New Information and the Grammar of Focus:
Evidence from San Martín Peras Mixtec

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Abstract

In this paper, I describe, and explore the consequences of a novel prominence pattern displayed in answers to wh-questions in San Martín Peras Mixtec. In this language, high tones that surface at the right edge of correlates of wh-words are raised in pitch. I compare three hypotheses to explain this pattern, and ultimately argue that a focus feature directly triggers this asymmetric prominence in the language. This conclusion is due in large part to the fact that the language does not have any apparent default prominence pattern, a crucial component of other theories. Additionally, I consider the larger theoretical implications of this pattern with respect to the syntax-prosody interface, and the relationship between default and focus prominence cross-linguistically.

1 Introduction

There is a well established generalization about sentential prominence in English: correlates of wh-words—that is, words in the answer to a wh-question that directly answer and correspond to the wh-word—are realized with prosodic prominence, even if they occur in a position that wouldn’t normally receive default phrasal prominence (Selkirk, 1995; Jackendoff, 1972; Rochemont, 1986, a.m.o.). In broad focus or neutral contexts, phrasal stress falls on the head of the rightmost constituent (1a). However, in examples like (1b), a pitch accent, realized as higher pitch on the stressed syllable, is placed on the word that corresponds to the wh-word, instead of its default sentence final position. Throughout this paper, I represent prosodic prominence with small caps.

(1) a. Q: What’s been happening?
   A: Mary bought a book about bats.
 b. Q: Who bought a book about bats?
   A: Mary bought a book about bats.

[Selkirk (1995):554]

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In this paper, I will explore the prominence associated with correlates of wh-words in San Martín Peras Mixtec (henceforth SMPM), a tonal language. I will argue that wh-correlates display prominence that is asymmetric. This asymmetry is expressed in three ways: (1) prominence is only realized on the final syllable of the wh-correlate; (2) only high tones are affected; (3) this prominence is realized only as pitch raising—there are no other apparent correlates of phonetic prominence. While this prominence is superficially similar to one way in which prominence is realized in English (a high pitch accent on a stressed syllable), it is quite different than patterns found in other tonal languages, which often display f0 expansion on the entire wh-correlate (Hartmann, 2008).

The prominence pattern of SMPM can be seen in (2a). Here, because the correlate of the wh-word has a final high tone, that tone is raised in pitch, compared to the production of the same word in a more neutral context.1 In (2b), however, because there is no high tone on the final syllable of the word corresponding to the wh-word, there is no detectable prominence.

(2) Nā tāshĩ Mariana ntà’ā Bernardo
what give.comp M. hand B.
‘What did Mariana give Bernardo?’

a. Chichi[tāshi=ñā ntā’ā=rā]
avocado give.comp=3sg.f hand=3sg.m
‘She gave him an AVOCADO.’

b. Ita[tāshi=ñā ntā’ā=rā]
flower give.comp=3sg.f hand=3sg.m
‘She gave him a FLOWER.’

The generalization that correlates of wh-words are prosodically prominent has been shown to hold in many languages besides English (see Büring, 2009, for a recent survey), but key questions remain up for debate. First, there is debate about whether correlates of wh-words should be considered a type of focus. This is the approach advocated for in Rooth (1992), but this view has recently been challenged by Kratzer and Selkirk (2018). In that paper, the authors argue that there is no need to appeal to focus as a way of accounting for prosodic prominence on correlates of wh-words, and instead suggest that lack of givenness is a more appropriate notion. As a way of framing this question, I will concretely compare two classes of hypotheses in this paper, which I call the NON-GIVEN HYPOTHESIS and the FOCUS HYPOTHESES. At their core, these hypotheses differ with respect to how they view correlates of wh-words: as something marked with a morphosyntactic feature, or as something lacking a morphosyntactic feature. As we will see, multiple versions of the focus hypothesis have been proposed. I refer to these collectively as the FOCUS HYPOTHESES.

The NON-GIVEN HYPOTHESIS suggests that the wh-correlate is prominent, not due to what it is, but rather due to what it is not. It is well-established that in many languages, given constituents

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1Here and throughout, a grave accent (ـ) marks low tones, an acute accent (أمل) marks high tones, a caron (ـ) marks rising tones, a circumflex (أمل) marks falling tones, and mid tones are unmarked. Pitch raising is represented with an arrow (↑). The following abbreviations are used in the glosses: c=Complementizer, comp=Completive, conj=Conjunction, cont=Continuative, cop=Copula, det=Determiner, emph=Emphatic, F=Feminine, fut=Future, gen=Genitive, incl=Inclusive, irl=Irrealis, m=Masculine, neut=Neutral Noun Class, nom=Nominalizer, obl=Oblique, prt=Particle, perf=Perfect, pl=Plural, poss=Possesive, pot=Potential, sg=Singular.
resist prominence, and are deaccented (Schwarzschild, 1999; Féry and Samek-Lodovici, 2006). According to this hypothesis, if the default intonational prominence would normally fall within a given constituent, it is shifted onto the non-given part of the answer. This shift forces the prominence onto the word that is new and not entailed by the context: the word corresponding to the wh-word in the question. This hypothesis supposes that there is nothing special about correlates of wh-words in terms of their featural makeup; they are merely the landing site for a prominence that must be shifted. This is schematized in (3).

(3) Q: Who bought a book about bats?
   A: MARY [bought a book about bats.]$_{\text{GIVEN}}$

An alternative set of hypotheses suggest that correlates of wh-words are marked with a morphosyntactic feature: [FOCUS]. This feature contributes to how the answer is interpreted semantically, but it also requires phonological prominence. This view crucially contrasts with the non-given hypothesis with respect to which constituents are marked with a feature.

(4) Q: Who bought a book about bats?
   A: [MARY]$_{\text{FOCUS}}$ bought a book about bats.

Additionally, there is a debate about how foci trigger prominence, with two alternatives commonly suggested in the literature. This question, while slightly orthogonal to the first, relates to it at a higher level of abstraction. On the one hand there are researchers that view prominence on foci as a “default” prominence, which surfaces at a specific prosodic boundary to which correlates of wh-words are aligned, either by movement of prominence or prosodic rebracketing (Féry, 2013; Büring, 2013; Truckenbrodt, 1999). That is, foci become prominent by being aligned to prosodic boundaries.² It is important to note that, although different from the non-given hypothesis in terms of which part of the answer is marked with a feature, this view, which I call the focus alignment hypothesis, shares with it a key intuition: namely that prominence on correlates of wh-words is due to a “default” prominence in the language. Crucially, this hypothesis marks correlates of wh-words as foci, but their prominence is triggered via a default prominence that is sensitive to edges of prosodic boundaries.

On the other hand, there are those that view prominence on correlates of wh-words not as a default phrasal prominence at all, but as a special prominence that is directly associated with their status as foci. This association is either made via phonological constraints (Samek-Lodovici, 2005), or by requiring a certain pitch accent to fall on a constituent that is in focus (Gussenhoven, 1984; Selkirk, 1995). Here, I refer to this as the direct focus hypothesis. In table (5), I show how these hypotheses fill out the paradigm of possible answers to two questions: are correlates of wh-words marked with a feature and do they receive their prominence via a default?³

²The details of this approach differ slightly by author in terms of the underlying motivation for alignment. Büring (2013) and Truckenbrodt (1999) argue that foci are aligned in order to become prominent. Féry (2013), on the other hand, argues that prominence is a possible (though not necessary) consequence of a universal pressure to align foci.

³I am not aware of anyone what has proposed the fourth logical possibility: correlates of wh-words which are unmarked, but that do not receive default prominence. This possibility seems, to me, to be untenable, given that correlates of wh-words must receive prominence somehow, and if they are unmarked there is no way that they could receive a special, non-default prominence.
In this paper, I will argue in favor of the direct focus hypothesis and against the non-given and focus alignment hypotheses. Specifically, I will argue that SMPM has no notion of a "default" prominence that can be shifted onto the correlate of wh-words, or that appears regularly at a prosodic boundary. This fact casts doubt on an integral component of these two hypotheses: prominence on correlates of wh-words is not special. I look in three places—at the level of the phonological phrase, at the level of the intonational phrase, and at the level of the sentence—and find no evidence of prominence, let alone the type of prominence that mirrors the effect that is found on correlates of wh-words. Furthermore, I show syntactic evidence that supports the view that correlates of wh-words are marked with a morphosyntactic feature, triggering movement to a left-peripheral position. This fact further rules out the non-given hypothesis, which predicts that correlates of wh-words should not trigger special syntactic operations.

This paper is organized as follows: in §2, I provide some relevant background on the phonology and syntax of SMPM. In §3, I detail the empirical generalization and provide phonetic evidence to support the claim that correlates of wh-words are prominent in SMPM, and that that prominence is realized asymmetrically. In §4, I argue that SMPM does not have a "default" prominence like English. I consider several different domains at which the prominence could plausibly be applied, but find no positive evidence in support of a default pattern. In §5, I introduce two diagnostics for prosodic phrasing in SMPM, and use both to show that correlates of wh-words are not aligned to a prosodic boundary. In §6, I outline the main proposal of this paper: correlates of wh-words are foci which are encoded with a feature that is visible to the phonology, and in SMPM this feature triggers raising of high tones in final position. I provide additional support for this claim by considering syntactic evidence that indicates that correlates of wh-words are marked with a feature. §7 considers further implications of this proposal and concludes.

2 Language Background

San Martín Peras Mixtec is an Oto-Manguean language (ISO: JMX), spoken principally in and around the municipality of San Martín Peras in Oaxaca, Mexico, near the border with the state of Guerrero. The 2010 Mexican Census documents 10,386 residents of the municipality that report speaking an indigenous language. A little less than half also speak Spanish, and less than 200 report not speaking any indigenous language (Instituto Nacional de Estadística y Geografía, 2010).

