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# Matching Light Elements

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## 1. Introduction

Our goal here is to investigate the impossibility of phrase-final prosodic enclisis in English, as in (1a) vs. (b).[1]

(1) a. *I don't know where Tom*′s*. (I don't know where Tom *is*.)
b. Where*′s* Tom? (Where *is* Tom?)

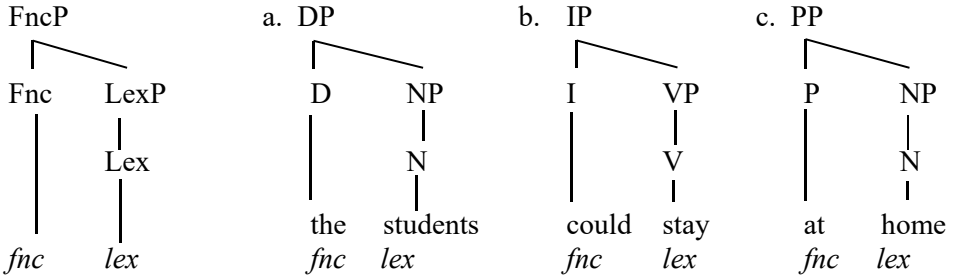
Familiar as it is, this fact is still surprising since ω(*Tom's*) looks like a *bona fide* prosodic word, just like ω(*where's*). It should therefore be wellformed in any position, including phrase-final, as is the homophonous possessive in the utterance *This book is Tom's*. The explanation we will pursue here builds on the basic fact that, because of wh-movement, [*is/'s*_ ] constitutes an entire syntactic phrase, and as such must correspond to a non-vacuous phonological phrase.

The impossibility of phrase-final enclisis needs to be seen in the context of the whole system of cliticization of English. The simple non-vacuity explanation turns out to have important consequences for Match Theory (Selkirk 2011; Elfner 2012; Ito and Mester 2013) since it motivates a conception of Syntax-Prosody (SP)-Match constraints that is rather different from the generally accepted one. The new conception is purely existential and non-gradient, insisting merely on the existence of some corresponding prosodic constituent, not on exact correspondence. The latter is enforced by other constraints that are already part of the theory, such as classical syntax-prosody Alignment and standard faithfulness, evaluated gradiently.

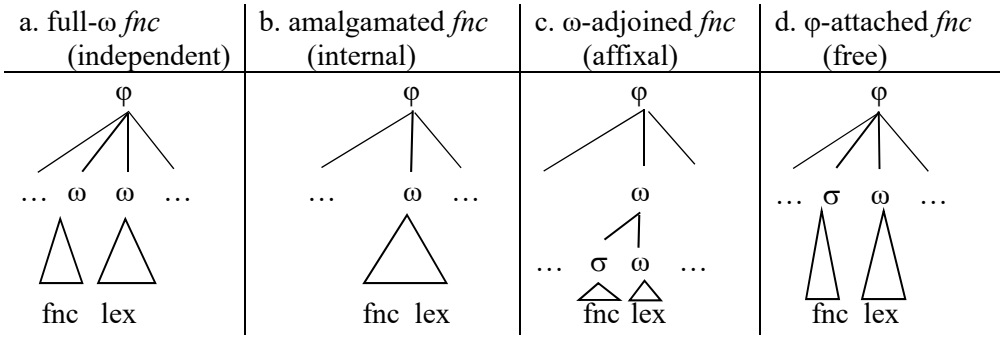
We start out with one class of English function words, including monosyllabic determiners, auxiliaries, and prepositions (2), that forms proclitic structures. Possible mappings to prosodic structure are given in (3) (Selkirk 1996; Ito and Mester 2009), where "σ" stands for "syllable", "ω" for "prosodic word", and "φ" for "phonological phrase". Peperkamp (1997) shows that all of (3b-d) are instantiated in Italian dialects.

[1] We are very pleased to contribute this paper to a festschrift in honor of Jim McCloskey, a friend and colleague of many years. Most of the work we have done on syntax-prosody matters took place in close collegial contact with him, it would not have come into existence without his input. We wish him many more years of productive research. Many thanks to the festschrift editors, and to Nick Kalivoda and Lisa Selkirk for productive discussion. We are especially grateful to Line Mikkelsen for her thorough and helpful comments on an earlier version.

(2)

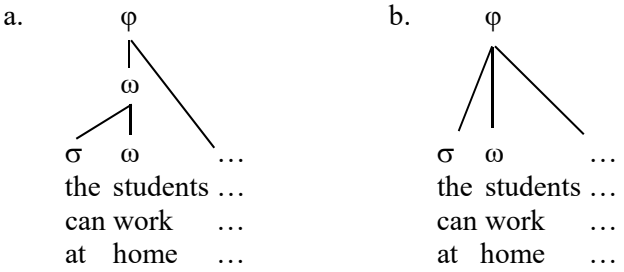



(3)




Two views regarding the prosodic structure of English proclitics have been proposed. The majority of researchers (including (McCarthy 1993; Booij 1996; Vigário 1999; Ito and Mester 2007; 2009) argues that they are affixal clitics (3c). The other view (Selkirk 1996; Hall 1999) identifies them as free clitics (3d). The two different structures are contrasted in (4ab).

(4)




## 2. Requirements on left edges

The phonology of enclisis is part of the overall process of syntax-prosody mapping, where the beginnings and ends of constituents are of special importance. The basic constraints on the correspondence between syntactic and prosodic phrasing are given in (5) in two forms, following Alignment Theory (McCarthy and Prince 1993; Selkirk 1996) and Match Theory (Selkirk 2011), where "CON" stands for "constraints" and "X" for "lexical category".

(5)

| | | *Alignment version* | *Match Theory version* |
|---|---|---|---|
| SP-Mapping | WordCon | Align-L/R (X, ω) | Match-X-to-ω |
| | PhraseCon | Align-L/R (XP, φ) | Match-XP-to-φ |
| PS-Mapping | PWdCon | Align-L/R (ω, X) | Match-ω-to-X |
| | PPhraseCon | Align-L/R (φ, XP) | Match-φ-to-XP |

Since the beginnings of metrical phonology it has been known that left edges of prosodic constituents are subject to more stringent requirements than right edges. An example is the initial dactyl requirement in English (Prince 1983, 49): feet/stresses are right-aligned, but words beginning with unfooted/unstressed syllables are avoided: (*Tàta*)*ma*(*góuchi*), not **Ta*(*tàma*)(*góuchi*). Recently, Selkirk (2011, 470) has proposed STRONGSTART**,** a generalized version of this kind of left edge requirement (informally: "Beginnings of prosodic units are strong."). STRONGSTART is responsible for a wide variety of prosodically motivated effects. The first is promotion of the initial constituent of the utterance, as in Xitsonga, where preposed constituents which would normally be parsed as phonological phrases are boosted into full intonational phrases (see Kisseberth 1994 for the original empirical generalizations; Selkirk 2011, 442–445). On the other hand, clitics are often banned from first position and appear in peninitial second position (Wackernagel 1892), or are moved to a position later in the sentence, as in Bulgarian (Harizanov 2014) and Irish, as illustrated in (6) (from Bennett, Elfner, and McCloskey 2016:171).

