Latest Insertion in K'ichee'*

Matthew A. Tucker & Robert Henderson (*in absentia*)
University of California, Santa Cruz
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1 INTRODUCTION

- Major goal of any theory of the syntax-phonology interface: determine what kinds of information each module has access to from the other.
- Traditional conception of the interface: syntax and phonology have very little access to each other, with prosody acting as an intermediary (e.g., Selkirk (1984), Zwicky and Pullum (1988), *i.a.*).
- One way of cashing this out:

(1) THE SEPARATIONIST HYPOTHESIS (Beard, 1966; Aronoff, 1976):
Within the morpheme, syntactic and phonological features are separated formally, and the relationship between them is arbitrary.

- Within the framework of Distributed Morphology (Halle and Marantz, 1993, 1994; Harley and Noyer, 1999; Embick and Noyer, 2001, 2007), there is currently debate over how to account for data which traditional analyses would handle with prosodic generalizations.
- Two general trends have emerged:
  1. *Prosody is built late*, as in Embick and Noyer (2001), adopted in other subsequent Distributed Morphology literature (*cf.*, the model in Figure 1).
  2. *Prosody isn't needed for morphosyntax*, as in Wagner (2005, to appear); Pak (2007, 2008); Embick (2010).
- Perspective shared by both strands of thought:

(2) PROSODIC IRRELEVANCE TO ALLOMORPHY:
Reference to prosodic structure is not necessary for Vocabulary Insertion.

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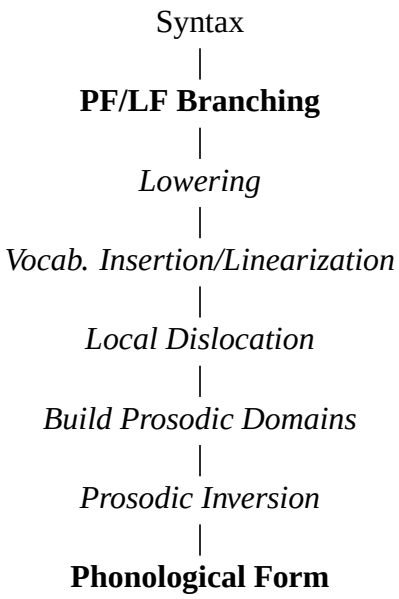

Figure 1: Embick and Noyer (2001)'s Model of the PF Branch of the Grammar

- Today we'd like to claim that this generalization in (2) is incorrect.
- We will do this by providing an analysis of K'ichee' *status suffixes*, which appear when the verb is in certain positions (3b) but not in others (3a).[1]

(3) Status Suffixes in K'ichee':

a. Xekos le tz'i'.
they.tired the dogs
The dogs got tired.

b. Le tz'i' xekos-**ik**.
The dogs they.tired-SS
The dogs got tired.

- We will argue that these status suffixes are a kind of *prosodically conditioned suppletive allomorphy*, and thus force a revision in the current understanding of the PF-branch.

1.1 Central Claims

1. The K'ichee' Status Suffixes have a prosodic, not syntactic, distribution.
2. Vocabulary Insertion is sensitive to high-level (ιP) and possibly higher prosodic structure.
3. Morphosyntactic spell-out provides default prosodic phrasing by general principles.

[1] In what follows we use standardized K'ichee' orthography, where letters have their usual values, but is different from English in that *x* is the palatal fricative and *j* is the velar fricative. We also employ the following abbreviations: SS=status suffix, IRR=irrealis, AP=anti-passive, NEG=negation, PL=plural, INL=infinitive, INFL=inflection, ιP=Intonational Phrase, φ/p-phrase=Prosodic Phrase, ω=Prosodic Word, VI=Vocabulary Insertion, and DM=Distributed Morphology.

1.2 Today's Outline

1. **Introduction**
2. An excursus in basic K'ichean morphosyntax
3. The K'ichee' status suffixes and ιP sensitivity
4. Status suffixes and Vocabulary Insertion
5. An explicit timing model of DM-Prosody interactions
6. Conclusions and implications

2 EXCURSUS: BASIC K'ICHEAN MORPHOSYNTAX

- K'ichee' is a Mayan language of the Kichean subfamily spoken in Guatemala by over a million people (Richards, 2003).
- Verbs in K'ichee' display differential morphology based on transitivity:
  - *Root Transitive* – verbs formed from inherently transitive roots.
  - *Derived Transitive* – verbs formed from inherently intransitive roots + transitivizing morphology.
  - *Intransitive* – any intransitive verb.
- In addition to transitivity, tense, aspect and mood (TAM, henceforth) are often marked on verbs, in conjunction with or separately from the transitivity marking.
- Thus many morphemes in K'ichee' are sensitive to these distinctions, like the status suffixes we will treat today, as shown in Table 1.