Additionally, there are an estimated 100,000-150,000 indigenous Oaxacans living in California (Kresge, 2007), many of whom speak Mixtecan languages. Speakers of SMPM are principally concentrated in the cities of Watsonville and Oxnard (Natalia Gracida Cruz, p.c.). Indeed, Kresge (2007) reports an estimated 1,500-2,000 indigenous Oaxacans living in Santa Cruz Country, especially in Watsonville. At least the plurality of these individuals speak Mixtecan languages, although there are also sizable populations of speakers of Triqui and Chatino. The exact number of speakers of SMPM in Santa Cruz County is not known.
All data in this paper comes from nearly two years of elicitation conducted with one female, middle-aged speaker who lives in Watsonville. The speaker grew up in a Mixtec-only household, in the town of Ahuajutla, which is roughly 10 miles away from the town of San Martín Peras. In addition to elicitation sessions and personal use with family, the speaker also uses the language daily for work. All elicitation was conducted in Spanish.

SMPM is a verb initial language, like all other Mixtec languages (Macaulay, 2005; Ostrove, 2018). The default word order in out-of-the-blue contexts is VSO, as in (6).

(6) Kotô Pébro chíchí
    like:cont P. avocado
    ‘Pedro likes avocados.’

This default order is often disrupted, however, by movements to a pre-verbal position. This is the case with correlates of wh-words, for instance, which always front to a pre-verbal position, as in (7).

(7) Q: Ná tâshî Ana ntà’á Juan
    what give:comp A. hand J.
    ‘What did Ana give Juan?’

A: [Šî’í] tâshî=ûântà’á=û râ
    mushroom give:comp=3sg.f hand=3sg.m
    ‘She gave him a MUSHROOM.’

Fronting is not restricted to direct answers to questions, however. In SMPM, constituents can also front in response to a broad focus question, which elicits all new information. In response to a broad focus question, for instance, it is possible for the direct object to front.  

(8) Q: Ná kû bitsî
    what cop:comp today
    ‘What happened today?’

\[^4\]It is also possible for other constituents to front in this context. See §6 for discussion.
A: [Shi‘i] tàshî Ana ntà‘à Juan
mushroom give.comp A. hand J.
‘Ana gave a mushroom to Juan.’

A similar phenomenon is also found in Chalcatongo Mixtec (Macaulay, 2005). Like SMPM, in that language subjects, objects, and prepositional phrases can appear before the verb, even when they are not directly questioned by a wh-word. This fact allows for a direct comparison of the prosody of fronted constituents in two different contexts—as correlates of wh-words and as parts of answers to broad focus questions—without influence from other factors such as declination. A comparison of the prosody of fronted constituents in these two contexts will be the main empirical focus of this paper.

SMPM is a tonal language, like all other Oto-Manguean languages (Dicanio and Bennett, to appear). It has 5 phonemic tones: three level tones (high, mid, low) and two contour tones (rising, falling) (Peters, 2017). There are two distributional restrictions on tones in the language that will be relevant to the discussion here. First, falling tones occur much less frequently in the language, and for that reason they are not investigated in this paper—I will not compare how they are pronounced across the two contexts. Second, the use of the rising contour is almost completely restricted to the final syllable of a word. For this reason, all the rising tones that I consider in this paper appear in word-final position.

Figures 2 and 3 on the following page show time-normalized plots of the target tones across a wide variety of sentence contexts. Figure 2 shows the pitch of the three level tones across the vowel of word-initial vowels. Figure 3 shows the three level tones, plus the rising contour, across word-final vowels. Each vowel was isolated in Praat, and 10 pitch measurements were taken at equal points across the vowel in Equivalent Rectangular Bandwidth (ERB), a psychoacoustic measurement scale that linearly plots the way pitch is perceived (Moore and Glasberg, 1983). Colored lines represent the mean pitch of the tone across the entire vowel. Gray bars represent a 95% confidence interval around the mean. I have excluded the final measurement from the plots throughout this paper. Including this measurement resulted in sharp contour slopes at the end of the vowel, converging at roughly 5.4 ERB, the initial level of a low tone. I hypothesize that this effect is due to the fact that all target words were immediately followed by a verb beginning with a low tone—that is, it is the result of tonal co-articulation. Additionally, the fact that this effect is only realized within the final tenth of the vowel further suggests that it is the result of tonal co-articulation.

There are two important exceptions that I am aware of to this generalization. First, they can arise as the result of a regular tone sandhi process (see §5.1). Additionally, initial rising tones are used to signal some grammatical distinctions, especially negation (Eischens, 2019).
3 Correlates of Wh-Words are Prosodically Prominent

3.1 Methodology

In order to compare the prosodic realization of correlates of wh-words and broad focus answers in a systematic way, I chose 36 target words with various tone melodies and elicited them using the questions in (9). All target words were bisyllabic. Target words were elicited as the direct object in a ditransitive construction. For each word, I would orally ask the appropriate question in SMPM, and would then show a picture representing a giving event between two individuals, with a picture of the target word in the middle (see Figure 4). The consultant would then respond with the appropriate response (as in 10). Sentences were held constant except for the target words and the proper names of the two individuals.

(9)  a. **Broad Focus Question**
    \[ Na \ kù \ \text{bitsi} \]
    what \ COP.COMP \ today
    ‘What happened today?’

b. **Example Wh-Question**
    \[ Na \ \text{tàshǐ} \ Raúl \ntà’ǎ \text{Sofia} \]
    what \ give.comp \ R. \ hand \ S.
    ‘What did Raúl give Sofia?’

---

\( ^6 \)Roots in Mixtec languages are minimally bisyllabic or bimoraic. This is often referred to as the couplet in the Mixtecanist literature (Pike, 1948; Macaulay and Salmons, 1995, a.m.o.).
Each word was elicited 8 times in response to a wh-question and 8 times in response to a broad focus question, for a total of 576 target observations. This systematic elicitation was carried out over the course of 10 elicitation sessions, over approximately 3 months. Elicitation was broken into blocks of broad focus questions and wh-questions. The condition that was presented first was counterbalanced to avoid any effects of repetition always occurring on one answer type. Elicitation of other unrelated material was often (though not always) interspersed between the two blocks of questions.

3.2 Results

The data elicited point to a clear asymmetry across tone type and position. Word final high tones are significantly raised in pitch when they are in the correlate of a wh-word compared to when they are the part of the answer to a broad focus question (Figure 6). This raising crucially depends on the the position of the high tone, however—there is no raising in word-initial high tones (Figure 5).

\[ P-values \text{ are the results of T-tests where the alternative hypothesis is that the difference in average pitch across the vowels is greater than 0.02 ERB, the Just Noticeable Difference threshold (Pulkki and Karjalainen, 2015). This is a more conservative approach and requires a greater difference in means to achieve significance. This was done to ensure that any observed differences were perceptible. N-values represent the total number of syllables in each context. Differences are averages of pitch values across the syllable.} \]
This difference can be contextualized by comparing it to the differences between each of the level tones in final position (Figure 3). On average, high and mid tones are distinguished by 0.37 ERB, and mid and low tones are distinguished by 0.34 ERB. Thus, the raising effect seen in Figure (6) is slightly more than half the difference between the each of the level tones and is well above the Just Noticeable Difference threshold.

(11)

<table>
<thead>
<tr>
<th>Tone</th>
<th>High↑</th>
<th>High</th>
<th>Mid</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean pitch (in ERB)</td>
<td>6.13</td>
<td>5.94</td>
<td>5.57</td>
<td>5.23</td>
</tr>
<tr>
<td>Difference</td>
<td>0.19</td>
<td>0.37</td>
<td>0.34</td>
<td></td>
</tr>
</tbody>
</table>

This effect is restricted to high tones. There is no comparable raising effect in low tones (Figures 7 and 8) or mid tones (Figures 9 and 10), nor in the rising tones (Figure 11). Additionally, there is no lowering of low tones, as is found in Mandarin Chinese (Xu, 1999), nor a global register shift as in Akan (Kügler and Genzel, 2011). There is simply no difference between the two question conditions, except in word-final high tones. This is one respect in which prosodic prominence is asymmetric in SMPM.
Ex: [yü] kù (‘leaf’)  

Figure 7: Initial Low Tones  
n=253, n.s.  
Difference=0.01 ERB

Ex: si [bà] (‘seed’)  

Figure 8: Final Low Tones  
n=52, n.s.  
Difference=0.02 ERB

Ex: [ndu] shi (‘honey’)  

Figure 9: Initial Mid Tones  
n=237, n.s.  
Difference=0.02 ERB

Ex: le so (‘rabbit’)  

Figure 10: Final Mid Tones  
n=162, n.s.  
Difference=0.02 ERB
This asymmetry, while distinct from other prominence patterns of tonal languages in the literature, is perhaps not completely unexpected. Ladd (2008) notes that pitch range expansion tends to be asymmetric, with more expansion happening at the upper bound of the pitch range than at the lower bound (pg. 203). This pattern may be especially unsurprising in SMPM for two reasons. First, high tones can freely raise without risking any neutralization with other tones. This is not the case, for instance, with mid tones, which, if raised, would quickly encroach on the pitch range of high tones. Additionally, it is the case that there is only so low that a speaker can go without introducing glottalization into the voice quality. As SMPM uses several different glottal phonation types contrastively, including “checked” and “rearticulated” vowels (Angeles, 2018; Ostrove, 2018), lowering low tones may also introduce the chance of neutralization.

In addition to pitch, vowel duration is often a phonetic correlate of prominence (Ladd, 2008; Gussenhoven, 2004; Jun, 2005). In SMPM however, there are no significant differences in duration between the questions conditions, for any of the tone types. This can be seen in Figure (12). Here, I compare the duration of vowels of each of the tone types across the two question contexts. The distribution of durations is represented as a violin plot—a box plot with a mirrored density plot on each side. The median is represented with a horizontal line, and each quartile of data is represented with a box or vertical line. Outliers are represented with dots. The mass between the curved lines and the midline of each plot represents the density of data at that point—the further the curved line from the mid-point, the more observations.
This pattern further indicates the asymmetry of prominence in SMPM. In addition to the fact that prominence is restricted to word-final high tones, only one correlate of prominence—pitch—can be detected.

