final Low tones (compare them with the prosody of the verb, the only word in this sentence which is not phrase-final; this one ends in a high tone, like all the non-phrase-final words we have seen).

The phrasing of possessors is one argument that Tagalog makes use of Left boundaries, rather than Right boundaries, to establish its phonological phrasing, and that the phrasing of the verb with the immediately following DP is the result of an overriding requirement that the verb

not be in a phrase by itself. As we would expect on this theory, the verb's need to phrase with following material can be satisfied by a number of types of phrases. Adverbs, for example, can be phrased with the preceding verb:





(44) differs from (43) just in the presence of a postverbal adverb, *mamaya* 'soon'. This adverb exhibits phrase-final prosody, ending in a Low tone; it is apparently phrased with the preceding verb, and followed by a phonological phrase break. This phrase break could be introduced by the Left edge of the following DP *ng bangos* 'the milkfish'; if phrase breaks are only introduced by Right edges of DPs, however, the facts in (44) are difficult to explain.

These arguments are meant to convince us that Tagalog prosodic phrasing makes crucial reference to Left edges of certain maximal projections (notably DPs). Tagalog, as we saw earlier, is also a language in which the complementizer is initial. For the theory developed here, then, Tagalog is effectively the mirror image of Basque; both the complementizer and prosodic phrase boundaries will be on the same side of any given wh-phrase (the Left side, in this case; the Right side, in the Basque case). As in Basque, then, Tagalog will be unable to create prosodic wh-domains. Recall that our procedure for creating these domains requires us to make use of one of the prosodic boundaries introduced by the wh-phrase as one of the edges of the new

prosodic wh-domain, with the opposite boundary freely chosen from any of the existing boundaries. Since the prosodic boundary introduced by a Tagalog wh-phrase will be one on the Left edge of the wh-phrase, the opposite prosodic boundary will have to be to the right of the wh-phrase. Since the complementizer is initial, it will necessarily precede the wh-phrase, and the wh-domain will therefore not include the complementizer. Tagalog, then, is not like Japanese; it cannot meet the conditions on wh-prosody by leaving the wh-phrase in situ and manipulating the prosody. Tagalog ought to have obligatory wh-movement to the left periphery. And indeed it does:

- (45) a. **Kailan** umuwi si Juan? when NOM-went.home ANG Juan 'When did Juan go home?
  - b. \*Umuwi si Juan kailan?

In fact, there is one case in which Tagalog does seem to allow wh-in-situ. Recall that Tagalog verbs must be phrased with immediately following material; the general requirement that Left edges of DPs be mapped onto phrasal boundaries is suspended in just this case. We might expect, then, that Tagalog would allow wh-in-situ just in case the wh-phrase in question was immediately postverbal; in such a case, no phrasal boundaries would intervene between the wh-phrase and the beginning of the sentence.

This is not as generally true as we might wish. Still, Tagalog does have one wh-word, *nino* 'who', which can appear just in the positions the theory leads us to expect:

(46) a. Ninakaw **nino** ang kotse mo?

ACC-stole NG.who ANG car your

'Who stole your car?'

- b. \* Ninakaw ang kotse mo **nino**?
- c. \*Sinabi ng mga pulis [na ninakaw **nino** ang kotse mo]?

  ACC-said NG PL police LI ACC-stole NG.who ANG car your

  'Who did the police say stole your car?'

As the data in (46) show, *nino* can appear in immediate postverbal position (as in (46a)), but cannot be separated from the verb by another DP (as in (46b)); moreover, the verb which it follows must be the verb of the clause where it takes scope (cf. (46c))<sup>8</sup>.

This option of wh-in-situ is more constrained in Tagalog than we ought to expect, unfortunately. For one thing, *nino* actually sounds best in contexts in which it is not followed by any material at all; while (46a) above is acceptable, and clearly better than (46b), (47) is even better (particularly when the direct object is salient and hence easily dropped, as in a response to a declaration like 'someone has stolen my car'):

(47) Ninakaw nino?