(6) Fuair sé __ óna dheartháir an lá cheana é.
get.PAST he from.his brother the-other-day it
'He got it from his brother the other day.'

Another mode of resolution is deletion of initial weak syllables, as in English and German (7).

| | | |
|---|---|---|
| (7) a. English (Weir 2012) | ~~Have~~ ~~you~~ got milk? | ~~It~~ ~~is~~ ~~a~~ nice day today. |
| b. German ("pronoun zap", Ross 1982; Haider 1986) | ~~Ich~~ hab das schon gelesen<br>'(I) have already read it' | ~~Das~~ hab ich schon gelesen.<br>'(that) have I already read' |

There are even modes of resolution deeply embedded in the morphosyntactic system, such as redundant agreement to create a branching first constituent (cf. Elordieta 2007), or the morphosyntactically unmotivated doubling of agreement clitics, such as the initial masculine clitic *rà* in (8), on unary initial constituents discovered by Ostrove (2016) in a dialect of Mixtec.

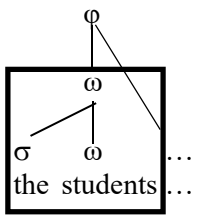
(8) rà=studiante rà=Juán
M=student M=Juán
'Juán is a student.'

A number of different versions of STRONGSTART have appeared in the literature. Bennett et. al. (2016, 198) state the constraint as a direct ban on prosodic dependents as initial immediate daughters: "Prosodic constituents above the level of the word should not have at their left edge an immediate subconstituent that is prosodically dependent. For our pur-

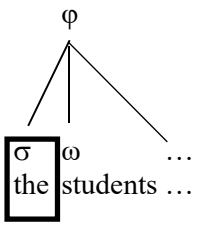
poses here, a 'prosodically dependent' constituent is any prosodic unit smaller than the word." Selkirk's original formulation takes its inspiration from Myrberg's EQUALSISTERS constraint (Selkirk 2011, 470; see Myrberg 2010; 2013): *($\pi_n$ $\pi_{n+1}$… "A prosodic constituent optimally begins with a leftmost daughter constituent which is not lower in the prosodic hierarchy than the constituent that immediately follows." The approach most in line with classical OT derives STRONGSTART effects from downward P-to-P-alignment: ALIGN-L ($\pi_n$, $\pi_{n-1}$) (see Ito and Mester 1992, 56; McCarthy and Prince 1993, 83), a well-known family of constraints requiring strict succession in the prosodic hierarchy at the beginnings of prosodic units (φ to ω, ω to f, etc.). This is the approach taken in Werle (2009), who develops an extensive analysis of peninitial clitics in Bosnian, Serbian, and Croatian along these lines.

The choice is of little import for our purposes, but it is worth noting the consequences of any particular choice for the rest of the theory. For example, the EQUALSISTERS version rules out [$_\omega$ σf but is silent on [$_\omega$ σσf. This is contrary to what is suggested by the facts of English: [$_\omega$ σf is abundantly attested in cyclic secondary stress cases such as *sen*(*sàtio*)(*náli*)*ty*, but not [$_\omega$ σσf. A second point is that the free clitic representation of proclitics in (9b) violates STRONGSTART in any of its versions at the φ-level since the first immediate subconstituent of φ (boxed) is a free syllable. This is problematic since it predicts languages where a DP beginning with a determiner can never start a phonological phrase.

(9) a. affixal: ω-adjoined *fnc*




b. free: φ-attached *fnc*




# 3. No weak phrase-final *fnc*

Before we are ready to confront our main topic, the ungrammaticality of final enclisis in English (**I don't know where Tom's,* etc.), we need to address a closely related additional fact: the ungrammaticality of reduced *fnc* in phrase-final position, illustrated in (10) (examples after Selkirk 1996, 200).

| | | | | | |
|---|---|---|---|---|---|
| (10) | a. | I can eat more than Ray *can.* | [kæn] | *[kən] | *[kn̩] |
| | b. | If you think you *can,* go ahead and do it. | [kæn] | *[kən] | *[kn̩] |
| | c. | I don't know where Ray *is.* | [ɪz] | *[əz] | *[z] |
| | d. | Wherever Ray *is,* he's having a good time. | [ɪz] | *[əz] | *[z] |
| | e. | What did you look *at* yesterday? | [æt] | *[ət] | |
| | f. | Who did you do it *for* that time? | [fɔr] | *[fr̩] | |

Selkirk (1996, 202) translates the observations in (10) directly into a constraint: ALIGN-RIGHT(φ,ω), requiring every phonological phrase to end in a prosodic word (and not in a prosodically deficient function word). The effect of this is shown in (11).

(11) [ What did Mary [$_{VP}$ look [$_{PP}$ at _ ]$_{PP}$ ]$_{VP}$ last time]
($_{\varphi}$ What did Mary look ($_{\omega}$ àt)$_{\omega}$ )$_{\varphi}$ ($_{\varphi}$ last time)$_{\varphi}$

As seen in (12), Alignment crucially dominates the PS-constraint requiring every prosodic word to be grounded in a lexical word (we use the general label PWDCON since the choice between ALIGNMENT and MATCH is not relevant here). "W/L" in a loser-row indicates that the constraint favors the winner/loser, respectively.

(12)

| What did Mary | [look at __ ] | Align-R(φ,ω) | PWdCon(ω,x) |
|---|---|---|---|
| ► | φ( ωlook ωàt ) | | * |
| | φ( ωlook σət ) | *W | L |

| I don't know where | [Ray is __ ] | Align-R(φ,ω) | PWdCon(ω,x) |
|---|---|---|---|
| ► | φ( ωRay ωìs ) | | * |
| | φ( ωRay σəs ) | *W | L |

| I can eat more than | [Ray can __ ] | Align-R(φ,ω) | PWdCon(ω,x) |
|---|---|---|---|
| ► | φ( ωRay ωcàn ) | | * |
| | φ( ωRay σcən ) | *W | L |

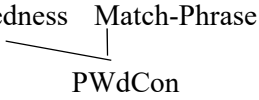
ALIGN-R(φ,ω) encourages full prosodification at constituent ends, and as such sits uneasily not so much with STRONGSTART in any of its versions, but with NONFINALITY and other constraints (such as Spaelti's (1994) FINALWEAKEDGE) that favor prosodically weak ends of constituents. Align-R sounds a strangely discordant "StrongEnd" note. It is therefore of some interest that "StrongEnd" is unnecessary in Revised Match Theory (Elfner 2012; Ito and Mester 2013; Bennett et al. 2016): MATCH-PHRASE applies to any XP with phonetic content, matching all XPs with φ's, with the result that recursive φ-structure emerges as the winner.