4 Against Default Prominence

In the previous section, I argued that SMPM displays asymmetric prominence on correlates of wh-words compared to broad focus contexts: word-final high tones are raised in pitch (cf. 12b and 13b). Other tones are unaffected.

(12) **Wh-question**

a. *Ná tàshî* Mariana ntà’ância Bernaldo
   
   what give.comp M. hand B.
   
   ‘What did Mariana give Bernardo?’

b. *Chichí* tàshî=ñá ntà’ância=rà
   
   avocado give.comp=3sg.f hand=3sg.m
   
   ‘She gave him an AVOCADO.’

(13) **Broad Focus Question**

a. *Ná kù* bitsi
   
   what cop.comp today
   
   ‘What happened today?’

b. *Chichí* tàshî Mariana ntà’ância Bernaldo
   
   avocado give.comp M. hand B.
   
   ‘Mariana gave Bernardo an avocado.’

Figure 12: Syllable Duration across Tone Types

\[n= 529, \text{n.s.}\]
Recall from §1 that there are (at least) three ways to think about this prominence:

1. **Non-given hypothesis**: The answer is prominent because it is not given, and attracts a default prominence.

2. **Focus alignment hypothesis**: The answer is aligned to a prosodic boundary, which is often an inherently prominent position.

3. **Direct focus hypothesis**: The answer is prominent because it is a type of focus, which triggers a special type of prominence.

In this section, I will argue that there is no default prominence in SMPM. First, I will show that in multiword answers including a modified noun, prominence falls at the right edge of the wh-correlate, on the post-nominal adjective. I will then compare this to the relative prominence of nouns and adjectives in out-of-the-blue contexts and show that there is no evidence that adjectives are more prominent than nouns in general in the language. I take this fact to indicate that there is no evidence that prominence is mapped onto an inherently prominent position, a crucial component of the non-given hypothesis. Then, I will argue that there is no evidence of a right-aligned sentence prominence in the language. I suggest that this fact raises doubt about whether there is a prominence in the language which is mapped to the right edge of the non-given constituent.

### 4.1 Background

In English, default sentence prominence falls on the head of the rightmost constituent (14a) (*Chomsky and Halle, 1968; Bresnan, 1971*). It is infelicitous for it to fall on other words in a neutral context (14b).

\[(14)\] What happened?
  a. My grandma made **broccoli**.
  b. #My grandma made broccoli.

However, given constituents, which are entailed by the context, resist phrasal prominence (*Schwarzschild, 1999; Féry and Samek-Lodovici, 2006*)—pitch accents cannot fall within the given constituent (15a), and instead fall on the new information (15b).

\[(15)\] Who made the broccoli?
  a. #My grandma [made the **broccoli**]_{\text{given}}
  b. My grandma [made the broccoli]_{\text{given}}

When the non-given constituent is a phrase, the pitch accent falls on the word with default phrasal prominence (16a) (*Jackendoff, 1972; Chomsky, 1971*).

\[(16)\] Who made the broccoli?
  a. My grandma from **norway** [made the broccoli]_{\text{given}}
  b. #My grandma from Norway [made the broccoli]_{\text{given}}
Here I assume a version of the Prosodic Hierarchy proposed in (Ito and Mester, 2012), with only three distinct higher-level prosodic domains: the prosodic word (\(\omega\)), the phonological phrase (\(\varphi\)) and the intonational phrase (\(i\)) (Selkirk, 1978; Nespôr and Vogel, 1986). These categories correspond, for the most part, to the syntactic categories of \(X^0\), XP and CP, respectively (Selkirk, 2011). Following many others in the literature, I assume that these categories allow for recursion, and that boundaries at different depths of recursion can potentially impose different phonological restrictions (Ladd, 1986; Ito and Mester, 2012; Elfner, 2015; Elordieta, 2015, a.o.).

\[
\begin{array}{c}
i \quad \text{Intonational Phrase} \\
| \\
\varphi \quad \text{Phonological Phrase} \\
| \\
\omega \quad \text{Prosodic Word}
\end{array}
\]

Crucially, in order to account for the English pattern, the non-given hypothesis requires that the shifted prominence must map onto a position that already has some word or phrase level prominence (Hayes, 1995). This intuition can be formalized using the Metrical Grid. Specifically, this is due to the Continuous Column Constraint, which requires that a grid mark at the intonational level must be supported by a grid mark at the phrasal and word level.

(18) **Continuous Column Constraint**

A grid containing a column with a mark on layer \(n+1\) and no mark on layer \(n\) is ill-formed. Phonological rules are blocked when they would create such a configuration.

[Hayes (1995):34]

If a default intonational level prominence is shifted onto the non-given constituent, this constraint requires that it fall on the word that already has phrasal prominence (as in 19a), creating a “continuous column”. It cannot fall on a word that does not already have phrasal stress (as in 19b), as this would create an intonational level prominence which is not “supported” by a lower phrasal prominence.

\[
\begin{array}{c}
x \\
| \\
x \\
| \\
x \\
x \\
x \omega \\
My \quad \text{grandma} \quad \text{from} \quad \text{norway} \\
\end{array}
\quad \begin{array}{c}
x \\
| \\
x \\
| \\
x \\
x \\
x \varphi \\
| \\
x \\
x \omega \\
``My \quad \text{GRANDMA} \quad \text{from} \quad \text{Norway}''
\end{array}
\]

In effect, this constraint forces a shifted intonational prominence to fall on a phrasal prominence, which must fall on a prominent word, etc. This constraint has been used, for instance, to explain patterns of stress-retraction in English (Hayes, 1995). This restriction forces the intonational level accent to shift to syllables that are already prominent in some sense. This allows the non-given hypothesis to predict where prominence will fall within the non-given constituent. The pitch accent must fall on the strong word within a phrase (20a) and the strong syllable within a word (21a).
(20) What is your favorite food?
   a. Raw broccoli [is my favorite food.]\textsubscript{GIVEN}
   b. #raw broccoli [is my favorite food.]\textsubscript{GIVEN}

(21) What is your favorite food?
   a. bróccoli [is my favorite food.]\textsubscript{GIVEN}
   b. #Broccoli [is my favorite food.]\textsubscript{GIVEN}

4.2 Multiword Correlates in SMPM

An important first step to determine whether the non-given hypothesis can correctly predict the prominence pattern in SMPM is to establish the empirical pattern of prominence in multi-word answers. This is crucial, because it allows us to determine if prominence is mapped onto an already prominent position, as in English. That is, can the prominence pattern in SMPM be explained simply with the Continuous Column Constraint? To that end, I elicited one and two word correlates of wh-words with final high tones, to determine patterns of prominence in larger constituents. I compared the production of tones in three positions: word-final high tones on adjectives, word final high tones on single nouns, and word-final high tones on nouns followed by an adjective. This pattern allows us to answer two questions simultaneously: (1) does raising affect all final high tones equally within the wh-correlate?; (2) if only one high tone is affected, which one is raised?

As expected, final high tones in one word answers are raised (22a). However, in two word answers, only the absolute final high tone on the adjective undergoes raising. There is no raising on the noun, even if it ends in a high tone (22b).

(22) Ná nàkábà nùhù nũ’ũ
    what fall.comp face ground
    "What fell onto the ground?"
    a. [Tsyáká] nàkábà nùhù nũ’ũ
       fish fall.comp face ground
       "The fish fell onto the ground."
    b. Tsyáká [ndú’ú] nàkábà nùhù nũ’ũ
       fish fat fall.comp face ground
       "The fat fish fell onto the ground."

This effect can be seen in Figure 13. Here we see that high tones on nouns that are modified are produced significantly lower than high tones on nouns that are unmodified. This difference can be seen by comparing the yellow and blue lines on the graph. Additionally, there is no significant difference between the pitch of high tones of unmodified nouns and adjectives. Furthermore, high tones on adjectives are raised in pitch when compared to the nouns that they modify. Importantly, this is the opposite of what we would expect based on declination, as adjectives follow nouns in SMPM.
Thus, in order for the Continuous Column Constraint to account for this pattern, we expect to find evidence that adjectives are more prominent than nouns in default cases. This is because the Continuous Column Constraint predicts that prominence should be mapped onto an already prominent position. So, in order to confirm this hypothesis, we need to look for evidence for a prosodic structure as in (23), where each right sister is prominent with respect to the left sister.

\[
\begin{array}{c}
\varphi \\
\varphi_{\text{WEAK}} \\
\omega_{\text{STRONG}} \\
\sigma_{\text{WEAK}} \quad \sigma_{\text{STRONG}} \\
tsyà \quad ká \\
\varphi_{\text{STRONG}} \\
\omega_{\text{STRONG}} \\
\sigma_{\text{WEAK}} \quad \sigma_{\text{STRONG}} \\
\text{ndu} \quad 'ú'
\end{array}
\]
4.3 Against Right-Headed Prominence

In order to show that the SMPM is right-headed with respect to prosody, one would have to demonstrate two things: (1) the final syllable within the word is most prominent; (2) the rightmost word within the phrase is most prominent. If we indeed find this constellation of facts, then the non-given hypothesis could straightforwardly explain why only the final syllable within the correlate of a wh-word receives prominence.

