Asymmetric Focus Prominence in San Martín Peras Mixtec

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2/19/19, AIS

1 Introduction

A well-known observation: focused constituents in English are prosodically prominent (Selkirk 1995, Jackendoff 1972, Rochemont 1986, a.m.o.)


Selkirk (1995):554

This generalization has been extended to many languages (Büring 2009), but there is ongoing debate about what types of constituents count as foci (Kratzer and Selkirk 2018) and about the phonological mechanism that triggers prominence (Ladd 2008).

A few ways of thinking about the prominence in (1):

— Feature hypothesis: The answer is a focus marked with a morphosyntactic feature. This feature can trigger phonological prominence at PF or can force default prominence in a non-canonical position (Selkirk 1995, Zubizarreta 1998).

— Givenness hypothesis: The answer is prominent because it is not given—given constituents resist prominence so the non-given constituent receives default prominence (Kratzer and Selkirk 2018, Schwarzchild 1999).

— Alignment hypothesis: Foci are aligned to prosodic boundaries, which tend to be prosodically prominent positions (Féry 2013, Büring 2009, Truckenbrodt 1999).

In this talk, I will outline the pattern of question-answer congruence (information focus) prominence in San Martín Peras Mixtec (SMPM), a tonal language. I will make the following empirical generalization:

*Thanks first and foremost to Natalia Gracida Cruz for her patience and insights during the elicitation process, as well as for sharing her intuitions about her language with me. Many thanks are also due to Ryan Bennett, Pranav Anand and Gorka Elordieta, as well as Judith Aissen, Andrew Angeles, Jérémie Beauchamp, Richard Bibbs, Ben Eischens, René Gutiérrez Márquez, Lisa Hofmann, Ur Shlonsky, Maziar Toosarvandani, an audience at Phlunch and the members of the 290 Research seminar for very helpful comments.
Focus prominence is realized asymmetrically in the language:

- Word final high tones raise in pitch when focused. Other tones are unaffected.
- There are no other correlates of prominence, such as lengthening.

I will argue that these patterns support several theoretical and typological claims:

- Information focus should be represented formally in the grammar (pace Kratzer and Selkirk 2018)
  - They are distinguished prosodically—no evidence that the prominence is a “default”.
  - Syntactic difference: information focus constituents must front to a preverbal position, any constituent can front in a broad focus context.

- More work is needed to investigate how focus and phrasal prominence are realized cross-linguistically, especially in tonal languages.
  - Different from F0 expansion languages, such as Mandarin (Xu 1999).
  - Reminiscent of "local high raising" in Hausa (Leben et al 1989).

Roadmap

- §2: I provide some relevant background on SMPM.
- §3: I detail the empirical generalization of focus prominence in the language.
- §4: I consider two approaches: alignment and default prominence.
  - I will show that one prediction of the alignment theory is substantiated, and another cannot be confirmed.
  - I will suggest that there is no evidence of phrasal prominence in the language.
- §5: I will argue that the facts of SMPM suggest that information focus is a relevant notion to the phonology, as well as the syntax of the language, and thus its formal status within the grammar should be maintained (pace Kratzer and Selkirk 2018)

2 Background

San Martín Peras Mixtec is an Oto-Manguean language spoken in western Oaxaca, Mexico, near the coast of Guerrero.
Additionally, it is spoken by a sizable diaspora population throughout California.

- All data in this talk comes from a single native speaker who lives and works in Watsonville, California.

SMPM is tonal, like all other Oto-Manguean languages (DiCanio and Bennett to appear).

- It has 5 tones—low, mid, high, falling and rising (Peters 2017).
  - Here I will not be discussing falling tones, which have a more marginal distribution.
  - All rising tones I consider are word final, as they are for the most part restricted to that position (Peters 2017).

- Tonal contrasts are both lexical and grammatical (e.g. tense, negation).

- Roots in Mixtec are minimally bisyllabic or bimoraic (Pike 1948, Macaulay and Salmons 1995, a.m.o.). All target words in this investigation are bisyllabic.

In Figures 1 and 2, I give time-normalized plot of all target tones across a wide variety of sentence contexts.

- Each vowel was isolated in Praat, and 10 F0 measurements were taken at equal points across the whole vowel in Equivalent Rectangular Bandwidth (ERB).