(13)

| What did Mary | $_{VP}$[look $_{PP}$[at ___]] | Headedness | Match-Phrase | PWdCon |
|---|---|---|---|---|
| ► | φ( ωlook φ( ωàt )) | | | * |
| | φ( ωlook φ( σət )) | *W | | L |
| | φ( ωlook ωàt ) | | *W | * |
| | φ( ωlook σət ) | | *W | L |

MATCH-PHRASE requires a φ to match $_{PP}$[*at* ___]; HEADEDNESS requires the lone *at* in a φ to be a full prosodic word (violating PWDCON); the choice of the strong allomorph of the function word therefore follows from Match Theory itself; no recourse is needed to any "StrongEnd" (right-alignment) constraint.

(14)



In conformity with the Inclusiveness Condition of Bare Phrase Structure (Chomsky 2007; 2008; 2013), we assume that there are no distinctions of bar levels in syntactic representations, hence no T'/T" distinction in (15).

(15) I can eat more than [$_{T}$ Michelle [$_{T\ T}$ can __ ] ].

The most natural interpretation of Match constraints then is one that applies them to all projections, including auxiliary-verb structures such as *can eat* that are "intermediate projections" of T in traditional understanding. In order to stay with familiar terminology, we refer to all projections of X as "XP", making no distinctions in bar level.

| (16) I can eat more than | $_{TP}$[$_{DP}$ [Michelle] | $_{TP}$[ can __ ] ] | Headedness | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$( $_{\varphi}$( $_{\omega}$Michelle ) | $_{\varphi}$( $_{\omega}$càn )) | | | * |
| | $_{\varphi}$( $_{\omega}$Michelle ) | $_{\varphi}$( $_{\omega}$càn ) | | *W | * |
| | $_{\varphi}$( $_{\varphi}$( $_{\omega}$Michelle ) | $_{\varphi}$( $_{\sigma}$cən )) | *W | | L |
| | $_{\varphi}$( $_{\omega}$Michelle | $_{\omega}$càn ) | | **W | * |
| | $_{\varphi}$( $_{\omega}$Michelle | $_{\sigma}$cən ) | | **W | L |

The recursive structure $_{\varphi}$( $_{\varphi}$( *Michelle*) $_{\varphi}$( *can*)) wins over the flat structure $_{\varphi}$( *Michelle*) $_{\varphi}$( *can*) because it matches the higher TP with a φ. One might argue that the nonapplication of the rhythm rule (*Michèlle cán*, not **Michelle cán*) favors the flat structure, but this is not probative if the domain is in fact $\varphi_{min}$ (see Elordieta 2015; Selkirk and Lee 2015 for recent overviews of recursive category structure in phonology).

| (17) I don't know where | $_{TP}$[$_{DP}$[Ray] | $_{TP}$[ is __ ] ] | Headedness | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$( $_{\varphi}$( $_{\omega}$Ray) | $_{\varphi}$( $_{\omega}$ìs )) | | | * |
| | $_{\varphi}$( $_{\omega}$Ray) | $_{\varphi}$( $_{\omega}$ìs ) | | *W | * |
| | $_{\varphi}$ ( $_{\varphi}$( $_{\omega}$Ray) | $_{\varphi}$( $_{\sigma}$əs ) ) | *W | | L |
| | $_{\varphi}$( $_{\omega}$Ray | $_{\omega}$ìs ) | | *W | * |
| | $_{\varphi}$( $_{\omega}$Ray | $_{\sigma}$əs ) | | *W | L |

| Compare: | $_{TP}$[$_{DP}$[ Tim ] | $_{TP}$[ is leaving ]] | Headedness | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$($_{\varphi}$($_{\omega}$Tim ) | $_{\varphi}$( $_{\sigma}$əs $_{\omega}$leaving )) | | | |
| | $_{\varphi}$($_{\varphi}$($_{\omega}$Tim ) | $_{\varphi}$( $_{\omega}$ìs $_{\omega}$leaving)) | | | * |
| | $_{\varphi}$($_{\varphi}$( $_{\omega}$Tim əs ) | $_{\varphi}$( $_{\omega}$leaving )) | | *W | |

The take-home question here is: Are there cases where Align-R(φ,ω) ("StrongEnd") is actually needed in English and elsewhere—because the function word does not constitute a syntactic XP all by itself?

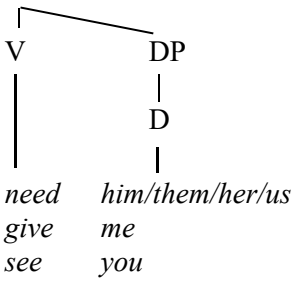
# 4. Morphosyntactic enclitics

In an apparent violation of the ban on weak phrase-final *fnc*, object pronouns in English can appear here in a weak form (cf. Selkirk 1972; 1984), besides in their strong form. The phonetic realization of these weak forms, and their rhythmic adherence to the verb, is identical to that of word-final stressless syllables (Selkirk 1996).

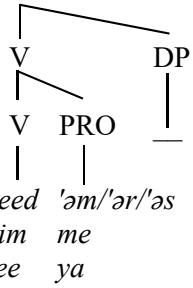
| (18) | object *pro* | cf.: | object *pro* | cf.: |
|---|---|---|---|---|
| | need 'əm (him, them) | Needham | feed 'əs | fetus |
| | will ɪt | billet | gimme (give me) | Jimmy |
| | stroke 'ər | stroker | see ya | Mia |

But there is a fundamental difference between enclitic *pro* and the proclitics seen earlier: The host of enclitic *pro* is always V, whereas proclitics have no such syntactic category restriction: *the book*$_{N}$, *the boring*$_{A}$ *book*, *the very*$_{Adv}$ *boring book*, *to go*$_{V}$, *to boldly*$_{Adv}$ *go*, etc. This suggests that the pronouns have a morphosyntactic signature. According to Selkirk (1996), whose position we follow, there are two possible syntactic sources for object *pro*: as a phrasal object, a full DP (19a), or as a morphosyntactic enclitic object, an impoverished category (19b) coindexed with a full DP (see Cardinaletti and Starke 1999 for a theory distinguishing clitic, weak, and strong pronouns along such lines.) The two syntactic sources for object *pro* are shown in the tableaux in (20).

(19) a.




b.




