***Preprint: In English Linguistics* 36: 1** (2019) 1–28

Match as Syntax-Prosody MAX/DEP: Prosodic Enclisis in English

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Abstract

This paper proposes to subsume Syntax-Prosody Match Theory under General Correspondence Theory, which distinguishes purely existential MAX/DEP constraints (requiring nothing but the existence of a correspondent in the output/input, which can be rather different from the input element) from IDENT and other faithfulness constraints. Exact correspondence (preservation of edges, no deletion, no insertion, uniqueness of mapping, order preservation, etc.) is enforced by *Syntax-Prosody* and *Prosody-Syntax* Alignment and by standard Faithfulness. The empirical topic is the impossibility of phrase-final enclisis in English (**I don't know where Tom's* vs. *Tom's here*) and its proper explanation.*

Keywords

Match Theory, Syntax-Prosody Faithfulness, prosodic enclisis

* An earlier version of this paper (Ito and Mester (2018)) appeared in a festschrift in honor of Jim McCloskey. For helpful comments and suggestions, we are grateful to Ryan Bennett, Gorka Elordieta, Nick Kalivoda, Jim McCloskey, and Lisa Selkirk. This material is based upon work supported by the National Science Foundation under Grant No. 1749368.

Introduction: Match as SP:MAX/DEP

Our goals here are twofold. On the empirical side, we take up the question of why phrase-final prosodic enclisis of function words is impossible in English, as shown by the ungrammatical reduction of *is* to *'s* in (1a), which contrasts with the phrase-medial reduction in (1b), and also with the phrase-final possessive marker *'s* in (1c), which is underlyingly /-z/ and not an instance of reduction.

(1) a. *I don't know where Tom*'s*. (I don't know where Tom *is*.)
b. Tom*'s* not here. (Tom *is* not here.)
c. This book is Tom*'s*.

Familiar as it is, the ungrammaticality of (1a) should still be surprising since ω(*Tom's*) is a *bona fide* prosodic word, as shown by (1b, c). As such, it should be wellformed in any position, including phrase-finally, as is the homophonous possessive phrase in (1c). The explanation we will pursue here builds on the basic observation that, because of wh-movement, [*'s*] in (1a)—but not in (1b, c)—constitutes an entire syntactic phrase, and is therefore required to have a (non-vacuous) phonological correspondent, which is not the case: *'s* is not a phonological phrase, not even a word or a syllable, and ω(*Tom's*) corresponds to the subject noun phrase, not to the verb phrase.

The impossibility of phrase-final enclisis needs to be seen in the context of the whole system of cliticization of English, and this is where the second—and theoretically more ambitious—objective of the paper comes into play. We will argue that the simple non-vacuity explanation informally sketched above has important consequences for the formal theory of Syntax-Prosody (SP) mapping, in particular, for Match Theory (Selkirk (2011), Elfner (2012), Ito and Mester (2013)). In order for the explanation to go through, it requires a conception of SP-Match constraints that is rather different from the generally accepted one. The new conception insists merely on the *existence* of some corresponding (syntactic or prosodic) constituent on the other side and not on exact correspondence. It therefore literally belongs to Faithfulness Theory (McCarthy and Prince (1995)). Syntax-Prosody-Match is SP:MAX, Prosody-Syntax-Match is PS:DEP. As with all MAX- and DEP-constraints, these are purely existential and non-gradient. Details of correspondence, on the other hand, are enforced by other families of constraints that are also already part of the theory, such as classical SP-ALIGN and standard faithfulness (including IDENT), and are evaluated gradiently.

In this section, we introduce in outline the theory of Match as SP:MAX/DEP. Section 2 develops the crucial foundation for explaining why phrase-final enclisis is impossible in English, examining prosodic requirements on left edges and the lack of weak phrase-final function words, with an allowance for morphological enclisis. Section 3 then turns to prosodic enclitics—their characteristics and basic analysis, and the full explanation for the lack of phrase-final enclisis; Section 4 concludes with the factorial typology.

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 traditional constraints on the syntax-prosody mapping relation are given in (2) in two forms, following Alignment Theory (McCarthy and Prince (1993), Selkirk (1996)) and Match Theory (Selkirk (2011)), with a syntactic phrase, XP, corresponding to a prosodic phrase, φ.