Some support for the first claim comes from DiCanio et al. (2018), who argue for fixed final stress in Yoloxóchitl Mixtec. However, it should be noted that the towns of San Martín Peras and Yoloxóchitl are roughly 100 miles apart in a region with a great diversity of languages. Additionally, in their typology of Mixtec stress patterns Dicanio and Bennett (to appear) include seven languages with root-initial stress, as well as four with final stress and three with variable stress. So, despite the fact that some Mixtec languages have been argued to have final stress, there is no typological basis for claiming that is a common feature of Mixtec languages. More work needs to be done to determine the stress pattern of SMPM.\(^8\)

Despite the fact that it is plausible that SMPM might have final stress, I argue that there is no evidence that adjectives are more prominent than the nouns they modify in basic cases. That is, there is no evidence that the rightmost word within the phrase is most prominent. This makes it unlikely that prominence is mapped onto the final syllable of correlates of wh-words because it is an inherently prominent position. In fact, neither word appears to be more prominent, which may indicate that \(\varphi\) are unheaded in the language.

To support this claim, I elicited sentences with a modified subject containing a noun and an adjective, both with final high tones, on the assumption that these form a syntactic constituent and thus likely form a prosodic constituent, presumably a \(\varphi\).

\[(24) \quad Shàhmi (yûtsì ihmì) rà lo’o\]

\[\text{burn} \quad \text{sand} \quad \text{hot} \quad \text{he} \quad \text{small}\]

‘The hot sand burned the boy.’

I compared the realization of pitch of these two final high tones, and found no evidence that adjectives are more prominent. There is no significant difference in pitch between these two words.

\[^8\text{It is possible that the general restriction of rising tones to word final position is indicative of final stress in the language. However, I don’t think this is the only possible explanation. First, this is typologically common restriction (Zhang, 2004). Second, North and Shields (1977) describe a closely related variety of Mixtec that has no phonemic contour tones, but that has rising tones created when a word final low tone is adjacent to an initial low tone in the following word. All of the examples of words that the authors describe as undergoing this process in Silacayoapan Mixtec have an underlying rising tone in SMPM. And, in fact, there is a tone sandhi process in SMPM where rising tones are turned “back” into low tones before a high tone. Therefore, I hypothesize that rising tones in SMPM arose historically in the language as the fossilization of this tone sandhi process. If this hypothesis is correct, then it may offer an alternative explanation for why rising tones are restricted to final position, without appealing to word stress.}\]
This pattern suggests that adjectives are not more prominent than the nouns they modify in default contexts. This in turn, eliminates two possible explanations for the wh-correlate prominence that is present in SMPM. First, it suggests that prominence does not fall on the last syllable of a two-word phrase because that position is inherently prominent. Additionally, it suggests that there is not raising of high tones at the edge of all $\varphi$ in the language. These conclusions, in turn, cast doubt on at least one instantiation of the non-given hypothesis, where default prominence falls on the most prominent syllable of the non-given part of the answer. As there is no evidence that adjectives are more prominent than nouns in general, the non-given hypothesis has no way of explaining why prominence should fall only on the adjective.

### 4.4 Against Sentence Final Prominence

In the previous subsection, I argued that the prominence that we see on correlates of wh-words is not mapped onto an inherently prominent position. I showed that there is no evidence that adjectives are more prominent than the nouns they modify in default cases, which in turn suggests that the edge of $\varphi$ is not the triggering boundary for raising.

An alternative possibility is that prominence doesn’t fall on the right edge of the correlate because that position is inherently prominent, but rather because prominence is aligned as far right as possible within the sentence. If this prominence cannot fall at the right edge, due to givenness, then it is aligned as far right as possible. An analysis of this type could appeal to the interaction between two constraints: one which aligns prominence to the right edge, and one that prevents prominence from falling in given constituents. This would cause prominence to shift to the right edge of the wh-word correlate.
a. **hi**: Align the right boundary of every iP with its head.

b. **destress-given**: A given phrase is prosodically non-prominent.


If **destress-given** is ranked above **hi**, then the prominence will fall as close to the right edge of the sentence as possible, without falling in the given constituent. This is schematized in (26).

(26) Nà nàkàbà nùhù nù’ù

what fall.comp face ground

"What fell onto the floor?"

A similar analysis is proposed for Mandarin Chinese by Kabagema-Bilan et al. (2011) to account for sentences with multiple foci. In that language, the authors argue that prominence (realized as pitch raising) is only expressed on the rightmost answer to a multiple wh-question.9

(27) Q: Shéi tōu shéi de wō

who steal who gen nest

‘Who steals whose nest?’

A: Māomī tōu wūyā wō

kitty steal raven nest

‘A kitty steals a raven’s nest’

[Kabagema-Bilan et al. (2011):1897]

On the basis of this fact, the authors argue against a focus feature which directly triggers prominence, and instead claim that the pattern can be captured by a single intonational phrase stress, which is shifted to the rightmost answer—the non-given constituent that is most closely aligned to the right edge. The authors reason that if prominence was triggered directly by a focus feature, then it should be realized on both of the answers to the multiple wh-question, rather than just on the rightmost.

As with the other analyses we have considered, this proposal makes the claim that this prominence is not due to focus *per se*, but is instead a default prominence that moves away from given material. This claim makes the clear prediction that we should be able to find evidence of this prominence in non-focus contexts. Kabegema-Bilan and colleagues, for their part, do not find any direct evidence for intonational prominence outside of focus contexts, but maintain that prominence is rightmost—in line with cross-linguistic tendencies.

9All the stimuli in the Kabagema-Bilan et al. (2011) study have exclusively high level tones, so it is impossible to determine if the expected lowering of low tones as described by Xu (1999) is also only restricted to the rightmost-focus.
Recall that in SMPM, prominence is aligned (descriptively) to the the right edge of correlates of wh-words. It falls on the final syllable of nouns, or on the final syllable of post-nominal adjectives. If there is indeed a right-aligned intonational prominence in the language, then we might expect to see its effects in absolute sentence final position.

This raises the obvious question: against what baseline should we determine if the sentence-final syllable is prominent? It is well known that tonal languages undergo declination throughout the clause, though the details vary and can be intricate (Connell, 2001; Gussenhoven, 2004; Ladd, 2008). Therefore, it would not be necessary to show that final high tones are higher than other high tones in the clause, as we expect them to be, in general, lower due to declination. Instead, to demonstrate prominence, one would have to show that the sentence-final high tone is prominent relative to its expected pitch after declination.

To test this prediction, I elicited 60 sentences with multiple high tones in the form of (28). Each sentence contained four high tones: a verb in the continuative form, which begin with a high tone; a subject noun with a final high tone; an adjective with a final high tone; and an object with a final high tone. The result of this pattern is 4 high tones spread almost evenly throughout the sentence.10

(28) Sháshi ndushi tsya’á chíchí
    eat.cont chicken dirty avocado
    ‘The dirty chicken is eating the avocado.’

The high tone of each word was isolated, and the mean pitch in ERB was plotted on the scatterplot in (Figure 15).11 A linear regression model was fit over the first three high tones using R (R Core Team, 2019).12 This model represented the expected rate of declination throughout the clause against which the final syllable could be compared, and is represented with a solid blue line in Figure 15. This linear regression model was then extended to predict the mean of the sentence-final high tone (dashed blue line). The model predicts with 95% confidence that the mean of the fourth syllable will fall within the blue bar. The actual mean is represented with a blue dot. Additionally, assuming standard error, the model predicts that 95% of the observations of the final syllable should fall within the red bar.

As predicted, the mean falls within expected range and over 95% of the final syllable observations fall within the red bar. Thus, the pitch of the final high tone is right where it is expected to be, based on the amount of declination throughout the clause. If, instead, there were raising of high tones in sentence final position, we would expect more observations to be outside the upper bound of the expected range (red bar). Additionally, we would expect these higher observations to influence the mean, pushing it above the blue bar. The fact that we don’t see this pattern

10I know of no verbs in SMPM that end in a high tone. For this reason, it was impossible to disperse the high tones completely evenly throughout the clause.

1110 syllables with a mean pitch below 5 ERB were excluded. This was done for two reasons. First, 5 ERB is well below the average pitch of low tones, thus it is probable that these means were the result of spurious measurements—likely pitch halving errors. Second, this significantly reduced the variance around the means, resulting in a more conservative prediction for the final vowel. This more conservative prediction in turn increased the likelihood that prominence would be found, if present.

12This approach makes the implicit assumption that declination will be a linear process in the language. This assumption seems warranted, based on the understanding of declination as a phonetic effect (Connell, 2001; Connell and Ladd, 1990). In this respect it is different from downstep, which is a phonological process of lowering that can be triggered by a specific tone type.
leads me to conclude that there is no positive evidence in favor of a sentence-final intonational prominence that could be mapped onto correlates of wh-words.

In Kabagema-Bilan et al. (2011), the authors also find no direct evidence of the putative sentence final intonational prominence that they propose. They suggest instead that “intonational phrase level prominence is not assigned if no narrow focus is involved.” (p. 1894), a position also maintained in Selkirk (2005). This, of course, means that prominence is dependent on focus, which undercuts the claim that the prominence is a default in the language. In fact, I see no substantive difference between the claim that intonational level prominence is only triggered in the presence of narrow focus, and the claim that focus directly triggers prominence.

4.5 Interim Summary

In this section, I have demonstrated that in multiword correlates of wh-words, raising of high tones is only triggered on the rightmost word. I then used this pattern to argue against the non-given hypothesis in two ways. First, I attempted to show that the right edge of the correlate of the wh-word (the final syllable of the adjective) is not an inherently prosodically privileged position. There is no evidence that adjectives are more prominent than the nouns they modify in out-of-the-blue contexts. I argued that this finding allows us to reject one way in which the non-given hypothesis might account for the pattern. If the final syllable of the adjective is not privileged, then why is prominence only expressed there?

I then went on to consider, and reject, another possible explanation: a sentence-final intonational level prominence that is aligned as far to the right as possible, without falling within the given constituent. While this account might be able to explain why prominence only falls at the right edge of the non-given constituent without relying on that position being especially prominent, I found no positive evidence to support the claim that there is sentence final-prominence in SMPM.
Together, I take these facts as strong evidence against the claim that correlates of wh-words simply receive a default prominence, without triggering any special prominence due to their information structural contribution to the sentence. That is, the non-given hypothesis simply does not seem to be able to account for the empirical pattern of prominence in the language.