(20) as a phrasal object

| | $_{vp}$[see | $_{DP}$[*pro*] ] | Headedness | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| ▶ | $_{\varphi}$( see | $_{\varphi}$( $_{\omega}$yòu ) ) | | | * |
| | $_{\varphi}$( see | $_{\varphi}$($_{\sigma}$ya ) ) | *W | | L |

as an enclitic object

| | $_{vp}$[see-PRO | $_{DP}$[ __ ] ] | Headedness | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| | $_{\varphi}$($_{\omega}$see $_{\omega}$yòu | ) | | | *W |
| ▶ | $_{\varphi}$($_{\omega}$see $_{\sigma}$ya | ) | | | |

Summarizing so far, English has a large number of prosodic proclitics (*fnc* lex): *to* go, *the* student, *can* meet, etc. There is a small number of specific morphosyntactic enclitics (lex *fnc*) which can occur in any position, including phrase-finally, but are restricted as to their host, which has to be verbal: see *ya* (V-obj pro, enclitic to verb). What remains

is prosodic enclisis, which is not morphosyntactically restricted to hosts of a specific category, but which cannot occur in phrase-final position (**Tell me where Tom's*).

# 5. Prosodic enclitics

English has half a dozen special forms of auxiliaries that show enclisis, as in (21). Different from the morphosyntactically enclitic pronouns seen in the previous section (*ya, əm,* etc.), the enclitic auxiliaries listed in (22) are single consonants and hence subsyllabic, and they do not have a morphosyntactic subcategorization frame, like the enclitic pronouns.

(21)
| | |
|---|---|
| Ted's right. | Ted is right. |
| Ted's already left. | Ted has already left. |
| Ted'll help us. | Ted will help us. |

(22)
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| is | 's | am | 'm | have | 've | will | 'll |
| has | 's | are | 're | had | 'd | would | 'd |

## 5.1 Characteristics

The substantial work on the clitic system of English done in the 1970's by Zwicky, Selkirk, Kaisse, and others already uncovered most of the characteristics of prosodic enclitics. They are subsyllabic in size (single consonants); there is a proper subset relation (wherever reduced auxiliaries can occur, corresponding full verbs can occur as well, but there are contexts where only the full form is possible.). This is allomorphy, not productive phonology: Enclitic auxiliaries are lexically listed allomorphs, not the results of general phonological reduction (Kaisse 1983, 94–95). For example, while *would, could,* and *should* all have reduced forms ([wəd, kəd, ʃəd]), only *would* has the idiosyncratic monoconsonantal form [d]: *I'd rather be home*. In terms of their position, enclitic auxiliaries are adjoined to the final syllable of the preceding word, just like the exponent of the plural/3sg/possessive morphemes (23).

(23)
| | |
|---|---|
| is/has | Matt'[s] gone, but Tom'[z] here, and Bruce'[əz] on his way. |
| plural | cat[s], home[z], busse[əz] |
| 3sg | fit[s], come[z], misse[əz] |
| poss | Matt'[s], Tom'[z], Bruce'[əz] car |

Enclitic forms correspond to auxiliaries, never to full verbs. Thus the word *has* occurs both as an auxiliary and as a main verb of possession, but the enclitic form *'s* homophonous with that of *is*) functions only as an auxiliary. Thus in Anderson's (2008) example (24), the (b) version only has the bizarre reading in which Fred's sister is a cat.

(24) a. Fred has adopted a new cat, and his sister Joanna has a cat, too.
b. Fred's adopted a new cat, and his sister Joanna's a cat, too.

Enclitic auxiliaries are prosodic, not morphosyntactic, enclitics because there is no restriction on the host (i.e., it can attach to any preceding word irrespective of category), as shown by examples as in (25).

(25)

| | |
|---|---|
| has | The man you met's just arrived. |
| is | The man you met's making an awful fuss. |

This indifference regarding the preceding context only holds for *'s* (*is, has*), not for the remainder (Zwicky 1970, 331; Kaisse 1983, 97–98), as shown in (26). We will henceforth restrict ourselves to these two.

(26)

| | |
|---|---|
| have | *?The people who cry've been there. |
| will | *?The people who cry'll be there. |
| are | *?The people you know're there. |

The most important feature of enclitic auxiliaries is that they are prosodically deficient variants of full forms, consisting of a single consonant. A single consonant, especially an obstruent, cannot constitute a syllable in English, hence also cannot be a foot, or a prosodic word on its own. Disregarding their syntactic affiliation, they go with the word on their left, even if they are syntactically more closely related to the material on their right. The syntax-prosody mapping is given in (27). Note the mismatch of the syntactic and the prosodic parse of **'s** in (27).

(27)
S: [ $_{NP}$[Tim] $_{TP}$[**'s** leaving]]
P: $_{\iota}$($_{\varphi}$($_{\omega}$($_{f}$($_{\sigma}$(Tim**'s**) ) ) ) ) ($_{\varphi}$($_{\omega}$($_{f}$($_{\sigma}$(lea)$_{\sigma}$( ving) ) ) ) )

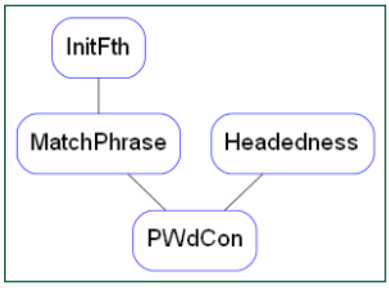
Our analysis appears in (28). The winning candidate (28a) parses the TP-initial 's with the subject and therefore fails to match both the subject NP and TP. It beats the more faithful candidate that preserves *'s* in φ-initial position by parsing it at the beginning of a prosodic word, violating standard positional faithfulness (28b). (To save space, we will from now on suppress the outermost phrase corresponding to the whole sentence in all candidates).

(28)

| | $_{NP}$[Tim] $_{TP}$['s leaving] | ω-Initial-Faith | Headedness | Match-Phrase | PWdCon |
|---|---|---|---|---|---|
| a. ▶ | $_{\varphi}$( $_{\omega}$Tim's ) $_{\varphi}$($_{\omega}$leaving ) | | | *$_{NP}$ *$_{TP}$ | |
| b. | $_{\varphi}$( $_{\omega}$Tim ) $_{\varphi}$($_{\omega}$'sleaving ) | * | | | |

A brief characterization of the constraints together with their ranking is given in (29).

(29)




INITFAITH: The beginning of a prosodic word is faithful to the beginning of the corresponding lexical word.
MATCHPHRASE: A syntactic phrase is matched by a corresponding phonological phrase.
HEADEDNESS: A prosodic category at level *i* immediately dominates a head at level *i-1* or *i*.
PWdCon: A prosodic word contains a lexical word.