ACC-stole NG.who

'Who stole it?'

For another thing, as far as I can tell, *nino* is the only wh-word to have this option:

b.\*Nakita kavo nila

Although it is of the NG class, *nino* follows all clitics, including those of the ANG class:

(ii) a. Nakita kayo nino? ACC-saw ANG.you.PL NG.who

'Who saw you?'

b. \*Nakita nino kayo?

<sup>&</sup>lt;sup>8</sup> One might be excused for thinking that *nino* is a second-position clitic, attaching to the verb in (46a). Tagalog does have second-position clitics, but *nino* is not one of them. For one thing, it does not obey the general conditions on ordering of multiple second-position clitics. Bisyllabic second-position clitics of the NG class are required to precede those of the ANG class:

<sup>(</sup>i) a. Nakita nila kayo ACC-saw NG.they ANG.you.PL

<sup>&#</sup>x27;They saw you'

(48) \*Umuwi kailan si Juan?

NOM-went.home when ANG Juan

'When did Juan go home?'

It is unclear, then, how fully we should embrace this prediction of our theory with respect to Tagalog. More broadly, however, the theory seems to make the right prediction about Tagalog; it predicts that Tagalog should be a wh-movement language, as indeed it is.

## 3.4 Chicheŵa: initial C, Minor Phrase boundaries to the right of certain XPs

The fourth and last case to be considered in this section is that of Chicheŵa; for work on the prosodic phrasing of Chicheŵa, see Bresnan and Kanerva (1989), Kanerva (1989, 1990), Truckenbrodt (1995, 1999), Seidl (2000), and references cited there.

Kanerva (1989, 1990) discusses a number of tests for phonological phrasing in Chicheŵa. For example, he notes that the penultimate syllable of a phrase-final word undergoes lengthening (Kanerva 1990, 148):

- (49) a. mtengo uuwu 'this price'
  - b. mteengo 'price'

Another rule, of Tone Retraction, retracts a phrase-final High tone to the penultimate syllable:

- (50) a. mlendó uuyu 'this visitor'
  - b. mleéndo 'visitor'

Using tests like these, Truckenbrodt (1995, 1999) proposes that one of the factors determining phrasing in Chicheŵa is a mapping of Right edges of certain maximal projections onto prosodic domains. No phrase boundary intervenes, for example, between a noun and a following DP-

internal maximal projection; the expressions in (51) consist of single phonological phrases (Truckenbrodt 1995, 76):

- (51) a. <sup>n</sup>jingá yá mwáána bicycle of child
  - b. <sup>n</sup>jingá yábwiinobicycle good

Similarly, no phrase boundary intervenes between a preposition and a following DP; the expression in (52) is a single phonological phrase:

(52) <sup>m</sup>páká máawa until tomorrow

Thus, left edges of PPs (as in (51a)), APs (as in (51b)), and DPs (as in (52)) are not mapped onto prosodic boundaries. On the other hand, subjects are separated from the VP by a phrase boundary, and coordinated DPs are also in separate phrases:

- (53) a. [fiisi] [anadyá mkáango] hyena ate lion
  - b. [miléeme] [ndi njúuchi]
    bats and bees

The data in (53) can be accounted for, Truckenbrodt points out, if we map right edges of DPs onto prosodic boundaries; the initial DP in both of these examples is separated from following material by this boundary.