(2)

Interface constraints	Alignment of E(dge) = Left, Right	Matching
Syntax-to-Prosody Mapping	ALIGN-XP-E: ALIGN (XP, E, φ, E)	MATCH-XP: MATCH (XP, φ)
Prosody-to-Syntax-Mapping	ALIGN-φ-E: ALIGN (φ, E, XP, E)	MATCH- φ: MATCH (φ, XP)

There are equivalent Alignment and Match constraints at the word level, e.g. ALIGN-E (LEXWD, PRWD) and MATCH(LEXWD, PRWD).

In Selkirk's (2011: 451) original definition reproduced in (3), MATCH is actually not a new type of constraint, but simply two-sided ALIGNMENT.

(3) a. MATCH(α,π) [= SP faithfulness]
The left and right edges of a constituent of type α in the input syntactic representation must correspond to the left and right edges of a constituent of type π in the output phonological representation.

b. MATCH(π,α) [= PS faithfulness]
The left and right edges of a constituent of type π in the output phonological representation must correspond to the left and right edges of a constituent of type α in the input syntactic representation.

This alignment-based conception of MATCH seems to call for gradient evaluation, but this has hardly ever been made use of in an essential way, to the best of 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 given in (4) (the subscript "T" indicates that the constraint is stated with reference to terminal nodes, overcoming some problems with the version in (3)).

(4) MATCH-PHRASET:
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.

As things stand, MATCH-constraints as in (3) or (4) create a serious redundancy within OT-phonology since the theory already contains not only the (semi-)equivalent edge Alignment constraints, but also a fully-worked-out subsystem of faithfulness constraints that militates against all conceivable kinds of input-output discrepancies, and syntax-prosody correspondence is just one kind of correspondence relation There is no need for MATCH-constraints to duplicate their work. A more radical, and more interesting, theory therefore suggests itself, namely to replace the current conception of MATCH by a purely existential conception. What may come as a surprise is that such existential Match constraints turn out to be equivalent to the familiar MAX/DEP constraints of General Correspondence Theory, as applied to the syntax-prosody relation. As such, SP:MAX/DEP constraints require nothing but the existence of a correspondent in the output (which can be utterly different from the input

element), whereas IDENT and other faithfulness constraints deal with detailed aspects of correspondence, together with the usual one-sided Alignment constraints. We thus propose to replace the interface constraints in (2) with (5).

(5)

Interface constraints	Alignment of E(dge)=Left, Right		SP-Faithfulness (="existential Matching")	
SP-Mapping	ALIGN-XP-E	ALIGN (XP, E, φ, E)	SP:MAX-XP	MAX (XP, φ)
PS-Mapping	ALIGN-φ-E	ALIGN (φ, E, XP, E)	PS:DEP-φ	DEP (φ, XP)

The general scheme of SP-Correspondence constraints is given in (6).

(6) SP-Correspondence Constraints
Let *S* be an input syntactic representation and *P* its corresponding output phonological representation.
a. SP:MAX: A constituent of type α with phonological content in *S* corresponds to some constituent of type π in *P*.
b. PS:DEP: A constituent of type π in *P* corresponds to some constituent of type α in *S*.

The particular values taken by the variables α and π are given in (7), building on Selkirk's work, resulting in the individual members of the family of SP-Correspondence constraints.

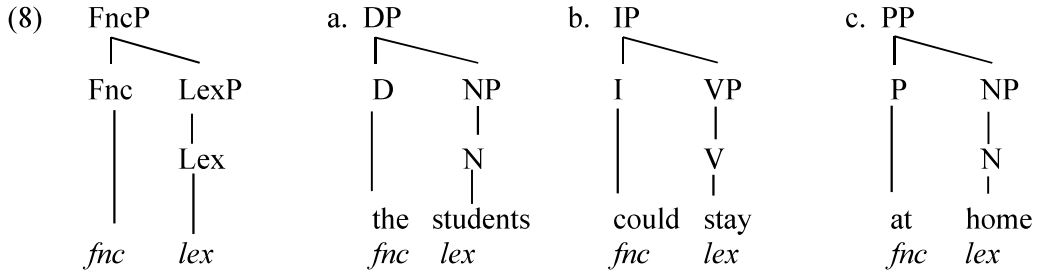
(7)