5 Against focus alignment

In the previous section, I argued against the non-given hypothesis. On the basis of this argumentation, I conclude that correlates of wh-words are marked with a morphosyntactic feature in the language. Leaving a correlate of a wh-word unmarked and relying on default prominence cannot capture the empirical pattern of SMPM. The question remains, however: do correlates of wh-words receive prominence because they are aligned to a prosodic boundary (Féry, 2013; Büring, 2013; Truckenbrodt, 1999), or directly via a rule that triggers prominence at PF (cf. Stress Focus Constraint, Saeck-Lodovici, 2005:697)?

Féry (2013) argues that correlates of wh-words (which she considers a type of focus) are universally aligned to a prosodic boundary, most often to an intonational phrase. Languages differ as to which edge of the prosodic domain is relevant for alignment purposes. Thus, a possible way to account for the prominence of correlates of wh-words would be to say that they are aligned to the edge of an intonational phrase (ιP). Recall from section §1 that I refer to this as the focus alignment hypothesis.

This is the case, for instance, in Italian. Here Féry (2013), following Samek-Lodovici (2005) and Truckenbrodt (1995), argues that the subject in (29b) is moved to the right edge of the intonational phrase, where it receives the final nuclear accent.

(29) a. Q: What happened?
   A: (Gianni ha [RISO] )ι
      G.    has laughed
             ‘Gianni has laughed.’

b. Q: Who has laughed?
   A: (Ha [GIANNI] riso )ι
      has laughed G.
             ‘GIANNI has laughed.’

[Féry (2013):694]

Here, Féry argues that Gianni is not prominent because it is a focus, per se. Rather, its status as a focus forces it to be aligned to the right edge, where it happens to receive the nuclear accent.

I assume, given that constituents are fronted in both wh-answers and answers to broad focus questions, that the left edge cannot be the crucial edge to which the focus has to be aligned in SMPM (as it is in some other languages). If the left edge did trigger prominence, then we would expect the same prominence pattern on correlates of wh-words and fronted objects in broad focus answers, as they are both left-most in the sentence. Instead, one might posit an intonational phrase boundary between the fronted correlate of a wh-word and the verb, allowing the right edge of correlates of wh-words to be aligned to an ιP. Crucially, under this account, there would be no such boundary between broad focus fronted constituents and the verb.
5.1 Tone Sandhi

In SMPM, some adjectives that normally begin with a high tone will instead begin with a rising tone if preceded by a low tone. This can be seen, for example, with the adjective ká’no, which undergoes this sandhi process after a noun that ends in a low tone (31a), but not after a noun that begins in a mid tone (31b). This effect can be seen by comparing the pitch contour of the first vowel in Figures (17) and (16).
This tone sandhi rule, which I call high tone contouring, can be formalized with the following rule:

(32) **HIGH TONE CONTOURING**

\[
H \rightarrow \text{R / L}_\omega \\
\]

This process only applies across word boundaries, not within words—it doesn’t, for instance, trigger a rising tone on a word with a low high tone pattern, such as \( \text{yòsò} \) (‘metate’).

Despite being a general process of the language, this tone sandhi rule is systematically blocked when the noun and adjective are separated by a clause boundary—it does not apply, for instance, between a matrix subject and an embedded adjectival predicate, even when the conditioning environment is seemingly satisfied. This is apparent from the highlighted vowel in the pitch track in Figure (18).

(33) \( \text{Kã’ã} \)  \( \text{kìnì} \)  [\( \text{kã’no itù} \)]\(_\text{cp} \)

think cont pig big tree

‘The pig thinks that the tree is big.’

Assuming a faithful match from syntax to prosody (Selkirk, 2011; Hamlaoui and Szendrői, 2017), it is reasonable to conclude that a clause is mapped to an intonational phrase, which in turn blocks tone sandhi in the language. This fact is reminiscent of tone sandhi processes in
other languages, which can also be blocked at prosodic boundaries. Campbell (2014), for instance, describes a process of high tone spreading onto toneless syllables, which additionally triggers downstep of mid and high tones, in Zenzontepec Chatino, another Oto-Manguean language. This rightward spreading is blocked, however, at an intonational phrase boundary, represented with the red arrow.\textsuperscript{13}

(34)

\[\text{Ja} \quad \text{kisō?n= nā} \quad \text{tā'kā}^4 (\text{maxi} \quad k-īi=q) \quad \text{laa}^i? \quad \text{nyā?ā}i\]

CONJ master=1PL.INCL exist even.if POT-feel.1PL.INCL like.so see.2sg

‘We have our master, even if we think that way, you see.’

[Campbell (2014):138]

Additional evidence that tone sandhi processes are sensitive to prosodic boundaries comes from Xiamen Chinese (Chen, 1987). Assuming that tone sandhi in (33) is blocked by a prosodic boundary, we can leverage this fact to test the hypothesis in (30a), which supposes that there is an intonational phrase boundary between the correlate of a wh-word and the following verb.

Contrary to the predictions of the alignment account, tone sandhi is not blocked between a fronted correlate of a wh-word and an adjectival predicate.

(35) Q: Nā yā kā’no?

what it.NEUT big

‘What is big?’

A: Kînì kā’no

pig big

‘THE PIG is big.’

\[\text{Figure 19: THE PIG is big}\]

This lack of a blocking effect strongly suggests that there is no intonational phrase boundary in between the correlate of the wh-word and the following verb, casting doubt on an analysis that relies on alignment to a \(ιP\) boundary to account for the prosodic differences between answers to different questions.

\textsuperscript{13}Here I adopt Campbell’s tonal orthography. Mid tones in this example are marked with a macron (\(\ddot{V}\)) and toneless syllables are unmarked.
5.2 Final Lengthening

Another reliable cross-linguistic diagnostic for an intonational phrase boundary is vowel lengthening (Wightman et al., 1992; Klatt, 1976; Oller, 1973, a.o.), a phenomenon known as phrase-final lengthening. In the previous section, I argued that there is an intonational phrase boundary between matrix subjects and embedded verbs, on the grounds that tone sandhi is blocked between them. If this blocking effect is truly due to a prosodic boundary, then we should expect to see phonetic effects in this position, such as lengthening.

To test this prediction, I compared the length of the final vowel of the matrix subject when it is unmodified, which by hypothesis is at a prosodic boundary (36a), and when it is modified by a post-nominal adjective (36b), which should push the noun away from that boundary.

(36) a. (K’a’á  tstiná) (áhsí kôñù)i
    think.cont dog tasty meat
    ‘The dog thinks that meat is tasty.’

   b. (K’a’á  tstiná) lo’o)i (áhsí kôñù)i
    think.cont dog small tasty meat
    ‘The small dog thinks that meat is tasty.’

If there is an intonational phrase boundary between the matrix subject and the embedded predicate, then we expect the final vowel to be lengthened when it is unmodified, as compared to when it is modified.

As predicted, the final vowel of the unmodified matrix subject is significantly lengthened, by an average of ≈28 ms. The represents an average increase in duration of 23%. This finding provides convergent evidence that there is an intonational phrase boundary between matrix and embedded clauses.

![Figure 20: Matrix Subject Final Vowel Length Before an Embedded Clause](image)

Figure 20: Matrix Subject Final Vowel Length Before an Embedded Clause

n=48, p<0.001
Difference=27.8 ms

Returning to the nature of the boundary between correlates of wh-words and the following verb, recall that the alignment hypothesis predicts that the prosodic prominence is due to an
intonational phrase boundary. Crucially, this boundary must exist between correlates of wh-words and main verbs, but not between fronted objects in broad focus answers and main verbs (repeated from 30).

(37) a. Answer to wh-question (What did Mariana give Bernardo?)

\[ (Chichí^{\uparrow}i \ (tàshi=ñá \ ntà’ā=rà)\i) \]

avocado give.comp=3sg.f hand=3sg.m

‘She gave him an avocado.’

b. Answer to broad focus question (What happened today?)

\[ (Chichí \ tàshi \ Mariana ntà’ā Bernardo)i \]

avocado give.comp M. hand B.

‘Mariana gave Bernardo an avocado.’

If this analysis is correct, then we expect to see lengthening when the fronted constituent is the correlate of a wh-word, but not when it is the answer to a broad focus questions.

In fact, comparing the duration of the final vowel of fronted constituents across the two contexts reveals that there is no significant difference (Figure 21).\(^{14}\) This strongly suggests that the difference between these two prominence patterns is not due to an intonational phrase boundary.

![Figure 21: Final Syllable Duration of Fronted Constituents](image)

Figure 21: Final Syllable Duration of Fronted Constituents

\(n=529, \text{n.s.}\)

Difference=3 ms

As a final check, it is worth testing whether there is any pitch raising on the matrix subject before an embedded clause. That is: is there pitch raising in the position where there is good evidence for an intonational phrase boundary? If we found a comparable prominence effect in this position (i.e. raising of high tones), then we could plausibly link the two patterns.

\(^{14}\)This is a pooled version of Figure 12.
In fact, this comparison provides further evidence against the alignment hypothesis. There is no significant difference in the pitch of final high tones between modified and unmodified matrix subjects, indicating that there is no default prominence in ι-final position.

It is worth commenting briefly on the separation between the mean initial pitches of modified and unmodified words at this boundary. At the first pitch measurement, there is an approximately 0.2 ERB difference in pitch between modified words and unmodified words. However, given that this point only shows the pitch of final syllables, it is worth noting that the set of preceding syllables in the two cases are identical. I hypothesize that this difference may be due to the difference in durations across these contexts. Recall that this pitch plot is time-normalized, but that in general, modified words are significantly shorter than unmodified words. I tentatively suggest that this may have an effect on the overall pitch contour. I emphasize again, however, that despite this fact, there is no significant difference in the overall pitch of these two contours, which should make us skeptical of any analysis that relies on correlates of wh-words being prominent because they are at an iP boundary.