Chicheŵa, then, is a language that maps Right edges of certain maximal projections onto prosodic boundaries. It is also a head-intial language, as the preceding examples reveal, with

head-initial PP (as in (52)) and VP (as in (53a)). More importantly for our purposes, Chicheŵa complementizers precede the clauses they introduce (Bresnan and Kanerva 1989, 10):

(54) Zikugáníziridwá [**kútí** átsíbwéni ángá ndi afîti]

it.is.thought that uncle my be witch

'It is thought that my uncle is a practitioner of witchcraft'

We have seen that Chicheŵa has initial complementizers and marks Right edges of certain maximal projections with prosodic boundaries. On the theory developed here, this makes Chicheŵa the mirror image of Japanese; a given wh-phrase will typically have the complementizer on one side (preceding it, in Chicheŵa; following it, in Japanese) and a phonological phrase boundary on the other (following it, in Chicheŵa; preceding it, in Japanese). Our procedure for the creation of prosodic wh-domains thus allows Chicheŵa, like Japanese, to manipulate the prosody in ways that create a prosodically acceptable wh-question without movement. In other words, Chicheŵa ought to have the option of wh-in-situ. This is correct:

(55) anaményá **chiyáani** ndi mwáálá (Downing 2005)

he.hit what with rock

'What did he hit with the rock?'

In fact, a number of researchers (Kanerva 1989, 1990, Truckenbrodt 1995, 1999, Downing 2005) have noted that Chicheŵa manipulates the prosody of focus constructions and wh-questions in the way this theory would lead us to expect. A difficulty for the account of Chicheŵa prosodic phrasing sketched here arises when we consider the phrasing of VPs;

typically, VPs have no prosodic boundaries inside them. The VP in (56), for example, is a single prosodic phrase:

(56) (anaményá nyumbá ndí mwáála)

he.hit house with rock

'He hit the house with the rock'

If all Right edges of DPs are to be mapped onto prosodic boundaries, then we ought to expect to find a prosodic boundary after the DP *nyumbá* 'house', but this is not what we find.

Truckenbrodt (1995, 1999) develops an Optimality-Theoretic account of the facts; in his approach, a constraint Wrap-XP demands that the VP be phrased as a unit, outranking the constraint which would normally place a prosodic boundary after the direct object (though see Seidl 2000, McGinnis 2001 for criticisms of Truckenbrodt's approach).

Whatever account of the VP phrasing might turn out to be the right one, it is of interest that in wh-in-situ contexts, the expected phrasing can reassert itself:

(57) (anaményá **chiyáani**) (ndi mwáálá) (Downing 2005)

he.hit what with rock

'What did he hit with the rock?'

Here the expected prosodic boundary after the direct object reappears. Recall that the algorithm for creation of prosodic wh-domains involves taking as one boundary for the wh-domain a prosodic boundary projected by the wh-phrase. In the case of (57), the relevant boundary is the one after the wh-phrase *chiyáani* 'what'. For whatever reason, this boundary is not ordinarily expressed in VP-medial position, but in wh-in-situ contexts it does appear, as we expect.

#### 4. Possible further directions

The preceding sections have discussed one language from each of the four possible types outlined by this theory. The languages are given in the table in (58):

(58)

	C to Right of TP	C to Left of TP
Prosodic boundaries on Right of XPs	Basque	Chicheŵa
Prosodic boundaries on Left of XPs	Japanese	Tagalog

Wh-questions in these languages are constrained by a requirement that the wh-phrase be separated from the complementizer where it takes scope by as few Minor Phrase boundaries as possible, for some level of Minor Phrasing. A procedure for the creation of new Minor Phrases allows some languages to satisfy this condition without movement; the algorithm is given again in (59) (repeated from (10)):

- (59) a. For one end of the larger Minor Phrase, use a Minor Phrase boundary which was introduced by a wh-phrase.
- b. For the other end of the larger Minor Phrase, use any existing Minor Phrase boundary. Whether the algorithm in (59) can improve the prosody of the structure depends on whether the Minor Phrase boundaries introduced by wh-phrases intervene between wh-phrases and the associated complementizer or not. In the shaded cells in the tree in (58), they do not; the complementizer and the phonological phrase boundaries associated with maximal projections are on opposite sides of the wh-phrase. These are therefore languages that allow wh-in-situ, since their typical rules for creation of prosody allow the creation of acceptable prosodic structures for wh-questions. The languages in the unshaded cells, by contrast, must resort to movement to

improve the structure; each must do whatever it can to move the wh-phrase and the associated complementizer closer together. In the case of Basque and languages like it, the result of this will be that the wh-phrase must be as far right as possible (immediately preverbal, in the particular case of Basque), while in the more familiar case of Tagalog, wh-movement will be to the left periphery of the clause.