- Colored lines represent the time-normalized contour across the entire vowel (excluding the last measurement where there is a clear effect of tonal co-articulation).

- Grey bars represent a 95% confidence interval around the mean.

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1ERB is a psychoacoustic measurement scale that linearly plots the way pitch is perceived. That is, a difference of 1 ERB will be perceived as the same interval at any pitch. This is not the case with Hertz, where differences are perceived logarithmically (e.g. the difference between 220Hz and 440Hz on the one hand, and 440Hz and 880Hz on the other are heard as the same interval.)
SMPM is a VSO language, like other Mixtec languages (Macaulay 2005, Ostrove 2018). Constituents interpreted as an information focus are fronted to a preverbal position.

(2) a. Ná tàshî Ana ntâ’â Bernardo
what give.comp A. hand B.
‘What did Ana give Bernardo?’

b. Shi’î tàshî=ñá ntâ’â=rà
mushroom give.comp=3SG.F hand=3SG.M
‘She gave him a MUSHROOM.’

SMPM also requires fronting of the subject or object in response to a broad focus triggering question.²

(3) a. Ná kù bitsi
what cop.comp today
‘What happened today?’

b. Shi’î tàshî Ana ntâ’â Bernardo
mushroom give.comp A. hand B.
‘Ana gave a mushroom to Bernardo.’

c. #Tàshî Ana shi’î ntâ’â Bernardo
give.comp A. mushroom hand B.
‘Ana gave a mushroom to Bernardo.’

This fact of SMPM allows for a more direct comparison of the prosody of focus, as identical words with distinct information structural contributions can be compared without influence from declination (cf. DiCanio et al 2018)

3 Empirical Pattern

3.1 Methodology

– 36 target words were elicited 8 times in broad and narrow focus fronted contexts over the course of 10 elicitation sessions.

– All words are bisyllabic.

– All words the direct object in a ditransitive construction.

– Elicited using pictures and the questions in (4) and (5)

(4) Broad Focus Context

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

b. Ita tàshî Raúl ntâ’â Sofia
flower give.comp R. hand S.
‘Raúl gave a flower to Sofia.’

(5) Narrow Focus Context

a. Ná tàshî Raúl ntâ’â Sofia
what give.comp R. hand S.
‘What did Raúl give Sofia?’

b. Ita tàshî=rà ntâ’â=ñá
flower give.comp=3SG.M hand=3SG.F
‘He gave her a FLOWER.’

²(3c) is infelicitous in response to a question, but is acceptable as an out-of-the-blue assertion.
3.2 Results

The results of this systematic elicitation point to an asymmetry across tone types.

Word-final high tones, on the one hand, are significantly raised in narrow focus contexts, when compared to broad focus contexts.\(^3\)

\[\text{Figure 4: Initial High Tones} \quad n=368, \ p=0.2691 \quad \text{Difference}=0.04 \text{ ERB}\]

\[\text{Figure 5: Final High Tones} \quad n=1,093, \ p<0.001 \quad \text{Difference}=0.18 \text{ ERB}\]

- This difference is roughly half the distance between the onset of each of the level tones (cf. Figures 1 and 2)
- Compare: Liberman and Pierrehumbert (1984) report that a focus pitch accent in English triggers a \(\approx 0.3 \text{ ERB} \) raise in \(F_0\).\(^4\)

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\(^3\)Throughout, p-values are the results of T-tests where the alternative hypothesis is that the difference in means is greater than 0.02 ERB, the Just Noticeable Difference threshold. N-value represents the total number of pitch measurements in each context.

\(^4\)Note that their results are reported in Hz. I have converted them to ERB for comparison purposes.
This difference is well above the Just Noticeable Difference (JND) threshold of ≈0.02 ERB (Pulkki and Karjalainen 2015).

This difference is not surprising, given that previous studies of focus prominence in tonal languages often show a raise in the pitch ceiling (e.g. Xu 1999) However: unlike other tone languages which show pitch range expansion, L tones do not lower in pitch when they are part of an information focus in SMPM.

Additionally, mid and rising tones (Figures 8-10) are not affected when they are an information focus.