It is worth comparing the analysis of enclitic monoconsonantal *'s*, which cannot be parsed ω-initially, with that of proclitic reduced *əs* in (30), which receives a faithful φ-initial parse by the same constraint hierarchy.

| (30) | NP[Tim] TP[*is* leaving]] | ω-Initial-Faith | Headedness | Match-Phrase | PWdCon |
|---|---|---|---|---|---|
| ▶ | φ( ω Tim ) φ( σəs ωleaving ) | | | | |
| | φ( ω Tim ) φ( ωìs ωleaving ) | | | | *W |

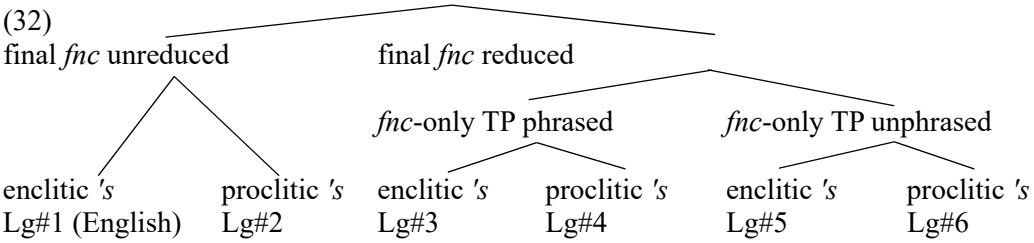
## 5.2 Factorial typology

Next we assess the predictions of the constraint system by studying the factorial typology of the system consisting of the representative inputs in (31) and the four constraints in (29), as produced in OTWorkplace (Prince, Tesar, and Merchant, https://sites.google.com/site/otworkplace/).

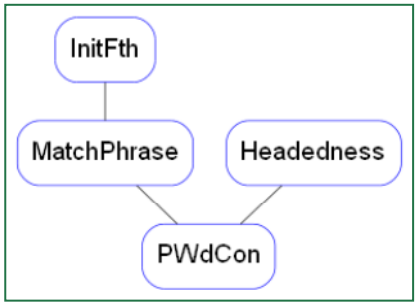
(31) Inputs:
- a. [[Ray] [can]] / *I can eat more than* __
- b. [[Ray] [is]] / *I don't know where* __
- c. [[Tim] [is leaving]]
- d. [[Tim] ['s leaving]]
- e. [look [at __]] / *What did Mary* __

It contains the six languages in (32).

(32)

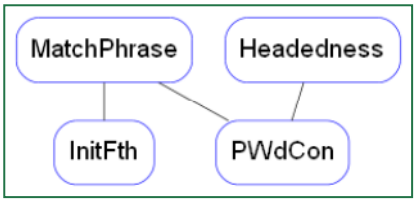



Lg#1
- a. φ( φ( ωRay ) φ( ωcàn ) )
- b. φ( φ( ωRay ) φ( ωìs ) )
- c. φ( φ( ωTim ) φ( σəs ωleaving ) )
- d. φ( φ( ωTim's ) ωleaving )
- e. φ( ωlook φ( ωàt ) )



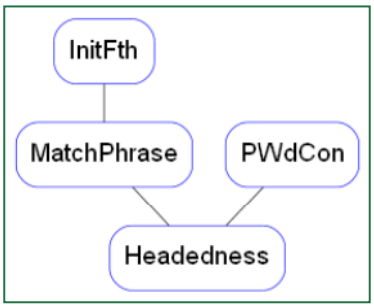
Lg#2

a. φ( φ( ωRay ) φ( ωcàn ) )
b. φ( φ( ωRay ) φ( ωìs ) )
c. φ( φ( ωTim ) φ( σəs ωleaving ) )
d. φ( φ( ωTim ) φ( ω'sleaving ) )
e. φ( ωlook φ( ωàt ) )



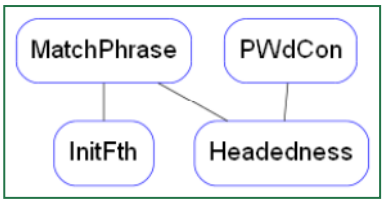

Lg#3

a. φ(φ( ωRay ) φ( σcən ) )
b. φ( φ( ωRay ) φ( σəs ) )
c. φ( φ( ωTim ) φ( σəs ωleaving ) )
d. φ( φ( ωTim's ) φ( ωleaving ) )
e. φ( ωlook φ( σət ) )



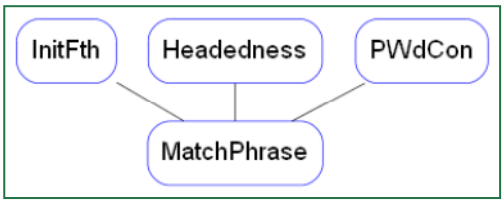

Lg#4

a. φ( φ( ωRay ) φ( σcən ) )
b. φ( φ( ωRay ) φ( σəs ) )
c. φ( φ( ωTim ) φ( σəs ωleaving ) )
d. φ( φ( ωTim ) φ ( ω'sleaving ) )
e. φ( ωlook φ( σət ) )



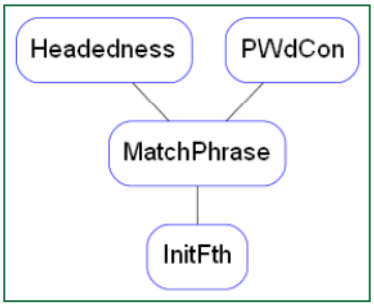

Lg#5

a. φ( φ( ωRay ) σcən )
b. φ( φ( ωRay ) σəs )
c. φ( φ( ωTim ) φ( σəs ωleaving ) )
d. φ( φ( ωTim's ) φ( ωleaving ) )
e. φ( ωlook σət )




Lg#6

a. φ( φ( ωRay ) σcən )
b. φ( φ( ωRay ) σəs )
c. φ( φ( ωTim ) φ( σəs ωleaving ) )
d. φ( φ( ωTim ) φ( ω'sleaving ) )
e. φ( ωlook σət )




The first two languages leave phrase-final *fnc* unreduced. Lg#1 is English, and Lg#2 differs in showing a faithful phrase-initial parse of *'s* in (31d), violating word-initial positional faithfulness, which ranks below MATCH-PHRASE. Lg#3-Lg#6 all allow phrase-final *fnc* to reduce. This happens in two ways: In Lg#3 and Lg#4, *fnc* is its own phrase while being reduced, violating HEADEDNESS (MATCH-PHRASE, PWDCON >> HEADEDNESS).

Monoconsonantal *'s* is either enclitic (Lg#3) or proclitic (Lg#4), depending on the relative ranking of INITFAITH and MATCH-PHRASE. Lg#5 and Lg#6 show reduced final *fnc* by leaving the *fnc*-only TP unphrased (HEADEDNESS, PWDCON >> MATCH-PHRASE). Again, monoconsonantal *'s* is either enclitic (Lg#5) or proclitic (Lg#6), depending on the ranking of INITFAITH and MATCH-PHRASE. This typology seems to reasonably reflect the crosslinguistic options. It can easily be expanded by including additional possibilities, such as allowing *'s* to delete, or to remain unsyllabified at the word level, which are of little interest to our current concerns.