α		π	
clause		ι	(international phrase)
XP	(syntactic phrase)	φ	(phonological phrase)
lex	(lexical word)	ω	(prosodic word)

A number of issues need to be settled regarding the meaning of "clause" (see Selkirk (2009) for discussion). The clausal level will not play a role in our analysis here. The label "lex" refers to the broadly shared assumption that in general only lexical words, not function words, project prosodic words. This kind of restriction does not hold at the phrasal and clausal levels, where projections of functional heads need to be mapped to prosody just like projections of lexical heads (Elfner (2012)).

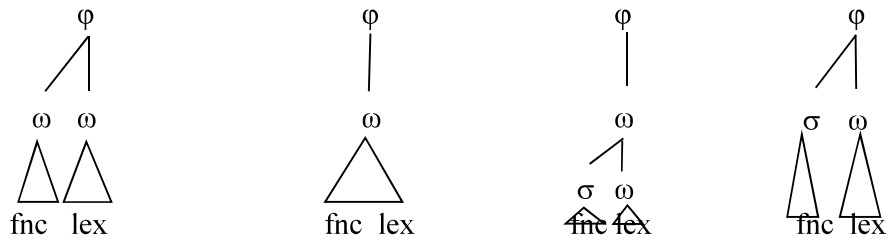
To illustrate, we take one class of English function words, including monosyllabic determiners, auxiliaries, and prepositions, that forms proclitic structures, as in (8).

(8)



Possible mappings to prosodic structure are given in (9) (Selkirk (1996), Ito and Mester (2009)), where "σ" stands for "syllable". Peperkamp (1997), for example, shows that all of (9b-d) are instantiated in Italian dialects. For English, two views regarding the prosodic structure of proclitics have been proposed. The majority of researchers (including (McCarthy (1993), Booij (1996), Vigário (1999), Ito and Mester (2007, 2009)) argue that they are affixal clitics (9c). The other view (Selkirk (1996), Hall (1999)) identifies them as free clitics (9d).

(9) a. full-ω *fnc* (independent) b. amalgamated *fnc* (internal) c. ω-adjoined *fnc* (affixal) d. φ-attached *fnc* (free)



Here the crucial constraints are at the word level, where lexical and functional status is the determining factor.

(10) Word-level correspondence constraints (cf. WdCon and PrdWdCon of Selkirk (1996))

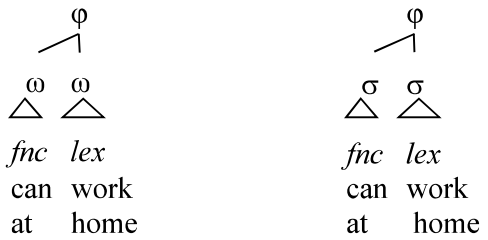
a. SP:MAX-*lex*: MAX (*lex*, ω) A constituent of type *lex* (lexical word) with phonological content in *S* corresponds to some constituent of type ω (prosodic word) in *P*.

b. PS:DEP-ω: DEP (ω, *lex*) A constituent of type ω (prosodic word) in *P* corresponds to some constituent of type *lex* (lexical word) in *S*.

SP:MAX-*lex* is fulfilled in all the candidates in (9), because *lex* always has a correspondent ω. There is no exact correspondence in (9b) because the ω consists of both *fnc* and *lex*, but MAX-*lex* is only concerned with the existence of a corresponding ω and is therefore fulfilled. Exact correspondence (preservation of edges, no deletion, no insertion, uniqueness of mapping, order preservation, etc.) is enforced by the other faithfulness constraints (IDENT, LINEARITY, UNIFORMITY, INTEGRITY, etc.) and one-sided edge ALIGNMENT, so in (9b) ALIGN-LEFT(*lex*, ω) is violated, because the left edge of *lex* is not aligned with the left edge of ω.