6 A Featural Account

In the previous two sections, I argued that SMPM does not display any evidence of default prominence at the phrasal, intonational, or sentence level. Furthermore, I concluded that this fact presents a serious challenge to theories that rely on default prominence to account for prominence on correlates of wh-words. This includes theories that propose that correlates of wh-words are foci that are prominent because they are aligned to prosodic domains (e.g. Féry, 2013; Büring, 2013; Truckenbrodt, 1999), as well as theories that seek to eliminate correlates of wh-words as a type of focus entirely (Kratzer and Selkirk, 2018). I found no evidence that prominence is realized on an inherently prominent position, nor did I find evidence of right-aligned prominence.
that is shifted away from a given constituent. Finally, I found no difference in phrasing between correlates of wh-words and answers to broad focus questions.

I believe that this suggests, at a minimum, that the non-given and focus alignment hypotheses are insufficient to capture the pattern in SMPM. In this section, I argue instead in favor of a featural account—that is, constituents are marked with a certain morphosyntactic feature, which directly triggers prominence. That said, I acknowledge that these other theories have been successfully used to capture the patterns of other languages. Furthermore, the featural account that I propose for SMPM may fail to capture some generalizations if applied to other languages, especially languages where focus seems to be tied directly to prosodic phrasing. It may simply be the case that none of these theories, in their current form, can fully capture the empirical landscape. This may reflect the fact that the phonology of focus is heterogenous, or it may suggest that more work must be done to uniformly account for focus prominence.

In SMPM, I propose that correlates of wh-words are represented in the grammar with a morphosyntactic feature, and that this feature is capable of triggering phonological upstep of high tones. Following a long line of work, I propose that this feature is \textit{focus} (e.g. Rooth, 1992).\footnote{I remain agnostic about whether another feature that encodes contrast, such as Kratzer and Selkirk’s FoCus, is necessary to account for the difference in the phonetic properties of correlates of wh-words and contrastive foci in languages like English (Katz and Selkirk, 2011), or to account for differences in movement properties of contrastive foci and correlates of wh-words in Hungarian (É Kiss, 1998). It is possible that the phonetic effect described in Katz and Selkirk (2011) could be the result of paralinguistic emphasis. Alternatively, a more elaborated feature geometry of focus, which to my knowledge has not been proposed in the literature, might capture these differences between different focus types.}

When a high tone is at the right edge of the focus domain, it undergoes phonological upstep, causing a rise in pitch.

\begin{equation}
\text{focal upstep} \\
H \rightarrow H^\uparrow / [... \_ \_]_F
\end{equation}

This rule, while slightly different in terms of its formalization, is similar in spirit to the Focus Prominence Rule (Zubizarreta, 1998, 21) and the Stress Focus Constraint (Samek-Lodovici, 2005, 697). Both of these rules state that a constituent that is focused must be more prominent than a constituent that is not focused. In both cases, prominence is equated with sentence-level stress. If we accept a broad interpretation of these constraints however, allowing for the fact that prominence in SMPM is asymmetric, and only involves raising of high tones, then the application of (38) would satisfy both of these constraints. It is the case that foci (in this case correlates of wh-words) are more prominent than non-focused constituents. It just so happens that this prominence is only realized on high tones in the language. However, instead of relying on the notion of stress, I suggest that the pattern in SMPM involves the insertion of an allotone that is conditioned by a morphosyntactic feature.

I argue that this raising is the realization of an allotone—it is not simple raising of the pitch ceiling. If this effect were caused by raising of the pitch ceiling in the phonetics, then we would likely expect to see some amount of raising of mid tones as well. If mid tones sit roughly in the middle of the pitch space, and that pitch space is expanded asymmetrically upward, then this will shift the middle of that pitch space upward as well. However, there is no raising of mid tones under focus, which suggests that the effect is phonological, and affects only high tones.
Additionally, there is reason to believe that this effect is not a paralinguistic one. First, a crucial difference between paralinguistic meaning and intonational meaning is gradience (Ladd, 2008). In English, the pitch accent which signals certain types of focus might plausibly be analyzed as a paralinguistic effect for this reason. Indeed, Hayes (1994) notes a correlation between the strength of emphasis of a focus and the pitch of the accented word: the more emphasis, the higher the pitch. So, in SMPM, if we equate focus prominence with paralinguistic emphasis, we expect the amount of raising to vary, roughly correlating with the amount of intended emphasis. If, on the other hand, this effect is due to an allotone with a designated pitch target, then we expect a categorical effect, with less pitch variance.

In SMPM, raised high tones display less variance around the median than other tones. This tighter grouping around the median may indicate that there is a designated pitch target that the speaker is trying to hit when answering a wh-question, as opposed to merely using pitch as a paralinguistic means of signaling emphasis (cf. Hayes, 1994).

<table>
<thead>
<tr>
<th>Context</th>
<th>Broad Focus Tones</th>
<th>Raised High Tones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean distance from Median</td>
<td>0.35 ERB</td>
<td>0.24 ERB</td>
</tr>
</tbody>
</table>

A second reason to doubt that this is a paralinguistic effect is the fact that is is asymmetrical and highly targeted. This prominence is realized only on one tone, in one position, in one phonetic dimension. This, I believe, suggests that it is a phonological effect, not merely a phonetic effect—realization of pitch under focus depends crucially on phonological primitives, such as tone and position within the word.

Although different from other tonal languages that involve pitch expansion at both ends of the pitch range (e.g. Xu, 1999), Focal Upstep can be related to patterns that have been described for two African languages: Kivunjo Chaga and Hausa. Both of these languages involve allotonic raising of high tones in certain environments—at the edge of the phonological phrase and within a focus constituent, respectively.

Kivunjo Chaga is a Bantu language spoken in Tanzania. While it has an underlying two-tone distinction, it has many tone sandhi and allotonic processes, causing its two tones to be mapped onto the surface as 3 level tones and 5 contour tones (McHugh, 1990). One of these allotonic variations is called Final High Raising. High tones that appear at the right edge of a phonological phrase surface as a superhigh tone. This alternation can be seen in (40). In (40a), the word goat is not at a φ edge, and thus it surfaces faithfully with a final high tone. In (40b) however, the high tone surfaces as a superhigh, due to its position at the φ edge.

(40) a. *(Ngěčíułá mbũrú ngițutu)*φ
    will.buy.I goat small
    ‘I’ll buy a small goat.’

b. *(Ngěčíułá [mbũrú]*φ *(inů)*φ
    will.buy.I goat today
    ‘I’ll buy a goat today.’

16This difference in variance is statistically significant, according to the Brown-Forsythe Test (Brown and Forsythe, 1974). Assuming that tones in broad focus words answers also have a designated pitch target, it is not clear why the non-upstepped tones would have a greater variance than the upstepped tone. However, I suggest that this result is evidence against the phonological upstep being a paralinguistic effect.
This pattern serves to demonstrate that non-phonemic tones can surface in certain phonological environments. Additionally, the rule itself closely resembles the alternation in SMPM.

The Kivunjo Chaga pattern, though similar to SMPM in the sense that it involves raising of high tones, is different in a few crucial respects. First, it is not triggered by focus. Second, its conditioning environment makes reference to the prosodic hierarchy. As I have shown in the previous section, it doesn’t seem as though focal upstep could be conditioned by prosodic phrasing in SMPM. Instead, it must be triggered by a morphosyntactic feature, to which the phonology can make reference.

In Hausa, a Chadic language spoken in Nigeria, there is a phonetic phenomenon known as Local High Raising (Leben et al., 1989; Inkelas and Leben, 1990; Hartmann and Zimmermann, 2007; Hartmann, 2008). In that language, a single high tone is raised within a focused constituent, as a means of highlighting that word. This can be seen in (41). Here the rightmost high tone within the fronted focus constituent is raised in pitch.\(^{17}\)

\[(41)\] Mâalàm [Nù lù] née yá hánà Láwàn híir̃á dà Häwwá
mister N. PRT 3SG.PERF prevent L. chat with H.

'It was Mister Nuhu who prevented Lawan from chatting with Hawwa.'

[\text{Hartmann (2008):422}]

This pattern, while apparently not restricted to an edge position, bears a strong resemblance to the SMPM pattern. In both languages, a single high tone is raised in pitch within a focus constituent. While Leben et al. (1989) imply that this process only affects high tones, they don’t provide any data to show what happens if there are no high tones in the focused constituent. I am not aware of any extant analysis that uses prosodic phrasing to explain the pattern in (41), though I am not aware of any reason why such an analysis should be excluded \textit{a priori}. Indeed, Hartmann and Zimmermann (2007) suggest that there is an intonational phrase boundary immediately following the focus particle in examples such as (41). Crucially, however, both languages exhibit raising on high tones, and only high tones, in the environment of focus. Like SMPM, the Hausa pattern doesn’t seem to rely on adjacency to the edge of a prosodic boundary. This suggests that the phonology may be able to make reference to that feature.

If correlates of wh-words are indeed a type of focus that is marked with a morphosyntactic feature, then we expect syntactic operations to be sensitive to this feature. In the following subsection, I show that there is evidence that correlates of wh-words are uniquely identified and moved by the syntax in SMPM.

6.1 Convergent Syntactic Evidence

The focus and non-given hypotheses make clear and divergent predictions when it comes to how correlates of wh-words should behave syntactically. Because the direct focus hypothesis accounts for prominence on the correlate with a morphosyntactic feature, it predicts that correlates of wh-words should participate in syntactic operations that depend on features. Conversely,

\(^{17}\)Because no contexts are provided in the papers describing local high raising, it is hard to determine exactly what types of focus this phenomenon applies to. Hartmann and Zimmermann (2007), using the same example, claim that Mâalâm Nûhû is in focus, and that \textit{née} is a focus particle, one of several in the language. (41) could therefore plausibly be the response to a wh-question, or be a type of corrective focus.
the non-given hypothesis predicts that correlates of wh-words are distinguished by their lack of a feature. This claim in turn predicts that correlates of wh-words should not undergo any special morphosyntactic operations.