## 5.3 No phrase-final enclisis

We now have all necessary pieces in place to address our main question, the impossibility of phrase-final enclisis for monoconsonantal clitics. As a reminder, we give some examples of the phenomenon in (33) (after Anderson 2008).

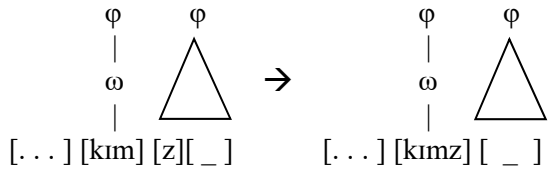
(33) a. Tim's happier than Kim is/*'s __. John is taller than Harry is/*'s __.
b. Freddie's a werewolf this year for Halloween. Do you know what Tommy is/*'s __(this year for Halloween)? Tommy has been a werewolf more often than Freddie has/*'s __(on Halloween).
c. John has known Mary longer than Fred has/*'s __Martha.
d. Who do you think you are/*'r __?
e. Fred's an Independent: he'd no more campaign for a Democrat than he would/*'d __ for a Republican
f. John is happier with their marriage than his wife is/*'s __.

Selkirk (1996, 198, footnote 5) observes that "[i]t is an interesting fact that these contracted forms are only possible if they are *not* phrase-final […]. The atypical prosodic encliticization that they display must somehow reflect this fact. For now, this remains a puzzle." Anderson's (2008) observes that the TP's in (34a-c) are wellformed, but not the TP consisting just of the monoconsonantal (34d). This is in itself unremarkable since it holds for basic syllabic reasons.

(34) a. [TP is happier] b. [TP 's happier] c. [TP is __] d. *[TP 's __]

The real question is why the simple phonological adjustment of reassigning the lone *'s* to the preceding phrase, as in (35), is also not a way out.

(35)




Taking up an idea first raised by Selkirk (1984, 366), Anderson's (2008, 11) insight is to interpret the impossibility of the move in (35) not as an idiosyncratic quirk of Modern English that could easily be changed, but rather as a reflection of a fundamental principle: The result of the phonological adjustment would be that the φ originally built over the

phonetic material corresponding to the TP would now be left with no phonetic content at all. This is impossible. We state the ban on prosodic vacuity in a preliminary form in (36), and will later derive it from Match Theory.

(36) *[$_{\varphi}$ Ø]: Phonetically empty PPhrases are disallowed.

The ban on prosodic vacuity has been argued by Kandybowicz (2015) to motivate a kind of *do*-support (*ye* 'do, make') in Asante Twi. Our question now is how to derive the ban on prosodic vacuity in our analysis. As things stand, the candidate with enclisis of *'s* is the winner in (37b) since MATCH-PHRASE is ranked too low to prevent this.

(37)

| a. Tim's leaving if | $_{NP}$[Kim] | $_{TP}$[is__ ] | Headedness | Match-Phrase | PWdCon |
|---|---|---|---|---|---|
| *correct* ► | $_{\varphi}$(Kim ) | $_{\varphi}$( $_{\omega}$ìs ) | | | * |
| | $_{\varphi}$( Kim ) | $_{\varphi}$ ($_{\sigma}$əs ) | * | | |
| | $_{\varphi}$($_{\omega}$ Kim | $_{\omega}$ìs) | | *$_{NP}$ *$_{TP}$ | * |
| | $_{\varphi}$( $_{\omega}$Kim | $_{\sigma}$əs) | | *$_{NP}$ *$_{TP}$ | |

| b. Tim's leaving if | $_{NP}$[Kim] | $_{TP}$['s __ ] | Headedness | Match-Phrase | PWdCon |
|---|---|---|---|---|---|
| *wrong*►!!! | $_{\varphi}$( Kim's ) | Ø | | *$_{NP}$ *$_{TP}$ | |
| | $_{\varphi}$( Kim ) | $_{\varphi}$( 's ) | * | | |

We present two different ways of deriving the correct outcome here. The first one uses M-PARSE (Prince and Smolensky 1993) to select the null candidate instead of the wrong outcome. In the second approach, *is* and *'s* are competing allomorphs, and the first beats the second. As we will see, both require us to sharpen our understanding of MATCH constraints. A standard use of M-PARSE is as enforcer of the single-foot subcategorization (38a) on comparative adjectives in English (*pretty, prettier; red, redder;* but *beautiful, *beautifuller*). As shown in (38b), the null candidate violating M-PARSE is preferable to a candidate violating the prosodic subcategorization constraint.

(38) a. /-er/: morphological subcategorization: [$_{A}$_]
prosodic subcategorization: [$_{Ft}$_ ]

| b. | /pretty-er/ | $_{A}$[Ft _ ] | M-Parse |
|---|---|---|---|
| ► | $_{A}$[$_{Ft}$(pretty)-er] | | |
| | Ø | | * |

| | /beautiful-er/ | $_{A}$[Ft _ ] | M-Parse |
|---|---|---|---|
| | $_{A}$[$_{Ft}$(beauti)ful-er] | * | |
| ► | Ø | | * |

Where is M-PARSE ranked in the grammar? It cannot be too low in the ranking because then the null candidate would always win. A first attempt would be to rank it between MATCH-PHRASE and PWDCON, as in (39). This gets the right result when the desired candidate only violates a constraint ranked below M-PARSE, such as PWDCON in (39a), or is in fact the null candidate, as in (39b).

(39)

| a. Tim's leaving if | $_{NP}$[Kim] | $_{TP}$[**is** ] | Headed-ness | Match-Phrase | M-Parse | PWdCon |
|---|---|---|---|---|---|---|
| *correct*▶ | $_{\varphi}$( $_{\omega}$Kim ) | $_{\varphi}$( $_{\omega}$ìs ) | | | | * |
| | Ø | | | | * | |
| | $_{\varphi}$( $_{\omega}$Kim ) | $_{\varphi}$( $_{\sigma}$əs ) | * | | | |
| | $_{\varphi}$( $_{\omega}$Kim | $_{\omega}$ìs) | | *$_{NP}$ *$_{TP}$ | | * |
| | $_{\varphi}$( $_{\omega}$Kim | $_{\sigma}$əs) | | *$_{NP}$ *$_{TP}$ | | |

| b. Tim's leaving if | $_{NP}$[Kim] | $_{TP}$[**'s** __ ] | Headed-ness | Match-Phrase | M-Parse | PWdCon |
|---|---|---|---|---|---|---|
| *correct*▶ | Ø | | | | * | |
| | $_{\varphi}$( $_{\omega}$Kim's ) | | | *$_{NP}$ *$_{TP}$ | | * |
| | $_{\varphi}$( $_{\omega}$Kim ) | $_{\varphi}$( 's ) | * | | | * |

But it goes wrong in (40), where the desired winner in fact violates MATCH-PHRASE, which dominates M-PARSE.