PS:DEP-ω is fulfilled in (9b-d) – all ω's contain *lex*'s within their ω-domain, including the recursive ω in (9c). On the other hand, DEP-ω is violated in (9a), because the first ω only contains a *fnc*. It is here useful to compare a candidate similar to (9a) with only σ's.

(11) a. PS:DEP-ω violation b. SP:MAX-LEX violation



MAX-*lex* is violated in a candidate like (11b), because there is no ω that the *lex* corresponds to. Even though *lex* is monosyllabic, it would have to project up to a ω through a monosyllabic head foot, $_{\omega}[_{f}[_{\sigma}lex]]$. On the other hand, (11b) fully satisfies PS:DEP-ω, different from (11a).

Requirement on prosodic edges

1. Requirements on left edges: STRONGSTART

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*).

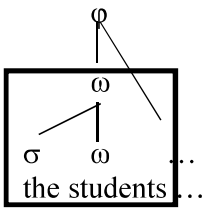
More recently, Selkirk (2011: 470) has proposed STRONGSTART**,** a generalized version of this kind of left edge requirement (informally, "beginnings of prosodic units are strong"). STRONGSTART is responsible for a wide variety of prosodically motivated effects, requiring prosodic constituents to start with a bang and not with a whimper. Examples of STRONGSTART show a great variety:

- Promotion of initial constituents: In Xitsonga 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)).
- Postposing of initial weak elements: 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 (Bennett, Elfner and McCloskey (2016: 171)).
- Deletion of initial weak elements: In English, initial weak syllables can be deleted as in ~~*Have*~~ ~~*you*~~ *got milk?* or ~~*It's*~~ ~~*a*~~ *nice day today* (Weir (2012)). Similarly, in German so-called pronoun zap (Ross (1982), Haider (1986)) deletes initial weak elements: ~~*Ich*~~ *hab das schon gelesen* '(I) have already read it' or ~~*Das*~~ *hab ich schon gelesen*. '(that) have I already read'.
- Modes of resolution deeply embedded in the morphosyntactic system: A case in point is the morphosyntactically unmotivated doubling of agreement clitics on unary initial constituents in a dialect of Mixtec (Ostrove (2016)) in order to create a branching first constituent (cf. Elordieta (2007)).

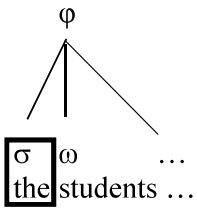
A number of different versions of STRONGSTART have appeared in the literature. Bennett et. al. (2016: 198) state the constraint as a direct ban on prosodic dependents as initial immediate daughters: "Prosodic constituents above the level of the word should not have at their left edge an immediate subconstituent that is prosodically dependent. For our purposes 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 also Myrberg (2010, 2013)): *(π_n π_{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 (see Ito and Mester (1992: 56), McCarthy and Prince (1993: 83)): ALIGN-L (π_n, π_{n-1}). ALIGN-L (π_n, π_{n-1}) is 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 a 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 (12b) 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.

(12) a. affixal:
ω-adjoined *fnc*



b. free:
φ-attached *fnc*



2. Requirements on right edges: No weak phrase-final *fnc*—STRONGEND?

There is thus ample crosslinguistic evidence that prosodic constituents optimally start with a strong prominent unit. The question then arises whether similar requirements are found at right edges of prosodic constituents. Is the ungrammaticality of final enclisis in English (**I don't know where Tom's,* etc.) an effect of a STRONGEND requirement? Before we are ready to confront this question, we need to address a closely related additional fact: the ungrammaticality of reduced *fnc* in phrase-final position, illustrated in (13) (examples after Selkirk (1996: 200)).

(13)	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) captures the data in (13) directly by a P-to-P alignment constraint (14), requiring every phonological phrase to end in a full prosodic word, as illustrated in (15).

(14) ALIGN-RIGHT-φ: ALIGN(φ, R, ω, R)

(15) S: [Who did Mary [$_{VP}$ look [$_{PP}$ at _]$_{PP}$]$_{VP}$ last time]
P: ($_{\varphi}$ Who did Mary look ($_{\omega}$ *ǽt*)$_{\omega}$)$_{\varphi}$ ($_{\varphi}$ last time)$_{\varphi}$

ALIGN-RIGHT-φ crucially dominates DEP-ω, which requires every prosodic word to be grounded in a lexical word. Tableau (16) shows that the preposition *at* appears in its (stressed) strong form $_{\omega}$[$_{f}$[$_{\sigma}$*ǽt*]]] phrase-finally (16a) violating DEP-ω, but in its weak (unstressed) form [$_{\sigma}$*ət*] if not phrase-final (16d) .