In what follows we will consider how this general approach might be extended to some other cases.

#### 4.1 Spanish

Uribe-Etxebarria (2002) and Reglero (2005) note an interesting condition on wh-in-situ in some dialects of Spanish. For some speakers, wh-in-situ is apparently straightforwardly acceptable in examples like (60):

- (60) a. Juan compró qué?
  - Juan bought what
  - b. Tú le diste la guitarra a quién?

    you CL gave the guitar to who

Crucially, these are examples in which the wh-phrases are utterance-final. The wh-phrase may also be utterance-medial, for these speakers, but must be followed by a 'pause':

(61) Tú le diste a quién \*(#) la guitarra?

you CL gave to whom the guitar

The example in (61) cannot be given the ordinary non-wh intonation, in which the indirect object is immediately followed by the direct object; the wh-phrase must be followed by an intonation break.

Here I am hampered by my ignorance of Spanish intonation. But one possibility is that Spanish is essentially like Chicheŵa; a complementizer-initial language in which wh-in-situ is possible, just when a prosodic break appears just after the wh-phrase. The phonetic implementation of the prosodic break in Spanish is not the same as the one in Chicheŵa, but this is a situation we have already seen in section 1.1, when we compared the wh-intonation of Tokyo to that of Fukuoka Japanese. The theory under development here is concerned only with prosodic structure, not with phonetic implementation.

#### 4.2 Bangla

Bayer (1996), Simpson and Bhattacharya (2003) discuss conditions on the position of whphrases in Bangla (also called Bengali). Descriptively speaking, it appears that wh-phrases must linearly precede the complementizer where they take scope.

Bangla is generally head-final (see Bayer 1996, 252-254 for arguments and discussion; Bangla has postpositions, and verbs which follow most of their complements except in marked orders). However, complement clauses may either precede or follow their selecting verb (Bayer 1996, 254):

- (62) a. chele-Ta jane na [baba aSbe]
  - boy CLASSIFIER know.3 not father will.come
  - 'The boy doesn't know that (his) father will come'
  - b. chele-Ta [baba aSbe] jane na

In preverbal complement clauses, Bangla wh-phrases may take either embedded or matrix scope (Bayer 1996, 272):

(63) ora [ke aSbe] Suneche they who will.come heard

'Who have they heard will come?' (matrix)

'They have heard who will come' (embedded)

In postverbal complement clauses, by contrast, Bangla wh-phrases must take embedded scope (Bayer 1996, 273):

(64) ora Suneche [<u>ke</u> aSbe]

they heard who will.come

'They have heard who will come' (*embedded* only)

For some Bangla speakers, at least, wh-phrases from postverbal clauses may take matrix scope by being moved into the matrix clause (Simpson and Bhattacharya 2003, 133<sup>9</sup>):

(65) jOn **ke** bollo [ cole gEche]?

John who said left gone

'Who did John say left?'

The generalization, then, appears to be that a wh-word in Bangla may take scope in a clause just if it linearly precedes the verb (and, this theory leads us to hope, the post-verbal complementizer) of that clause<sup>10</sup>. Wh-phrases from embedded clauses may take matrix scope just if the embedded

(i) us-ne <u>kyaa</u> kiyaa? he ERG what did 'What did he do?'

(ii) a.\*Raam-ne kahaa [ki <u>kOn</u> aayaa hE]?
Raam ERG said that who come has 'Who did Ram say has come?'