In SMPM, as we have seen, various constituents can move from their in-situ position to a preverbal position. This includes correlates of wh-words, as well as subjects and objects in broad focus contexts. However, there are two syntactic diagnostics that can distinguish fronting of correlates of wh-words from other fronting operations in the language: obligatoriness and non-clauseboundedness. I argue that both of these diagnostics indicate that correlates of wh-words are represented formally with a feature in the grammar of the language.

6.1.1 Correlates of Wh-Words Must Move

Movement of correlates of wh-words to a preverbal position is obligatory in SMPM. It cannot stay in-situ (42b), nor can any other constituent front: either as a lexical word (42c) or a clitic (42d).

\[(42) \quad \text{Nā } shishi \text{ tsinā} \]

what ate dog

`‘What did the dog eat?’`

a. \( Kōnù \ shishi=ři \)

meat ate=it.animal

`‘It ate the meat.’`

b. \( *Shishi=ři \ kōnù \)

ate=it.animal meat

Intended: It ate the meat.

c. \( *\text{tsinā } shishi \ kōnù \)

dog ate meat

Intended: The dog ate the meat.

d. \( *Rí=shishi \ kōnù \)

it.animal=ate meat

Intended: It ate the meat.

Compare this to broad focus contexts. In this case, either the subject (43a) or the object (43b) can front to a preverbal position.\(^{18}\)

\[(43) \quad \text{Nā } kù \text{ bitsi} \]

what cop.comp today

`‘What happened today?’`

a. \( \text{tsinā } shishi \ kōnù \)

dog ate meat

`‘The dog ate the meat.’`

b. \( \text{Sháshi} \text{ tsinā kōnù} \)

ate.nonfood dog meat

Intended: The dog ate the meat.

\(^{18}\)Interestingly, (1a) is infelicitous in response to (43), but is acceptable as an out-of-the-blue assertion. VSO order is only allowed in response to a broad focus question if the action itself is somehow surprising (as in 1b).

\[(1) \quad \text{a. } \#\text{Shishi } tsinā \ kōnù \]

ate dog meat

Intended: The dog ate the meat.

b. \( \text{Sháshi} \text{ tsinā kōnù} \)

ate.nonfood dog meat

Intended: The dog stole the meat.’

SMPM has two words that correspond to the English word eat: one which is used in most contexts (shishi) and one that is used (at least) when eating fruit, plants or other things that are not typically considered food (shashi). When shashi is used, non-canonically, with meat, it apparently means something like ‘to eat surreptitiously’. I take the fact that the verb must be surprising to indicate that some sort of focus is obligatory in this context, and thus verb-initial order is interpreted as predicate focus. I leave full exploration of this fact to future research.
b. *Kôñù shishi tsnà
   meat ate dog
   ‘The dog ate the meat.’

This pattern of movement suggests two facts: (1) the syntax is able to uniquely identify correlates of wh-words; (2) the triggering probe will bypass intervening constituents to move the correlate. That is, the probe which triggers movement to a pre-verbal position is relativized such that only correlates of wh-words can satisfy its needs. These facts, in turn, strongly suggest that there is a syntactic feature that correlates of wh-words bear which is visible by the syntax. Regardless of the theory of syntactic movement that one adopts—movement to satisfy the needs of the probe or movement to satisfy the needs of a feature\(^\text{19}\)—the pattern in SMPM suggests that there is a property of correlates of wh-words that forces them to move, notwithstanding intervening constituents. This distinguishes this movement from other types of fronting in the language, where any constituent can front.

6.1.2 **Answer movement is not clause-bounded**

Another diagnostic that can be used to distinguish wh-correlate movement from other fronting in the language is that it is not blocked by a clause boundary. Even when the correlate of a wh-word is interpreted within the embedded clause, it must front before the matrix verb (44-45)

\[(44)\]
\[Q:\; Ná \; kàchì \; Juan \; [shàshi \; Ana]_{cp}\]
\[\text{what said \; J. \; ate \; A.}\]
\[\text{‘What did Juan say that Ana ate?’}\]
\[A:\; Ita_i \; kàchì=rà \; [shàshi=ñá \; ____]_{cp}\]
\[\text{flower said=3.SG.M \; ate=3.SG.M}\]
\[\text{‘He said that she ate a FLOWER.’}\]

\[(45)\]
\[Q:\; Ná \; kàchì \; Juan \; [shì \; Ana \; nùhù \; yàbi]_{cp}\]
\[\text{what said \; J. \; bought \; A. \; face \; market}\]
\[\text{‘What did Juan say that Ana bought at the market?’}\]
\[A:\; Chichi_i \; kàchì=rà \; [shì=ñá \; ____]_{cp}\]
\[\text{avocado said=3.SG.M \; bought=3.SG.F}\]
\[\text{‘He said she bought an AVOCADO’}\]

Contrast this pattern with fronting of constituents in broad focus contexts. In this case, fronting out of an embedded clause is ungrammatical (46-47).

\[(46)\]
\[Q:\; Ná \; kù \; bitsi\]
\[\text{what \; cop.comp \; today}\]
\[\text{‘What happened today?’}\]
\[A:\; *Ita_i \; kàchì \; Juan \; [shàshi \; Ana \; ____]_{cp}\]
\[\text{flower \; said \; J. \; ate \; A.}\]
\[\text{Intended: Juan said that Ana ate a flower.}\]

\(^{19}\)See, e.g. \textit{Zyman (2018)} for recent discussion of these two possibilities.
Q: *Ná kù bitsi*  
   what cop.comp today  
   ‘What happened today?’

A: *Chíchí kàchi Juan [shi Ana]_cp*  
   avocado said J. bought A.
   
   Intended: Juan said that Ana bought an avocado.

On its face, this contrast parallels a familiar contrast in English, between A and Ā movement. Famously, Ā movements, such as wh-movement, are unbounded (48a), while A movements, such as passivization, cannot cross a clause boundary (48b).

(48)  
   a. Who did Kim say [that Alex thinks [that Sam likes __ ]]?  
   b. *Those people were said [that Alex thinks [that Sam likes __ ]].*

I take this parallel to suggest, at least tentatively, that fronting of correlates of wh-words is a type of Ā-movement, while fronting of constituents in broad focus contexts is a type of A-movement. If this assessment is correct, then fronting of constituents in broad focus contexts resembles a similar process in the language, Quantifier Fronting, which has also been argued to be a type of A-movement (see Ostrove, 2018, §3.2). I leave for future research a more systematic investigation of this question, as other as yet untested diagnostics, such as reconstruction, will surely be revelatory.

Regardless of the exact status of the two movement processes, the problem for the non-given hypothesis is a more general one: many languages move correlates of wh-words to an ex-situ position (Zimmermann and Onea, 2011; Hedding, 2018; Hartmann and Zimmermann, 2007; Kügler and Genzel, 2011; Szendrői, 2001). This fact has lead to proposals for a designated focus projection in the CP domain (Rizzi, 1997; Aboh, 2016), and to proposals where movement occurs to satisfy alignment constraints (e.g. Féry, 2007). Crucially, all of the current proposals to account for this pattern, of which I am aware, assume that correlates of wh-words are a type of focus. If they are not, as proposed by the non-given hypothesis, then this cross-linguistic pattern warrants some other explanation. If, however, we accept that correlates of wh-words are marked with a morphosyntactic feature, then we can begin to understand why the pattern resembles other types of feature driven movement, such as wh-movement (Chomsky, 1977) and contrastive focus movement in Hungarian (É Kiss, 1998).

7 Implications and Conclusions

7.1 Direct vs. Indirect Reference

The analysis proposed here raises important questions about the nature of the syntax-phonology interface, especially about what aspects of the syntax the phonology can access and make reference to. These questions have long been debated within the literature, and there is often a division made between so-called direct reference theories and indirect reference theories. Direct reference theories argue that phrasal domains are defined solely by making reference to syntactic structure, while indirect reference theories posit an additional layer of prosodic structure that defines
domains, along with an algorithm that maps syntactic structure onto prosodic structure. See, for example, Bennett and Elfner (2019) and Elordieta (2008) for recent overviews of this distinction.

On its face, the analysis presented here may appear to support the direct reference hypothesis. Indeed, I have argued that the phonology is able to directly make reference to a syntactic feature, and I have taken great pains to argue that prominence in SMPM is not triggered by any particular level of the prosodic hierarchy. It is important to note, however, that I do not deny an intermediate representation that mediates between the syntax and phonological processes, nor do I provide any arguments against the prosodic hierarchy, though as far as I can tell, there is no direct evidence for prosodic domains below the intonational level. That said, if the analysis presented here is correct, then the prosodic hierarchy alone is not sufficient to capture the pattern. The output of the mapping algorithm between syntax and phonology must include information about what constituents are in focus in the syntax.

Of course, the nature of the syntax-phonology interface is such that the question is not if the phonology is able to make reference to the syntax, but rather what does it make reference to, and what can it not make reference to? Previous work within Direct Reference Theory has proposed that structural notions such as C-Command are relevant (Kaisse, 1985). Some Indirect Reference Theories suppose that syntactic notions such as phasehood are relevant (Kratzer and Selkirk, 2007). In fact, it is fairly uncontroversial, at least within Prosodic Hierarchy Theory, that the mapping from syntax to phonology is sensitive to syntactic notions such as head and phrase, as well as specific phrasal labels such as CP. Indeed, Match Theory (Selkirk, 2011) foregrounds these categories as central components of its mapping algorithm.