(16)	Who did Mary	[look	at	]	ALIGN-R-φ	PS:DEP-ω
	a. ▶	($_{\omega}$lóok	$_{\omega}$*ǽt*	)$_{\varphi}$		*
	b.	($_{\omega}$lóok	$_{\sigma}$*ət*	)$_{\varphi}$	*	
	Mary	[looked	at	Jim]	ALIGN-R-φ	PS:DEP-ω
	c.	($_{\omega}$looked	$_{\omega}$*ǽt*	$_{\omega}$Jím) $_{\varphi}$		*
	d. ▶	($_{\omega}$looked	$_{\sigma}$*ət*	$_{\omega}$Jím) $_{\varphi}$		

Candidates (17a, b) fulfill higher-ranking alignment, but (17a) has fewer violations of PS:DEP-ω (only one prosodic word not rooted in a lexical word), and emerges as the winner.

(17)		Tony [can eat] more than [Ray can __]	ALIGN-R-φ	PS:DEP-ω
a.	▶	Tony ($_{\sigma}$*kən* $_{\omega}$éat)$_{\varphi}$ more than ($_{\omega}$Ráy $_{\omega}$*kə̀n*)$_{\varphi}$		*
b.		Tony ($_{\omega}$*kə̀n* $_{\omega}$éat)$_{\varphi}$ more than ($_{\omega}$Ráy $_{\omega}$*kə̀n*)$_{\varphi}$		**
c.		Tony ($_{\sigma}$*kən* $_{\omega}$éat)$_{\varphi}$ more than ($_{\omega}$Ráy $_{\sigma}$*kən*)$_{\varphi}$	*	
d.		Tony ($_{\omega}$*kə̀n* $_{\omega}$éat)$_{\varphi}$ more than ($_{\omega}$Ráy $_{\sigma}$*kən*)$_{\varphi}$	*	*

Although the right-alignment analysis demanding full prosodification at constituent ends can produce the correct outputs, the ALIGN-R-φ constraint strikes a strangely discordant "StrongEnd" note. The problem is that it sits uneasily not 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. Can we do better than resorting to a constraint directly strengthening the end of prosodic units, by alignment or other means that run afoul of the evidence from phonetics and psycholinguistics that has accumulated over the years since Beckman (1997), Smith (2002), etc.? We can fortunately answer in the affirmative: No reference to ends of prosodic units is necessary in SP-Correspondence Theory. MAX-XP (5) and HEADEDNESS (Ito and Mester (1992: 37); see also Selkirk (1996: 190)) requiring a prosodic unit π_n to contain a head π_{n-1}, can simply take over the what the alignment constraint did but without any reference to edges of prosodic constituents.

(18)	What did Mary	VP[look	PP[at _]]	HEADEDNESS	SP:MAX-XP	PS:DEP-ω
	▶	φ($_{\omega}$lóok	φ($_{\omega}$ə̀t))			*
		φ($_{\omega}$lóok	φ($_{\sigma}$ət))	*		
		φ($_{\omega}$lóok	$_{\omega}$ə̀t)		$*_{PP}$	*
		φ($_{\omega}$lóok	$_{\sigma}$ət)		$*_{PP}$	

MAX-XP requires PP[*at* __], as well as VP[*look at*], to correspond to a φ, with the result that recursive φ-structure emerges as the winner. HEADEDNESS requires the lone *at* in a φ to be a full prosodic word, violating DEP-ω; the choice of the strong allomorph of the function word therefore follows from SP-Correspondence Theory itself.

(19) HEADEDNESS SP:MAX-XP

PS:DEP-ω

No recourse is needed to any "StrongEnd" (right-alignment) constraint, which, in hindsight, was merely a descriptive observation in the guise of a good-looking (but misguided) formal alignment constraint. The SP-constraint in (19), on the other hand, has no edge reference, and only cares about the existence of the appropriate correspondent.