<sup>&</sup>lt;sup>9</sup> I have attempted to revise Simpson and Bhattacharya's transcription of Bangla to match Bayer's, hopefully not introducing too many errors in the process.

<sup>&</sup>lt;sup>10</sup> As Bayer and Simpson and Bhattacharya note, the same may be said to be true of Hindi, though the facts here are less clear, since Hindi tensed complement clauses must always be postverbal. The consequence is that although Hindi allows wh-in-situ in simple clauses (as in (i)), wh-in-situ in embedded clauses (as in (ii)) cannot take matrix scope:

clause precedes the matrix verb (as in (63)) or if the wh-phrase itself is moved to a pre-verbal position in the matrix clause (as in (65)). Otherwise, only embedded scope is possible (as in (64)).

This pattern can be made to fit into the theory developed here, on two additional assumptions. One is about the nature of Bangla prosody, which will need to be relevantly like that of Japanese; that is, it will have to insert prosodic phrase boundaries at Left edges of certain maximal projections. The other is about the position of the complementizer to which wh-phrases are to be related. This will have to immediately follow the verb of its clause.

We will shortly see some evidence for the first of these assumptions, but first let us consider how the assumptions help us to derive the facts. Consider first the possible readings of an example like (63), repeated as (66) (with the phonologically null complementizers added):

(66) ora [<u>ke</u> aSbe C] Suneche C

they who will.come heard

'Who have they heard will come?' (matrix)

'They have heard who will come' (embedded)

If Bangla, like Japanese, places phonological phrase boundaries at Left edges of DPs, then the DP ke 'who' will have a phrase boundary to its Left. Consequently, we can use the procedure for creating prosodic wh-domains to connect ke with either of the two complementizers; the phrase boundary to the left of ke will be one edge of the wh-domain, and the other boundary will be whatever boundary is present to the right of the relevant complementizer. In other words, the

b. **kOn** Raam-ne kahaa [ki \_\_ aayaa hE]?

See Srivastav 1991, Simpson 2000 for discussion.

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wh-phrase in this type of example ought to be able to take scope at either complementizer, as indeed it can.

Next, consider (64), repeated as (67):

(67) ora Suneche C [ke aSbe C] they heard who will.come

'They have heard who will come' (*embedded* only)

If we apply the procedure for creating wh-domains to an example like (67), the wh-domain will start at the Left edge of ke 'who' and extend as far right as necessary to include a complementizer where the wh-phrase can take scope. As it happens, there is only one complementizer to the right of ke in (67), and hence ke can only take scope in this position. If the complementizers in (67) are placed correctly, and if Bangla prosody is like Japanese prosody in this respect, then we have the result we want.

As it happens, it has in fact been argued that Bangla prosody is not unlike Japanese prosody in the respects that are relevant to us. Hayes and Lahiri (1991), Michaels and Nelson (2004), and Selkirk (2006) describe a system for Bangla prosody which typically places prosodic boundaries at Left edges of certain maximal projections; the examples in (68), which would form single phonological phrases, are from Hayes and Lahiri (1991, 87-8)<sup>11</sup>:

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 $<sup>^{\</sup>rm 11}$  Here, again, I have modified the transcription to match Bayer's.

(68) a. [[ram-er] Taka]

Ram's money

- b. [[chobi-r] jonno]

  pictures-GEN for

  'for pictures'
- c. [[[Tok gur-er] jonno] durgOndho
  sour molasses for bad.smell
  'the bad smell of sour molasses'

All of these examples have DPs contained in larger structures; in (68a), for example, the DP possessor *ram-er* 'Ram's' is followed by the noun *Taka* 'money'. These DPs are not, however, followed by prosodic breaks, which shows that Right edges of DPs are not typically associated with breaks in prosody.