5While the difference in rising tones is significantly higher between focus contexts, the difference is small enough (≈0.05 ERB) that is seems unlikely that it represents a salient contrast that speakers use to distinguish between focus types.
In addition to pitch, vowel duration is often cited as a correlate of prosodic prominence (Ladd 2008, Gussenhoven 2004, Jun 2005).

In SMPM, there is no significant difference in duration between focus contexts.

These results support my initial claim: focus prominence is realized asymmetrically across tone type in SMPM.

- Only high tones are realized at a different pitch in information focus contexts.
- There is no duration difference for any tone across focus types.
Furthermore, I believe they suggest that a wider range on languages must be explored to inform our theories of focus prominence. Under focus, tone languages can:

- Expand the F$_0$ space (e.g. Mandarin—Xu 1999).
- Shift the entire pitch register (e.g. Akan—Kügler and Genzel 2013).
- Realize prominence asymmetrically (e.g. SMPM, Hausa—Leben et al. 1989)

We may not yet know the full range of variation of how languages express prosodic prominence, especially tonal languages.

4 Towards an Account

4.1 Alignment

Féry (2013) claims that, cross-linguistically, foci tend to be aligned to prosodic boundaries. She claims that, most commonly, these are intonational phrase boundaries.

Her theory, and other theories of alignment, make two clear predictions:

1. A final H tone that is pushed away from the triggering boundary should be less prominent than a final H tone that remains at the boundary.

2. There should be similar patterns of prominence at prosodic boundaries that have nothing to do with focus.

To test the first prediction, I compared the pitch of final H tones in focused words that that were unmodified (7a) and modified by an adjective (7b).

(6) Ná nákàbà nùhũ nũ’ũ
what fell face ground
"What fell onto the floor?"

(7) a. Chíchí nákàbà nùhũ nũ’ũ
avocado fell face ground
"The avocado fell onto the floor."

b. Chíchí lo’o nákàbà nùhũ nũ’ũ
avocado small fell face ground
"The small avocado fell onto the floor."

As predicted by an alignment account, H tones that are modified by an adjective (and thus potentially pushed away from the triggering boundary) are produced with a lower pitch.

- This difference is once again $\approx$0.2 ERB, the same as the difference between information and broad focus contexts.
To test the second prediction, I compared the pronunciation of tones at relative clause boundaries.

— Often a prosodic break in this position.

— For now, I will assume that these are CPs which are faithfully matched to iP.

\[(8) \quad \begin{array}{ll}
\text{a. } & \text{Shìni } \underline{\text{chìchì}} \ [nàkàbà \ nùhù \ nũ'ũ]_{\text{CP}} \\
& \text{saw=I avocado fell face floor} \\
& \text{’I saw the avocado that fell on the floor.’} \\
\text{b. } & \text{Shìni } \underline{\text{chìchì}} \ \underline{\text{chìchì}} \ [nàkàbà \ nùhù \ nũ'ũ]_{\text{CP}} \\
& \text{saw=I avocado ripe fell face floor} \\
& \text{’I saw the ripe avocado that fell on the floor.’}
\end{array} \]

If H tone raising is trigger by alignment to a prosodic boundary, then we should see it lowering when it is pushed away from that boundary by an adjective.

Here the alignment hypothesis seems unsupported

— Unmodified (i.e. at the phrase boundary) H tones are not produced significantly higher than modified H tones.

— This suggests that, if focus prominence is realized via alignment, then iP is not the relevant boundary.
While Low tones are unchanged, Mid and Rising tones are produced at a higher pitch when they are followed by an adjective.

— This may suggest that H tones behave differently at this boundary than other tones.

However, as of yet, I have found no independent evidence that there is a prosodic boundary following information foci.
4.2 Default Prominence

Many analyses of focus prominence in English rely on the concept of a default stress assignment rule. This rule will assign phrasal stress to the rightmost constituent within the F-Marked phrase (Selkirk 1995).