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 (20).

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

The most natural interpretation of SP:MAX-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 the traditional understanding. In order to stay with familiar terminology, we refer to all projections of X as "XP", making no distinctions in bar level.

(21)

I can eat more than	$_{TP}$[$_{DP}$ [Michelle]	$_{TP}$[can__]]	HEADED-NESS	SP: MAX-XP	PS: DEP-ω
►	$_{\varphi}$($_{\varphi}$($_{\omega}$Michelle)	$_{\varphi}$($_{\omega}$kǽn))			*
	$_{\varphi}$($_{\omega}$Michelle	$_{\varphi}$($_{\omega}$kǽn))		*$_{DP}$	*
	$_{\varphi}$($_{\varphi}$($_{\omega}$Michelle)	$_{\varphi}$($_{\sigma}$kən))	*		
	$_{\varphi}$($_{\omega}$Michelle	$_{\omega}$kǽn)		*$_{TP}$*$_{DP}$	*
	$_{\varphi}$($_{\omega}$Michelle	$_{\sigma}$kən)		*$_{TP}$*$_{DP}$	

The recursive structure $_{\varphi}$($_{\varphi}$(*Michelle*) $_{\varphi}$(*can*)) wins over the flat structure $_{\varphi}$(*Michelle*) $_{\varphi}$(*can*) because the higher TP has a correspondent φ. Since the domain of the rhythm rule is usually taken to be φ, the phonological phrase (Hayes (1984)), one might argue that its nonapplication in this case (*Michèlle cán*, not **Mìchelle cán*) favors the flat structure, but this is not probative if the domain of the rhythm rule is in fact φ_{min} (see Elordieta (2015), Selkirk and Lee (2015) for recent overviews of recursive category structure in phonology).

(22)

I don't know where	$_{TP}$[$_{DP}$[Ray]	$_{TP}$[is__]]	HEADED-NESS	SP: MAX-XP	PS: DEP-ω
►	$_{\varphi}$($_{\varphi}$($_{\omega}$Ray)	$_{\varphi}$($_{\omega}$íz))			*
	$_{\varphi}$($_{\omega}$Ray	$_{\varphi}$($_{\omega}$íz))		*$_{DP}$	*
	$_{\varphi}$ ($_{\varphi}$($_{\omega}$Ray)	$_{\varphi}$($_{\sigma}$əz))	*		
	$_{\varphi}$($_{\omega}$Ray	$_{\omega}$íz)		*$_{TP}$*$_{DP}$	0*
	$_{\varphi}$($_{\omega}$Ray	$_{\sigma}$əz)		*$_{TP}$*$_{DP}$	

Compare:	$_{TP}$[$_{DP}$[Tim]	$_{TP}$[is leaving]]	HEADED-NESS	SP: MAX-XP	PS: DEP-ω
►	$_{\varphi}$($_{\varphi}$($_{\omega}$Tim)	$_{\varphi}$($_{\sigma}$əz $_{\omega}$leaving))			
	$_{\varphi}$($_{\varphi}$($_{\omega}$Tim)	$_{\varphi}$($_{\omega}$íz $_{\omega}$leaving))			*

The remaining question here is the following: Are there other 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? Or can we here also affirm the validity of the asymmetric ANCHOR-AWAY of Nelson (2003), where only left-anchoring constraints exist in the grammar, and apparent cases of right anchoring are compelled by other factors (mainly, by stress)?[1]

3. An apparent exception: Morphosyntactic enclitics

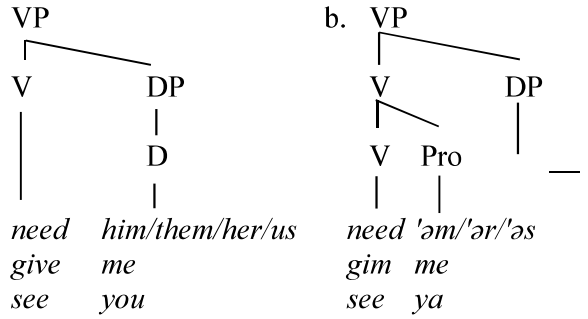
In an apparent violation of the ban on weak phrase-final *fnc*, object pronouns in English can appear here in a weak form (cf. Selkirk (1972, 1984)), in addition to their strong form. The phonetic realization of these weak forms, and their rhythmic adherence to the verb, is identical to that of word-final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

[1] Another string-wise identical possible candidate $_{\varphi}$($_{\varphi}$($_{\omega}$*Tim əz*) $_{\varphi}$($_{\omega}$*leaving*)) violates Initial Faithfulness, discussed below in section 3.