Here I seek to adopt a more nuanced approach. I assume, following Indirect Reference Theories, that there is a level of intermediate structure mediating the syntax and phonological processes, but I argue that additional elements of the syntax must be preserved in the mapping from syntax to phonology. Specifically, I believe that the case of SMPM indicates that the feature [focus]—which is active in the syntax and semantics—remains active in the phonology, at least in that language. That is, the feature that identifies a constituent as focused in the syntax, and triggers movement in languages like SMPM, continues to identify that constituent as focused in the phonology—the feature is not lost in the translation from syntax to phonology. I refer to this view as the FOCUS PRESERVATION HYPOTHESIS.

\[
\text{Mapping Algorithm} \\
[XP]_{foc} \rightarrow [\varphi]_{foc}
\]

This relationship can be interpreted as a type of correspondence, similar to other correspondence relationships between the syntax and phonology, such as those facilitated by MATCH constraints (Selkirk, 2011). Under this approach, there is a pressure for the phonology to correspond in a systematic way to the syntax, although other prosodic pressures can disrupt this relationship. In the case of SMPM, there is a pressure to match syntactically focused constraints to phonologically focused ones. One might imagine that this correspondence is established with a constraint, such as MATCH([XP]_{foc}, [\varphi]_{foc}), which forces the mapping algorithm to translate syntactic focus into prosodic focus.

This view, itself, raises many questions about the nature of the syntax–phonology interface; questions that I do not currently know the answer to. The first of these is: what limits, if any, are
there on the types of features that can be mapped into the phonology? If a feature like \texttt{focus} is maintained into the phonology, do we expect other phonological rules in other languages to reference \texttt{wh}, or \texttt{participant}, or any other number of syntactic features that have been proposed in the literature? Or, alternatively, is there something special about \texttt{focus}, perhaps indicated by the fact that it so often triggers prosodic effects cross-linguistically? That is, are only focus features preserved, or all information structural notions, or all features? This is an empirical question, but it strikes me, at least impressionistically, that allowing the phonology to reference any syntactic feature may be too powerful. I suspect that a line must be drawn—some set of features are preserved into the phonology and some not—but I don’t yet know where that line is.

As a purely technical matter, constraining the set of features that are preserved from the syntax into the phonology is quite simple: we might easily say that the grammar only demands correspondence with respect to some features, and not to others. Of course, as a theoretical claim, this is quite unsatisfying. Ideally, any theory that relies on feature preservation ought to explain which features are preserved in a principled way, and at least suggest what distinguishes these features from those that are not preserved. This in turn, may lead to deeper generalizations about the types of features that are used by the syntax.

A second question that this account raises: Do we expect other types of phonological processes, such as segmental effects, to be triggered by features in the phonology, or do we expect this to be an effect that is restricted to suprasegmental effects? Here, again, I believe it is necessary to widen our typology of focus effects to fully answer this question. That said, the fact that we tend to find languages that mark focus with pitch, and not, for instance, languages that mark focus with final devoicing, suggests that there may be an underlying generalization about what types of phonological effects can be triggered by \texttt{focus}. This generalization—that focus seems to be realized by the phonology with suprasegmental effects, rather than segmental effects—is robust, and suggests that the phonology may be restricted in the ways it can realize the \texttt{focus} feature.

This generalization is related to a finding in Hyman et al. (1987). Here, the authors note that in Luganda, the domains of application of tonal processes and segmental processes are not identical, and in fact the tonal processes seem to be insensitive to the prosodic hierarchy, assuming a non-recursive prosodic structure. This leads the authors to hypothesize that there are two distinct tiers—a segmental tier and a tonal tier—of the prosodic hierarchy, which may overlap. While this idea certainly needs to be investigated more, it may provide some means of isolating tonal processes from other segmental processes, using the prosodic hierarchy. If for example, focus preservation only affected the tonal tier, then this might give us the tools to explain the limited set of phonological effects that focus seems to have cross-linguistically. I leave further exploration of these questions to future research.

### 7.2 Default Prominence and the Typology of Focus

As we have seen, many current theories of focus prosody rely on a notion of default sentence prominence. These theories often argue that a default prominence is mapped onto foci to satisfy constraints against stressing given material, or they argue that foci become prominent as a result of being aligned to a prosodic boundary. If the analysis here is correct, however, then it should place in doubt any theory that relies on a notion of default prominence to account for cross-
linguistic patterns of focus prominence. As I have argued in this paper, I suggest that there is no evidence that any position in a sentence of SMPM is especially prominent, by default.

The notion that default prominence and focus should be separated is not new. Féry (2013), in arguing that foci are aligned to prosodic boundaries, also argues that there is no reason per se that foci must be prominent—if they are prominent it is simply a consequence of their alignment to a prominent position. Additional evidence that calls for the separation of default prominence and focus comes from Nle’kepmxcin, a Salishan language of British Columbia. In this language, foci are left-dislocated, however default sentence stress falls on the rightmost word of the sentence. This can be demonstrated in (50b): the focus is in sentence initial position, while the nuclear stress (represented by an underline) falls on the final word in the sentence.

(50) a. Stēʔ xʷú’y k s-ɬaʔxáns-ʔp tk sɬáp
what fut c nom-eat-2pl.poss obl.irl evening
‘What are you people going to eat this evening?’

b. [Pǐns]foc nceʔ xʷú’y e n-s-ɬaʔxáns
beans 1sg.emph fut det 1sg.poss-nom-eat
‘I’m gonna eat beans.’

Koch (2008) argues that there is no prosodic correlate of prominence on the focus, and that only prominence in the sentence is due to sentence-level stress. Thus, he argues that the correspondence between stress and focus is epiphenomenal—it just so happens that in some languages, such as English, prosodic heads fall on the same edge of prosodic constituents as foci, while in other languages, such as Nle’kepmxcin, foci are aligned to left edges while default prominence falls on the right.

SMPM provides a different argument against the connection between default prominence and focus prominence: there is no evidence of a default prominence at all in the language. That is, it may be the case that phonological phrases are headless in the language. Although headed phonological phrases are sometimes taken to be a universal, a part of the GEN function (McCarthy, 2003), this view has also been challenged (Ishihara, 2011; Hyman, 2006). Indeed, Ishihara (2011) argues that focus prominence in Japanese is best thought of as adding an additional head to a phrase, whereas he argues that post-focal deaccenting involves the deletion of a head. He argues that this is possible, due to the low ranking of a constraint, culminativity, which requires each phonological phrase to have exactly one head. If culminativity where similarly ranked low in SMPM, and there was a pressure to avoid labeling phonological phrases with a head, then this might result in the pattern that is apparently found: no apparent default prominence pattern.

Going forward, more work must be done to fit SMPM and other tonal languages into theories of focus prominence. While the pattern of SMPM is distinct from patterns that some other tonal languages display, it is by no means anomalous or unmotivated by phonological theory. I believe more work must be done to determine the role that default prominence plays in the languages of the world, especially outside the domain of some familiar stress-accent languages. A more thorough understanding of these patterns will surely be vital when developing and comparing theories of how phonology and information structure interact. If we find, for instance, that other languages mark focus prosodically, without having a default prominence pattern, this will strengthen the claim that these two notions ought to be separated.
7.3 Conclusion

In this paper, I have described a novel empirical pattern from an understudied language: San Martín Peras Mixtec. I have shown that correlates of wh-words in the language are asymmetrically prominent—pitch raising targets the rightmost syllable if it is a high tone, but otherwise there is no difference between these answers and answers to broad focus questions. No other tone is raised or lowered, and there are no durational differences.

I used this pattern to compare three alternative hypotheses to explain how correlates of wh-words receive prominence. One hypothesis—the NON-GIVEN HYPOTHESIS—leverages the fact that correlates of wh-words are not given to explain their prominence. I argue that this hypothesis crucially relies on a notion of default prominence, and I have tried to demonstrate that no such default exists in SMPM. This was done by way of analyzing multi-word correlates of wh-words. In these cases, only the absolute final syllable of the correlate is raised in pitch if it is a high tone. If this were a default prominence (i.e. prosodic right headedness), then we would expect a similar pattern to appear outside of focus contexts. This, however, does not seem to be the case. Additionally, I showed that focus prominence cannot be accounted for by means of a right-aligned intonational prominence, as no such prominence exists in non-focus utterances.

A second hypothesis—FOCUS ALIGNMENT—suggests that correlates of wh-words are aligned to a prosodic boundary, which is often a prosodically prominent position. I showed, based on two diagnostics—tone sandhi and final lengthening—that no such boundary exists between correlates of wh-words and the verb in SMPM. Additionally, I showed that there is no raising of high tones at other intonational boundaries in the language, suggesting that this explanation cannot account for the empirical pattern in SMPM.

As an alternative, I have suggested that wh-correlate prominence is phonological, and is triggered by the feature [focus]. Furthermore, I have shown that this rule can straightforwardly account for the pattern of prominence in the language, without making reference to prosodic defaults. My claim is that prosodic units can be marked as foci, and this label triggers insertion of an superhigh allotone at their right edge. Additionally, I have shown that there is convergent syntactic evidence that supports the view that correlates of wh-words are marked with a syntactic feature in the language.

This account has many potential implications for how we understand focus, and possibly the syntax-phonology interface more generally. The analysis presented here requires that a [focus] feature must be visible to the phonology, either directly or via the mapping from syntax to prosody. I suggested that the relationship between foci in the syntax and the phonology might be considered a type of correspondence, governed by MATCH constraints.

Furthermore, most current accounts of focus prominence rely on a notion of default prominence. There is some evidence that these two notions should be separated, however, and I believe that the facts of SMPM add to this body of evidence. As we expand our view, to incorporate more patterns from diverse languages, I believe we will find that this connection is not as strong as previously believed, especially for tonal languages.

Finally, I believe the pattern in SMPM suggests that the typology of focus prominence is not yet complete. More work, especially on understudied languages, is needed to understand the full range of phonological expressions of focus. Until that work is done, I believe theories of focus prominence will be more limited in scope, and we will not fully understand what is shared across the information structure systems of the world’s languages.
References