To see what syntactic boundaries are mapped onto prosodic boundaries, we can consider the phrasing of examples like (69), where the phrasing is indicated by parentheses:

(69) (Omor) (cador) (tara-ke) (dieche)

Amor scarf

'Amor gave the scarf to Tara'

Tara-DAT gave

The phrasing in (69) shows, first, that Bangla is like Basque in that it places a prosodic break just before the verb. Second, we can see in (69) that although Right edges of DPs may not be associated with prosodic breaks (as (68) showed us), Left edges of DPs apparently are.

The second of these is the more important one from our perspective; we are concerned with how edges of maximal projections are typically mapped onto prosodic domains, since it is these maximal projections which may be wh-phrases and will therefore potentially determine one

edge of a prosodic wh-domain. The anomalous prosodic break before the verb makes Bangla resemble Basque, but this is a red herring, on the theory developed here; the pre-verbal break will never be one projected by a wh-phrase, and hence will never determine the position of such a phrase. This is a good result, since Bangla wh-phrases are not in fact constrained, as their Basque counterparts are, to appear in immediately preverbal position<sup>12</sup> (Simpson and Bhattacharya 2003, 137):

(70) jOn <u>kon boi-Ta</u> borders-e kal kinlo

John which book-CLASSIFIER Borders LOC yesterday bought

'Which book did John buy yesterday at Borders?'

Thus far, then, Bangla intonation appears to be relevantly like Japanese intonation, in that Left edges of certain maximal projections (such as DPs) are mapped onto prosodic boundaries. In cases in which a Bangla wh-phrase precedes a complementizer, then, Bangla ought to be able, like Japanese, to create a prosodic wh-domain extending from the wh-phrase to the complementizer, and thus allow the wh-phrase to take scope at the complementizer without movement.

In fact, Hayes and Lahiri (1991), Michaels and Nelson (2004), and Selkirk (2006) do discuss data that may support the idea that these Bangla wh-questions involve the creation of prosodic wh-domains. The main concern of these researchers is actually with focus, rather than with wh-in-situ (though Hayes and Lahiri do suggest that wh-in-situ has the same prosody as focus); what they show is that focus on a particular phrase is characterized by loss of prosodic boundaries after that phrase. Focus has other prosodic consequences, however, which are less congenial to the theory developed here; in particular, a focused phrase is apparently always

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<sup>&</sup>lt;sup>12</sup> Michaels and Nelson (2004), studying a different dialect of Bangla than Hayes and Lahiri do, report that their informant prefers to put focused phrases in immediately preverbal position. It is not clear how the strength of this preference compares with that in Basque, and I will have to leave this question for future investigation.

immediately <u>followed</u> by a prosodic break. Given the complicated nature of the data, and the fact that the data are primarily about focus and not wh-questions, I will leave this as an issue for future work on Bangla intonation. The point of interest, from our perspective, is simply that Bangla seems to have the right type of prosody to allow wh-phrases to remain in situ, just when they precede the complementizer where they take scope. In other words, Bangla has the potential to be just like Japanese, as far as this theory is concerned.

The preceding discussion of Bangla has the potential flaw that it hinges on placing phonologically null complementizers in certain positions. These complementizers are in perfectly reasonable positions, given Bangla's generally head-final nature, but we might wish to see more evidence for the crucial assumptions about their positions. At this point it may be instructive to return to Japanese.

Although Japanese is quite straightforwardly head-final, it does have a form of extraposition that can move phrases to postverbal position (see Endo 1996, Murayama 1998 for discussion):

(71) John-wa katta yo, ano hon-o

John TOP bought ASSERTION that book ACC

'John bought (it), that book'

Clauses, both declarative and interrogative, can also be extraposed in this way (Takako Iseda, p.c.):

- (72) a. John-wa shinjiteiru yo, [Mary-ga dokushin da tte]

  John TOP believes ASSERTION Mary NOM single is that

  'John believes that Mary is single'
  - b. Keesatsu-wa sirabeteiru yo, [dare-ga okane-o nusunda ka]
    police TOP investigating ASSERTION who NOM money ACC stole Q
    'The police are investigating who stole the money'

And a matrix clause which is itself a question may exhibit rightward extraposition of an embedded clause:

John-wa shinjiteiru no, [Mary-ga dokushin da tte]?