(23)	object *Pro*	cf.:	object *Pro*	cf.:
	need 'əm (him, them)	Needham	feed 'əs (us)	fetus
	will ɪt	billet	gimme (give me)	Jimmy
	stroke 'ər	stroker	see ya (you)	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.—but *need maybe him* cannot reduce to **need maybe 'əm*. 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 (24a), or as a morphosyntactic enclitic object, an impoverished category (24b) 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 (25).

(24) a. b.



(25)

as a phrasal object	VP[see	DP[*Pro*]]	HEADED-NESS	SP:MAX-XP	PS:DEP-ω
►	φ(sée	φ(ωyòu))			*
	φ(sée	φ(σya))	*		

as an enclitic object	VP[see-Pro	DP[__]]	HEADED-NESS	SP:MAX-XP	PS:DEP-ω
	φ(ωsée ωyòu	)			*
►	φ(ωsée σya	)			

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 to be explained 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*).

Prosodic enclisis

English has half a dozen special forms of auxiliaries that show enclisis, as in (26). Different from the morphosyntactically enclitic pronouns seen in the previous section (*ya, əm,* etc.), the

enclitic auxiliaries listed in (27) are single consonants and hence subsyllabic, and they do not have a morphosyntactic subcategorization frame, like the enclitic pronouns.

(26) Ted's right. Ted is right.
Ted's already left. Ted has already left.
Ted'll help us. Ted will help us.

(27)

is	's	am	'm	have	've	will	'll
has	's	are	're	had	'd	would	'd

4. 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 (28).

(28) is/has Matt'[s] gone, but Tom'[z] here, and Bruce'[əz] on his way.
plural cat[s], home[z], bus[əz]
3sg fit[s], come[z], miss[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 (29), the (b) version only has the bizarre reading in which Fred's sister is a cat.

(29) 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 (30).

(30) 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 (31) (the judgments here reflect those of Zwicky and Kaisse, but there seems to be some variation). We will henceforth restrict ourselves to these two auxiliaries.

(31) 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 (32). Note the mismatch of the syntactic and the prosodic parse of ***'s***.

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

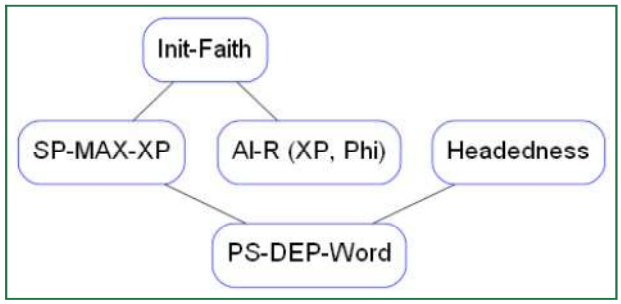
Our analysis appears in (33). The winning candidate (33a) parses the TP-initial *'s* with the subject and therefore fails to match both the subject NP and TP. It beats the more faithful candidate that preserves *'s* in φ-initial position by parsing it at the beginning of a prosodic word, violating standard positional faithfulness INITIAL-FAITH in (33b)[2] (to save space, we will from now on suppress the outermost phrase corresponding to the whole sentence in all candidates).

(33)	$_{NP}$[Tim] $_{TP}$['s leaving]	INIT-FAITH	SP: MAX-XP[3]	AL-R (XP,Φ)	HEADED-NESS	PS: DEP-ω
a. ►	$_{\varphi}$($_{\omega}$Tim's) $_{\varphi}$($_{\omega}$leaving)			*		
b.	$_{\varphi}$($_{\omega}$Tim) $_{\varphi}$($_{\omega}$'sleaving)	*				

A brief characterization of the constraints together with their ranking is given in (34).