TAM	*Root Trans.*	*Deriv. Trans.*	*Intrans.*
simple	**-o**	-j	**-ik**
dependent	-a'	-j	-a/-oq
perfect	-Vm	-m	-inaq

Table 1: K'ichee' Status Suffixes by TAM/Transitivity

- Furthermore, we assume as the basic clausal syntax the tree in Figure 2, following Aissen (1992, 1996).

- Finally, because they are reflections of *both* transitivity and TAM, we take the Status Suffixes in Table 1 to be realizations of the head adjunction complex resulting from $V^0 \rightarrow T^0$ movement shown in Figure 3.

3 THE K'ICHEE' STATUS SUFFIXES

- K'ichee' displays a kind of prosodically conditioned suppletive allomorphy sensitive to the right edge of ιPs.
  - Where ιPs are mapped onto CPs (Henderson, 2009; Selkirk, 2009).

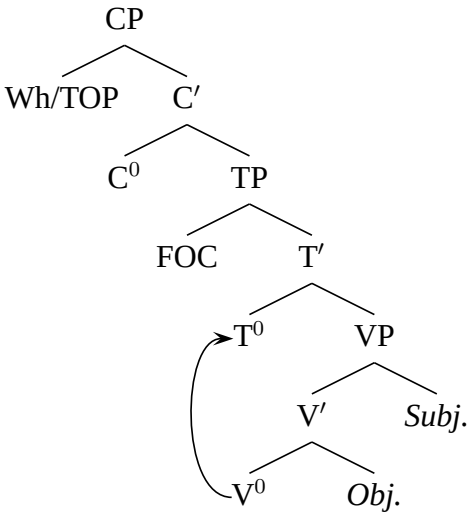

Figure 2: Assumed Clausal Syntax for K'ichee'

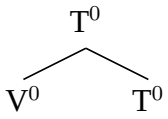

Figure 3: Internal Syntax of Status Suffixes

(4) a. (We kinkos-**ik**)$_{CP}$ (kinwar-**ik**)$_{CP}$
if I.tired-SS I.sleep-SS
If I get tired, I sleep.

b. (We kinkos pa juyub')$_{CP}$ (kinwar-**ik**)$_{CP}$
if I.tired in country I.sleep-SS
If I get tired out in the country, I sleep.

- **Generalization**: The SSs are *not* the principle bearers of transitivity (5) *or* TAM (Henderson (2009)) – they are *semantically vacuous*:

(5) Xin-chap-**o**
INFL-grab-SS
I grabbed it.

(6) Xin-war-**ik**
INFL-sleep-SS
I slept.

(7) X-chaap-**ik**
INFL-grab.PASS-SS
It was grabbed.

- Three arguments as to why ιPs are the appropriate domain over which to state these generalizations (as opposed to, say, CPs):
  1. The syntactic characterization is/would have to be disjunctive.
  2. The syntactic generalization has empirical problems.
  3. We need the prosodic boundaries anyway to state other processes in the language.

3.1 The Syntactic Characterization is Disjunctive

- Since syntax is recursive, phrase medial left boundaries do not necessitate phrase medial right boundaries. But we see status suffixes phrase medially:

(8) (Xin-wil-**o** (chi xe'-el-**ik**)$_{CP}$)$_{CP}$
INFL-see-SS that INFL-left-SS
I saw that they left.

- The syntactic generalization must say that status suffixes appear at the edges of CPs.
- We can state a uniform prosodic generalization (i.e., status suffixes appear ιP finally) in a theory that allows recursive syntactic stucture to be flattened in the prosody (*e.g.*, Selkirk (1984)).
- When recursive syntactic structure is flattened, phrase medial left boundaries *will* necessitate phrase medial right boundaries.
- Thus instead of (8), what we really want to say is (9):

(9) (Xin-wil-**o**)$_{\iota P}$ (chi xe'-el-**ik**)$_{\iota P}$
INFL-see-SS that INFL-left-SS
I saw that they left.