John TOP believes Q Mary NOM single is that

'Does John believe that Mary is single?'

However, a wh-phrase in an extraposed clause may not take matrix scope:

\* John-wa shinjiteiru no, [dare-ga dokushin da tte]?

John TOP believes Q who NOM single is that

'Who does John believe [\_\_ is single]?'

Without extraposition, of course, such a sentence is well-formed:

John-wa [dare-ga dokushin da tte] shinjiteiru no?

John TOP who NOM single is that believes Q

'Who does John believe [ \_\_ is single]?'

The contrast between (74-75) in Japanese is reminiscent of the contrast between (63-64) in Bangla, repeated here as (76-77):

(76) ora Suneche [ke aSbe]
they heard who will.come
'They have heard who will come' (embedded only)

(77) ora [ke aSbe] Suneche

they who will.come heard

'Who have they heard will come?' (matrix)

'They have heard who will come' (embedded)

In both Japanese and Bangla, apparently, wh-phrases in postverbal clauses may not take matrix scope. The theory developed here explains why: both of these languages mark the Left edges of maximal projections with prosodic boundaries, and thus may only create prosodic wh-domains connecting wh-phrases with complementizers which follow them. Schematically, the examples in (74) and (76) have the structure in (78):

(78) [...matrix clause... C] [
$$(_{\phi} \underline{who} \dots C]$$

The procedure for constructing prosodic wh-domains begins by taking the prosodic boundary projected by the wh-phrase as one of the boundaries for the new wh-domain. As a result, in a configuration like (78), languages like Japanese and Bangla have no choice but to begin the wh-domain at the Left edge of the wh-phrase, and to extend it to the right of that phrase. As a result, following complementizers, but not preceding ones, are possible scope positions for this kind of wh-phrase; in other words, wh-phrases in extraposed clauses cannot take scope in the matrix clause, since the complementizer of that clause precedes the wh-phrase in question. In Bangla, the assumption that the matrix complementizer preceded the wh-phrase in the extraposed clause was simply an assumption (though a fairly reasonable one, given Bangla's generally head-final

nature). In the Japanese example in (74), we can actually see the matrix interrogative complementizer *no* linearly preceding the wh-phrase.

### 4.3 Echo-questions

Many languages with overt wh-movement allow wh-in-situ just in the case of "echo-questions" like the one in (79b):

- (79) a. John bought a motorcycle.
  - b. John bought a **WHAT**?

In fact, this exception for echo-questions is extremely widespread; as of this writing, I am not aware of clear cases of wh-moving languages which do not allow wh-in-situ in this type of example.

In a theory which posits strength and weakness, it is unclear why this should be so. We could, for example, claim that English has an ordinary interrogative complementizer with a strong feature, and an "echo-question" complementizer with a weak feature. While this would get the English fact, it seems to miss the point, which is that (a) the English pattern is extremely common, and (b) the reverse is (as far as I know) unattested; there are no wh-in-situ languages which require movement just for echo-questions. A more interesting tack might be to claim that echo-questions lack complementizers at all, and hence lack a Probe for the wh-phrase; this approach would be left with the burden of explaining how such questions can be interpreted as questions.

The theory developed here allows us to make another kind of move. Echo-questions are typically questions in which all the material, apart from the wh-phrase itself, is old information; this results in the destressing of all the non-wh material, indicated in (79b) by small type<sup>13</sup>. This paper has proposed that wh-phrases must be separated from the complementizer at which they

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<sup>&</sup>lt;sup>13</sup> Many thanks to Lisa Selkirk for suggesting this move.

take scope by as few prosodic boundaries (of a certain type) as possible. The bulk of the paper has concentrated on two main strategies for achieving this: movement of the wh-phrase closer to the complementizer, and creation of a new Minor Phrase, making use of existing boundaries.