(40)

| | $_{NP}$[Kim] | $_{TP}$[**'s** leaving] | Headed-ness | Match-Phrase | M-Parse | PWd Con |
|---|---|---|---|---|---|---|
| *wrong winner*! ▶ | Ø | | | | * | |
| *desired winner:* | $_{\varphi}$( $_{\omega}$Kim's ) | $_{\varphi}$($_{\omega}$leaving ) | | *$_{NP}$ *$_{TP}$ | | * |

Assembling the winner~loser pairs from(39) and (40) in a comparative tableau, we identify a ranking paradox (bolded) in (41).

(41)

| | Winner | | Loser | Headed-ness | Match-Phrase | M-Parse | PWd Con |
|---|---|---|---|---|---|---|---|
| a. | Ø | ~ | $_{\varphi}$( $_{\omega}$Kim's ) | | **W** | **L** | L |
| b. | $_{\varphi}$($_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | ~ | Ø | | **L** | **W** | L |
| c. | $_{\varphi}$( $_{\omega}$Kim ) $_{\varphi}$( $_{\omega}$ìs ) | ~ | Ø | | | W | L |

Ranking M-PARSE below MATCH-PHRASE gets the right result when we have a catastrophic MATCH-violation, akin to a MAX-violation: A failure to have any kind of phrase whatsoever corresponding to the TP $_{TP}$[*'s*] in (41a). It gets the wrong result when the desired winner violates MATCH-PHRASE in a minor way, akin to an IDENT-violation, by reassigning *'s* to the subject's PPhrase in (41b). This suggests that we are in fact dealing with two different constraints. As a preliminary move, to be revised later, we add an "existential" MAX-type constraint MATCH-∃-PHRASE to the constraint system which is distinct from general Match-Phrase and is only violated when a syntactic phrase has no prosodic correspondent whatsoever, of whatever category. With M-PARSE sandwiched between the two types of Match-constraint, the correct distinctions are derived in (42), where the null-candidate wins in (a), but not in (b).

(42) a.

| Tim's leaving if $_{NP}$[Kim] $_{TP}$['s ___ ] | Init-Faith | Headed-ness | Match-∃-Phrase | M-Parse | Match-Phrase | PWd Con |
|---|---|---|---|---|---|---|
| ► Ø | | | | * | | |
| $_{\varphi}$( $_{\omega}$Kim's ) | | | *$_{TP}$ | | *$_{NP}$*$_{TP}$ | |
| $_{\varphi}$( $_{\omega}$Kim ) $_{\varphi}$( 's ) | | * | | | | |

b.

| Tim's leaving if $_{NP}$[Kim] $_{TP}$['s leaving]] | Init-Faith | Headed-ness | Match-∃-Phrase | M-Parse | Match-Phrase | PWd Con |
|---|---|---|---|---|---|---|
| ► $_{\varphi}$( $_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | | | | | *$_{NP}$*$_{TP}$ | |
| Ø | | | | * | | |
| $_{\varphi}$( $_{\omega}$Kim ) $_{\varphi}$ ($_{\omega}$'sleaving ) | * | | | | | |

The difference between existential MATCH-∃-PHRASE and general MATCH-PHRASE is that the first just requires the existence of some prosodic correspondent or other, the second an exact match. This raises an interesting idea: As things stand, general MATCH-constraints create a serious redundancy within OT since the theory already contains a fully-worked-out subsystem that militates against all conceivable kinds of input-output discrepancies, namely, the system of alignment and faithfulness constraints. There is no need for MATCH-constraints to duplicate their work. A more radical, and more interesting, theory therefore suggests itself: (i) Replace the current conception of MATCH by a purely existential conception. (ii) Let familiar ALIGNMENT—together with the usual faithfulness constraints (IDENT, LINEARITY, UNIFORMITY, INTEGRITY, etc.) take care of the detailed measurement of correspondence.

## 5.4 Why MATCH has to be an existential constraint

We begin by defining existential MATCH-∃ as in (43).

(43) Let *S* be an input syntactic representation and *P* its corresponding output phonological representation.
MATCH-∃ (α,π): A constituent of type α with phonological content in *S* corresponds to some constituent of type π in *P*.
MATCH-∃ (π,α): A constituent of type π in *P* corresponds to some constituent of type α in *S*.

Exact correspondence (preservation of edges, no deletion, no insertion, uniqueness of mapping, order preservation, etc.) is enforced by *S-P* and *P-S* Alignment and Faithfulness. As originally defined by Selkirk (2011, 451), MATCH is not a new type of constraint, but simply two-sided ALIGNMENT. This alignment-based conception of MATCH calls for gradient evaluation, but this has hardly ever been made use of in an essential way, to our knowledge. The intention has always gone beyond alignment, and has aimed for prosodic replication of the whole constituent, not just preservation of its edges (see Ishihara 2014). But checking on whole-scale correspondence requires the whole set of faithfulness constraints, and is in any case not easily, or profitably, expressed in a single constraint that can be evaluated gradiently. Elfner (2012, 28), in a move away from gradience, proposes an all-or-nothing categorical version of MATCH-PHRASE: "Suppose there

is a syntactic phrase (XP) in the syntactic representation that exhaustively dominates a set of one or more terminal nodes α. Assign one violation mark if there is no phonological phrase (ϕ) in the phonological representation that exhaustively dominates all and only the phonological exponents of the terminal nodes in α." As a categorical constraint, this is easy to evaluate, but it is unlikely to be workable in real life where standard phonology (such as the ONSET requirement) routinely leads to small deviations from perfect correspondence. We subsume Match Theory under General Correspondence Theory, which distinguishes purely existential MAX (requiring nothing but the existence of a correspondent in the output, which can be utterly different from the input element) from IDENT and other faithfulness constraints which deal with detailed aspects of correspondence (here, instantiated by Al-R(XP,φ)).[2]

| (44) | a. Tim's leaving if $_{NP}$[Kim] $_{TP}$['s _ ] | Headedness | Match-∃-Phrase | M-Parse | Al-R (XP,φ) | PWd Con |
|---|---|---|---|---|---|---|
| ► | Ø | | | * | | |
| | ($_{\omega}$Kim's ) | | *$_{TP}$ | | * | * |
| | $_{\varphi}$($_{\omega}$Kim) $_{\varphi}$( 's ) | * | | | | |
| | b. $_{NP}$[Kim] $_{TP}$['s leaving] | | | | | |
| ► | $_{\varphi}$($_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | | | | * | * |
| | Ø | | | * | | |