3.2 The Syntactic Generalization Has Empirical Problems

- There are cases where status suffixes appear next to no CP boundary:

(10) Relational Noun Adjuncts with Clausal Compliments:
  a. (Xinkos-**ik** r-umal (xinchakun-**ik**)$_{CP}$)$_{CP}$.
  I.get.tired-SS E3s-because I.worked-SS
  I am tired because I worked.

  b. *Xinkos rumal xinchakun-**ik**.
  I.get.tired because I.worked-SS
  I am tired because I worked.

- The (b) example is unexpected if the generalization is purely syntactic – in both cases a relational noun follows the verb.
- We cannot simply tie the presence of the SS to the presence of the relational noun – the complement of the relational noun matters as well:

(11) Relational Noun Adjuncts with Nominal Compliments:

a. (Xinkos r-umal nuchaak)$_{CP}$.
I.get.tired E3s-because my.work
I am tired because of my work.

b. *Xinkos-**ik** rumal nuchaak.
I.get.tired-SS because my.work
I am tired because of my work.

- However, prosody differentiates the examples in (10-11) – nominal complements of relational nouns don't get their own ιPs, whereas clausal complements do:

(12) (Xinkos-**ik**)$_{\iota P}$ (r-umal xinchakun-**ik**)$_{\iota P}$
I.get.tired-SS E3s-because I.worked-SS
I am tired because I worked.

(13) (Xinkos r-umal nuchaak)$_{\iota P}$
I.get.tired E3s-because my.work
I am tired because of my work.

- Notice, too, that these data are troubling for an account which takes phonological domains to be {identical to, isomorphic to} syntactic Spell-Out domains (*e.g.,* Wagner (2005); Pak (2008), *i.a.*).
  - (10) argues against treating the SSs as "workspace-delimiting morphemes," since the relational noun is final in the workspace containing the verb.
    - We would thus predict (wrongly) that the SS should not appear in (10).
  - We might try to insert SSs every time verbs are followed by relational nouns.
    - This will work, but notice its Duke-of-Yorkness in deriving (11); the prosodic theory we advocate has no such redundant downhill marching/morpheme deletion.
- A prosodic theory allows for, and can account for, limited syntax-prosody mismatches in the mapping algorithm from syntax to prosody. There is little such wiggle room in a purely syntactic treatment.

3.3 We Need Prosody Anyway: Why Not Use It?

- K'ichee' requires a stress peak and pitch rise to be aligned with the right edge of every ιP.

(14) a. **Kintíj na** le ák'.
I.eat.it ASP the chicken
I am going to eat the chicken.

b. **Kintíj ná**.
I.eat.it ASP
I am going to eat it.

- In some cases, pressure for ιP final stress placement drives allomorphy (see Henderson (2009) for more discussion of these clitics).

(15) a. La xutíj **k'út**.
Q he.ate.it Q
Did he eat it?

b. La xutíj **k'u** le wáh.
Q he.ate.it Q le wah
Did he eat the tortilla?

- In (15a), the pressure for ιP final prominence drives selection of the *k'ut* allomorph – *k'u* is subminimal and would be unable to bear the phrasal prominence.
- When the clitics appear ιP medially, as in (15b), the burden of realizing ιP prominence doesn't fall on the clitic, and the *k'u* default allomorph is found instead.[2]
- Importantly, these ιP final stress peaks and allomorphic alternations occur in the same configurations where we see phrase final suffixes.
- Presumably we do not want to do our stress rules over syntactic structure (Selkirk, 1984).
- So if we need prosodic boundaries where we find the status suffixes anyway, we should state their distribution over prosody as well.
- Finally, if we did not do this, we would miss a generalization about the uniform behavior of these clitics and status suffixes.

4 SOLUTION: PROSODICALLY CONDITIONED VOCABULARY INSERTION

- We propose that at Spellout, high level prosodic structure is built according to a default syntax-prosody mapping.
- Call this default DEFAULT MATCH, which consist of the following Spellout constraint (*cf.*, Selkirk (1996); Ishihara (2003)).