In an example like (79b), we might be seeing a third kind of strategy. It is possible, at least, that the destressing of all the non-wh-material in the sentence reflects a lack of prosodic structure; this old information, on this type of account, is not assigned the type of prosodic structure that it would be if it were new information. Consequently, (79b) might be a prosodically well-formed wh-question to begin with; there might be no offending prosodic boundaries between the wh-phrase and the complementizer.

At the moment, this is speculation; I have no facts to offer about the prosody of echoquestions which would support this. The account does have the virtue, however, of explaining why echo-questions are associated with wh-in-situ, and why there are no languages in which echo-questions are associated with movement not found in non-echo-questions. The properties of echo-questions, on this type of account, are linked to the fact that old information tends (universally?) to be prosodically bleached, and hence to make the creation of a prosodically wellformed wh-question easier, even in languages that must normally resort to wh-movement.

#### 5 Conclusions

I began this paper by noting that languages seem to differ in how they form their wh-questions. The paper has been an exploration of the idea that this is in fact false. Languages do not differ in how they form their wh-questions; in every language, wh-questions are formed by arranging for the wh-phrase and the complementizer associated with it to be separated by as few (Minor) phrase boundaries as possible, for some level of Minor phrasing.

How this universal goal is achieved, of course, is in fact a matter of cross-linguistic variation. But the cross-linguistic variation appears to follow, once the universal goal is stated in this way; languages treat their wh-phrases differently because their complementizers are in different places, and because the basic rules for how prosodic structures are formed can differ from language to language. Languages (like Japanese, Chichewa, and possibly Spanish and Bangla) which place complementizers on one side of wh-phrases and habitually map the other side onto prosodic boundaries are able to satisfy the prosodic conditions on wh-questions without movement, and hence can leave wh-phrases in situ. Languages which place the complementizer and the prosodic boundaries on the same side of maximal projections (such as Basque, Tagalog, and hopefully English) cannot directly manipulate the prosody in this way, and must resort to movement, doing everything possible to bring the wh-phrase and the complementizer closer together.

Much work remains to be done, of course. The theory will need to be tested on many more languages than the handful that I have managed to apply it to here; for many languages, this will require study of the basic mapping of syntax onto prosody. I have not attempted to apply this theory to multiple-wh questions, another domain of cross-linguistic variation, which needs further study.

Ultimately, the hope is to apply this way of thinking to other types of movement, as well. We have grown accustomed to being able to stipulate that this or that type of movement (not only wh-movement, but also scrambling, head-movement of the verb to T, etc.) is present or absent in a given language. The idea here has been to derive this apparent parameter from other parameters, just in the case of wh-movement. If this attempt proves successful, then we need to undertake the same project for other types of movement. In general, the goal should simply be

the general one of linguistics: to describe languages in such a way that, properly understood, they do not in fact differ, at least not in as many ways as one might at first think.

I have deliberately avoided trying to solve the 'look-ahead' problem that I raised at the beginning of the paper: what is the right way of understanding the interactions between the syntax and the phonology, such that conditions on the prosody dictate how the syntax is to treat wh-phrases? In my opinion, it is too early to try to solve this question, though it is sure to be a pressing one if the research program outlined here continues. My own strategy will be to wait to try to seriously address this question until we have a better sense of what type of phonological information the syntax is allowed to 'respond' to. I have been claiming in this paper that syntactic operations can in part be triggered by considerations of prosody, but I suspect that not all properties of phonology can influence the syntax in this way; we will probably not find movements triggered by the need to put onsetless syllables in positions where they can acquire onsets from preceding consonant-final words, for example. If this turns out to be correct, then we probably do not want to solve the 'look-ahead' problem by brute force, allowing the syntax full access to the information in the phonological representation. Like many other topics, I will have to leave this one to future research.

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