In the M-PARSE approach, /is/ and /'s/ are separate inputs that do not compete. *Kim **is** leaving* and *Kim'**s** leaving* each win their competition—optionality as lexical choice. (*Tim's leaving if*) *Kim's* loses against the null candidate because the TP [*is* _ ] has become phonologically vacuous. (*Tim is leaving if*) *Kim **is*** wins its competition. In an alternative allomorphy approach, /is/ and /'s/ compete with each other as different allomorphs of the same input morpheme. All allomorphs enter the same competition. Priority (Mascaró 1996) (or some economy constraint) prefers /'s/ to /is/. Standard alignment-based MATCH continues to have the familiar problem: *Ceteris paribus,* unranked MATCH-PHRASE (preferring *is*) and PRIORITY (preferring *'s*) admit both outputs as winning candidates in 45) (optionality as lack of ranking). But there continues to be a problem with phrase-final '*s* (46).

| (45) | a. I wonder if $_{NP}$[Kim] $_{TP}$[is/'s leaving] | Match-Phrase | Priority: 's > is | PWd Con |
|---|---|---|---|---|
| ► | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$($_{\sigma}$əs $_{\omega}$leaving ) | | * | |
| | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$($_{\omega}$ìs $_{\omega}$leaving ) | | * | * |
| | $_{\varphi}$($_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | *$_{NP}$ *$_{TP}$ | | |

[2] Things are different in the two-stage view of prosodic structure formation developed in Selkirk (2017), which distinguishes Spell-Out-by-MATCH from the phonology, which incorporates prosodic structure faithfulness constraints, in a division of labor reminiscent of the proposal made here.

| b. I wonder if | $_{NP}$[Kim] | $_{TP}$[is/'s leaving] | Priority: 's > is | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| | $_{\varphi}$($_{\omega}$Kim ) | $_{\varphi}$( $_{\sigma}$əs $_{\omega}$leaving ) | * | | |
| | $_{\varphi}$($_{\omega}$Kim ) | $_{\varphi}$( $_{\omega}$ɪs $_{\omega}$leaving ) | * | | * |
| ► | $_{\varphi}$($_{\omega}$Kim's ) | $_{\varphi}$( $_{\omega}$leaving ) | | *$_{NP}$ *$_{TP}$ | |

(46) a. Tim's leaving.

| I wonder if | $_{NP}$[Kim] | $_{TP}$[is/'s _ ] | Match-Phrase | Priority: 's > is | PWd Con |
|---|---|---|---|---|---|
| *correct* ► | $_{\varphi}$($_{\omega}$Kim ) | $_{\varphi}$( $_{\omega}$ɪs ) | | * | * |
| | $_{\varphi}$($_{\omega}$Kim's ) | | *$_{NP}$ *$_{TP}$ | | |

b. Tim's leaving.

| I wonder if | $_{NP}$[Kim] | $_{TP}$[is/'s _ ] | Priority: 's > is | Match-Phrase | PWd Con |
|---|---|---|---|---|---|
| | $_{\varphi}$( $_{\omega}$Kim ) | $_{\varphi}$( $_{\omega}$ɪs ) | * | | * |
| *wrong* ►!!! | $_{\varphi}$( $_{\omega}$Kim's) | | | *$_{NP}$ *$_{TP}$ | |

Again, high-ranked MATCH-∃-PHRASE together with ALIGN-R correctly predicts the sole winning candidate.

(47)

a. Tim's leaving if $_{NP}$[Kim] $_{TP}$[is/'s _ ]

| | | Match-∃-Phrase | Align-R (XP,φ) | Priority: 's > is | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$( $_{\omega}$Kim ) $_{\varphi}$( $_{\omega}$ɪs ) | | | * | * |
| | $_{\varphi}$( $_{\omega}$Kim's ) | *$_{TP}$ | *$_{NP}$ | | |

b. Tim's leaving if $_{NP}$[Kim] $_{TP}$[is/'s _ ]

| | | Match-∃-Phrase | Priority: 's > is | Align-R (XP,φ) | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$( $_{\omega}$ɪs ) | | * | | * |
| | $_{\varphi}$($_{\omega}$Kim's ) | *$_{TP}$ | | *$_{NP}$ | |

Sentences without gaps do not incur MATCH-∃ violations, so the allomorph variation arises as before.

(48)

a. I wonder if $_{NP}$[Kim] $_{TP}$[is/'s leaving]

| | | Match-∃ Phrase | Align-R (XP,φ) | Priority: 's > is | PWd Con |
|---|---|---|---|---|---|
| ► | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$( $_{\sigma}$əs $_{\omega}$leaving ) | | | * | |
| | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$( $_{\omega}$ɪs $_{\omega}$leaving ) | | | * | * |
| | $_{\varphi}$($_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | | *$_{NP}$ | | |

b. I wonder if $_{NP}$[Kim] $_{TP}$[is/'s leaving]

| | | Match-∃-Phrase | Priority: 's > is | Align-R (XP,φ) | PWd Con |
|---|---|---|---|---|---|
| | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$($_{\sigma}$əs $_{\omega}$leaving ) | | * | | |
| | $_{\varphi}$($_{\omega}$Kim ) $_{\varphi}$( $_{\omega}$ɪs $_{\omega}$leaving ) | | * | | * |
| ► | $_{\varphi}$($_{\omega}$Kim's ) $_{\varphi}$( $_{\omega}$leaving ) | | | *$_{NP}$ | |

Both analyses (M-PARSE and Allomorph PRIORITY) need the existential version of MATCH-PHRASE instead of the alignment-based version. Which, if any, of these two ap-

proaches—M-PARSE or allomorphy—is the correct one? It is hard to think of decisive evidence either way. Kaisse (1983, 95) makes the interesting observation that the contexts where *'s* is admitted are not literally a proper subset of those where *is* is admitted. There are exceptions to this subset relation in examples such as *There'{s/*is/*has} a new book been written.* She notes that this is suggestive of morphemes with separate listings in the lexicon. Since true allomorphs have one lexical entry, one could interpret this to favor the M-PARSE approach, where the two have separate lexical entries.

# 6. Conclusion

By insisting that syntactic constituents must in some form be matched in prosody, Match Theory provides very simple explanations (i) for positions where weak elements must appear in their strong form—because otherwise a phonological phrase would have no head—, and (ii) for positions where a functional element cannot undergo enclisis—because if it did, a whole syntactic constituent would go unmatched. In order for this explanation to go through, Match constraints must have a purely existential force, and merely insist on the existence of a prosodic correspondent to a syntactic phrase. Detailed correspondence falls to standard alignment/faithfulness constraints.

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