(16) $(\ldots)_{CP} \Rightarrow_{Spellout} (\ldots)_{\iota P}$

- We believe K'ichee' gives evidence that (some) languages do not allow recursive ιP generation from recursive XP's. This allows us to understand the data in (8), repeated below as (17), and follows the claim in Selkirk (1984).[3]

[2]It is important for this argument that the *k'u-k'ut* alternation be true suppletion. This is not the topic of this talk (see Henderson (2009) for more details), but suffice it to say: (i) there is no general consonant deletion/augmentation process to appeal to in K'ichee' and (ii) there is uniform morphosyntactic class of clitics that participate in this alternation. Thus, we take it as given here that these clitic alternations are true suppletion.

[3]Note that it's also possible for us to appeal to an ALIGNment-based approach to syntax-prosody mapping. We choose to follow the references in the text for simplicity. What is crucial is that we not have a theory which generates recursive prosodic structure from syntax, or at least allows this choice to be parameterized.

(17) (Xin-wil-**o** (chi xe'-el-**ik**)$_{CP}$)$_{CP}$
INFL-see-SS that INFL-left-SS
I saw that they left.

- We take Spell-Out to generate the default prosodic phrasing. We will remain agnostic today as to whether or not this needs to be overwritten in K'ichee', but we believe the cross-linguistic picture will bear out the need for overwriting default prosody (*cf.*, Gribanova (2009) for one particularly interesting example of this).
- Since default prosody building takes place before VI, it can be contextually sensitive to prosody, which is exactly what we find with the K'ichee' status suffixes.
- With the current model, their analysis is as simple as (18).

(18) Vocabulary Items for Some K'ichee' Status Suffixes:
  a. $T_{\text{intrans.}}{}^{0})_{\iota P} \leftrightarrow$ /**-ik**/
  b. $T_{\text{trans.}}{}^{0})_{\iota P} \leftrightarrow$ /**-o**/
  c. Elsewhere $\leftrightarrow \emptyset$

- *Recall*: We treat the status suffixes as exponents of T^0 since they encode tense/aspect/mood (*-ik/-o* indicate default Tense-Aspect-Mood).
- These VIs thus capture the informal/intuitively obvious facet of these morphemes' behavior: they are *audible pauses*, which appear at the end of intonational phrases; the grammar states this fact explicitly in our analysis.
  - **Confirmed Prediction**: these status suffixes should appear in lists or any other situation in which a single verb itself forms an ιP. This has been born out in preliminary fieldwork by the second author.
- **To summarize**: high level prosodic structure is built according to Default Match conditions, which allows for the prosodically conditioned VI needed to capture the distribution of K'ichee' status suffixes.

5 A Model of Prosody-Distributed Morphology Interactions

- As it stands, we have a problem: no versions of DM which countenance prosodic domains allow for building prosody early enough.
- Thus recall the model from Embick and Noyer (2001) from §1, repeated here as Figure 4.

- In this model, prosody isn't even *built* until after VI – it will thus be impossible to write a VI like the one we propose in (18).
  - This is because of the (implicit) generalization in (2) which we have been arguing against – if prosody is built after allomorphy is determined, then prosody will be irrelevant to allomorphic selection.
- **Possible Question**: Why encode this in a VI at all? Because it is about *realization* of a morpheme, we think the right idea is to *conditionally insert*, as opposed to any other mechanism.

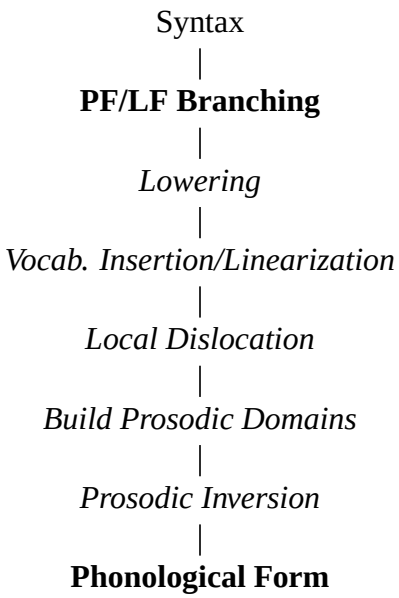

Figure 4: Embick and Noyer (2001)'s Model of the PF Branch of the Grammar

- What we need instead is a model in which the relevant prosodic domains are built early enough to be accessible to Vocabulary Insertion.
- **Tentative Proposal**: Modify the PF-model proposed by Embick and Noyer (2001, 2007) to the ordering in Figure 5. [4]
- This is the intuitively correct idea: we build (at least) ιPs before Vocabulary Insertion applies, allowing the VIs in (18) to be well-formed.