(9) Mary bought a book about bats.
   a. (What did Mary buy a book about?) Mary bought a book about [bats]$_F$
   b. (What kind of book did Mary buy?) Mary bought a book [about bats]$_F$
   c. (What did Mary buy?) Mary bought [a book about bats]$_F$
   d. (What did Mary do?) Mary [bought a book about bats]$_F$
   e. (What been happening?) [Mary bought a book about bats]$_F$

Selkirk (1995):554

DiCanio et al. (2018) report that there is increased tonal hyperarticulation on the final syllable under focus in Yoloxóchitl Mixtec, which they argue is due to fixed final stress in the language.

So, if H-tone raising only applied on the strong syllable within the strong word of a phrase, then we might expect the pattern described in §3: H tone raising does not apply when the noun is modified.

(10)
Crucially, this hypothesis relies on the notion that the rightmost prosodic word will receive phrasal prominence.

To test this hypothesis, I compared the pitch and duration of H tones in nouns and adjectives in neutral contexts.

\[ \text{Shàhmi (yùtsí ihmí) rà lo’o} \]
burn sand hot he small

‘The hot sand burned the boy.’

The default prominence hypothesis predicts that adjectives should be more prominent than nouns in a default context, and this default phrasal stress is mapped onto F-Marked constituents in focus contexts.

Initial results show no evidence that adjectives are more prominent than the nouns they modify:

- H tones in adjectives are not produced at a higher pitch (Figure 15).
- H tones in adjectives do not have a longer duration (Figure 16).

I take this as evidence against a default prominence approach to focus prominence in SMPM.

5 Is Information Focus even a type of focus?

In a recent paper, Kratzer and Selkirk (2018) argue that there is no need to encode information focus into the grammar.

- They argue, following Katz and Selkirk (2011), that information focus is prosodically distinct from contrastive focus.
- They conclude that a feature marking contrast and a feature marking givenness are sufficient to account for the prominence patterns in English.
In their proposed system, answers to wh-questions are prominent because the rest of the sentence is given (i.e. entailed by the context). Repeated from (2)

(12)  
a. Ná tǎshí Ana ntà’ǎ Bernardo  
what give.COMP A. hand B.  
‘What did Ana give Bernardo?’
b. Shì’i [tǎshí=ñá ntà’ǎ=rà]GIVEN  
mushroom give.COMP=3SG.F hand=3SG.M  
‘[She gave him] a MUSHROOM.’

However, as we have seen, information foci are asymmetrically prominent in SMPM, despite the fact that there is no apparent phrasal prominence in the language.

This suggests that the prosodic difference that we see is due to responses to wh-questions being a type of focus, not simply a default prominence pattern that is mapped onto non-given constituents.

Additionally, there is a clear syntactic difference between the two constructions: the answer to a wh-question must move to a preverbal position (13a), while in the broad focus context either the object (14a) or subject can move (14b).

(13) Ná tǎshí Margarita ntà’ǎ Juan  
what give.COMP M. hand J.  
‘What did Margarita give Juan?’
a. Shì’i tǎshí=ñá ntà’ǎ=rà  
mushroom give.COMP=3SG.F hand=3SG.M  
‘She gave him a MUSHROOM.’

(14) Ná kù bitsi  
what cop.comp today  
‘What happened today?’
a. Yùkù tǎshí José ntà’ǎ Maria  
leaf give.COMP J. hand M.  
‘José gave a leaf to Maria’
b. José tǎshí yùkù ntà’ǎ Maria  
J. leaf give.COMP leaf hand M.  
‘José gave a leaf to Maria.’

This indicates that information foci are a category that both the syntax and phonology act upon in SMPM, and might suggest that the idea that information focus is represented as a feature in the grammar must be maintained.

6 Conclusion

In this talk, I detailed the pattern of focus prominence in San Martín Peras Mixtec.

The takeaways:
  - Focus prominence is realized asymmetrically in the language.
— There is some preliminary evidence that this prominence is derived via alignment, however the same prominence pattern does not hold at intonational phrase boundaries.

— There is no evidence of phrasal prominence in the language, creating problems for an analysis of information focus that relies purely on givenness.

A look ahead:

— Independent evidence for a prosodic boundary after information foci. Possible candidates: tone sandhi processes.

— More diagnostics to show that fronted foci behave differently syntactically than broad focus fronted constituents. This will lend support to the idea that information focus is a category that is represented formally in the syntax (pace Kratzer and Selkirk 2018). Possible candidates: cross-clausal movement.

References