5.1 Some Predictions of the Model

- In this model, the Match Principles apply before Vocabulary Insertion. This means that the prosodic domains established by Default Match can be triggers of allomorphic variation.
- In this talk, we have focused only on what we call "high level" prosody, by which we mean domains above φP. One prediction of this implicit narrow focus:
  - Only these prosodic constituents, and not lower ones, can trigger allomorphy.[5]
- Building prosody this early also countenances purely "prosodic" morphemes, of which we believe there may be two relevant cases in the extant literature:
  - Functional tonal morphemes (*e.g.*, absolutive H in Samoan – see Yu (To Appear)) require a prosodic constituent to dock to at VI.

[4] We know of no data at present that allows us to decide between the ordering of LOWER and MATCH, so for now we represent them in the way shown in Figure 5. We are in principle open to adjusting this ordering, however.

[5] It is important to note that this is not the same as claiming that φPs and lower prosodic constituents cannot trigger prosodically conditioned allomorphy. Instead, we are claiming that any allomorphy sensitive to such constituents should be amenable to an analysis in terms of some combination of (i) Local Dislocation of morphosyntactic constituents and (ii) purely phonological principles. Whether or not this is the case is currently the topic of much debate under the heading of "(Non-)Optimizing Prosodically Conditioned Suppletive Allomorphy." See Paster (2006) and Bennett (2009) for some useful discussion.

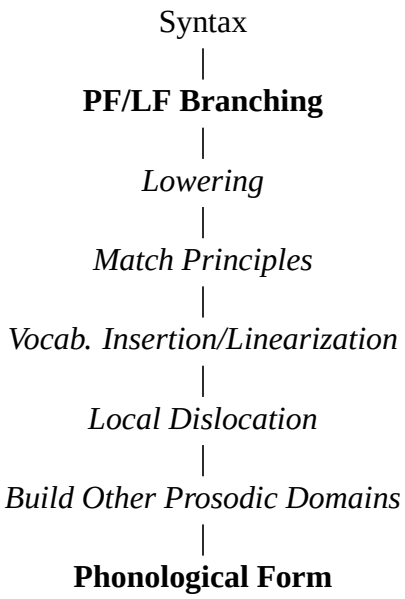

Figure 5: The PF Branch of the Grammar

- **Question**: Why should low-level and high-level prosodic categories differ in the timing of their construction?
  - Building ω's (and categories contained within) require reference to segmental qualities (*e.g.*, segment sonority principles necessary for syllable weight calculation).
  - These segmental properties are not available until after VI given (1).
  - ιP's, on the other hand, can be read off the output of syntax, as they only require reference to syntactic structure/node labels.
  - Thus, our claims amount to a sort of economy condition on prosodic construction – BUILD PROSODY ASAP.
- Finally, we predict the appearance of a class of *audible pause* morphemes – morphemes which serve *no* syntactico-semantic purpose, but instead simply delimit prosodic constituents.
  - This is Aissen (1992, p.53–7)'s analysis of the Tzotzil clitic *un*, which is meaningless, optional, and whose appearance is predicated on the existence of an ιP boundary to its right.
  - In our model, these are just like the status suffixes in K'ichee'.

6 CONCLUSIONS AND IMPLICATIONS

- The Status Suffixes in K'ichee' are morphological markers of transitivity and TAM which do not lend themselves to a purely morphosyntactic solution.
  - CPs (or any other relevant syntactic constituents) are not sufficient for stating their distribution.
  - The data suggest that equivocating phonological and Spell-Out domains is not the right move.

- Instead, their conditioning environment is a prosodic one – the ιP, which is mapped nonrecursively onto CPs in K'ichee'.
- This understanding of the Status Suffixes poses a particular timing problem for derivational, late-insertion models of morphology such as DM.
- Instead, we need a model which builds prosody much earlier than is typically assumed – specifically, earlier than Vocabulary Insertion.
- Finally, if we assume this, then a wider range of empirical phenomena appear to have tantalizingly accessible solutions.

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Both Authors:

Department of Linguistics
University of California, Santa Cruz
1156 High Street
Santa Cruz, CA 95064-1077

Henderson:

rmh@ucsc.edu
http://people.ucsc.edu/∼rmh/

Tucker:

matucker@ucsc.edu
http://people.ucsc.edu/∼matucker/