(34)	
INIT-FAITH	The beginning of a (minimal) prosodic word is faithful to the beginning of the corresponding lexical word.
SP:MAX-XP	A syntactic phrase is matched by a corresponding phonological phrase.
AL-R (XP, Φ)	The right edge of a syntactic phrase corresponds to the right edge of a phonological phrase.
HEADEDNESS	A prosodic category at level *i* immediately dominates a head at level *i-1* or *i*.
PS:DEP-ω	A prosodic word corresponds to a lexical word (see (10)).

[2] We are assuming that single segments like *'s* cannot adjoin to a prosodic word.
[3] The input contains two phrases, $_{VP}$[*leaving*] and its functional extension $_{TP}$[*is leaving*]. We are assuming that what needs a prosodic correspondent is the extended projection (Grimshaw (2005)) consisting of this whole complex, not each individual phrase. This is obviously an issue that needs further thought, given the rich functional architecture assumed in current work in syntax. Note also the the question is essentially irrelevant here since (33a, b) will continue to have identical violation profiles (one violation each) if both phrases counted, and one of them had no correspondent.



It is worth comparing the analysis of enclitic monoconsonantal *'s*, which cannot be parsed ω-initially, with that of proclitic reduced *əs* in (35), which receives a faithful φ-initial parse by the same constraint hierarchy.

(35)	NP[Tim] TP[*is* leaving]]	INIT-FAITH	SP: MAX-XP	AL-R (XP, φ)	HEADED-NESS	PS: DEP-ω
a.►	φ(ω Tim) φ (σəs ωleaving)					
b.	φ(ω Tim) φ (ωìs ωleaving)					*

So far, the correspondence-theoretic MAX-XP and the traditional MATCH select the same winners. In the next section, we turn to the phrase-final enclitics where the difference emerges, pointing to the advantages of MAX-XP.

5. No phrase-final enclisis

All the necessary pieces are now in place to allow us to address our main question, the impossibility of phrase-final enclisis for monoconsonantal clitics. As a reminder, we give some examples (after Anderson (2008)) of the phenomenon in (36).

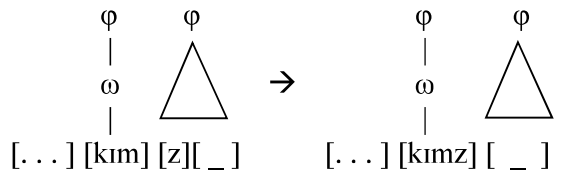
(36) a. Tim's happier than Kim is/*'s __. John is taller than Harry is/*'s __.
b. Freddie's a werewolf this year for Halloween. Do you know what Tommy is/*'s __(this year for Halloween)? Tommy has been a werewolf more often than Freddie has/*'s __(on Halloween).
c. John has known Mary longer than Fred 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 ìs/*'s.

Selkirk (1996: 198, fn. 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 (2008) observes that the TP's in (37a-c) are wellformed, but not the TP consisting just of the monoconsonantal (37d). This is in itself unremarkable since it holds for basic syllabic reasons.

(37) 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 (38), is also not a way out.

(38)



Taking up an idea first raised by Selkirk (1984: 366), Anderson's (2008: 11) insight is to interpret the impossibility of the move in (38) 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 (39), and will later derive it from Syntax-Prosody Correspondence Theory.

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

This is similar to the ban on prosodic vacuity 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 wrongly selected as the winner in (40b) since MAX-XP is ranked too low to prevent this.

(40)

a. Tim's leaving if $_{NP}$[Kim] $_{TP}$[is__]		HEADED-NESS	SP: MAX-XP	ALIGN-R (XP,φ)	PS: DEP-ω
correct ►	$_{\varphi}$(Kim) $_{\varphi}$($_{\omega}$ìs)				*
	$_{\varphi}$(Kim) $_{\varphi}$ ($_{\sigma}$əs)	*			
	$_{\varphi}$($_{\omega}$ Kim $_{\omega}$ìs)		*$_{TP}$	* $_{NP}$	*
	$_{\varphi}$($_{\omega}$Kim $_{\sigma}$əs)		*$_{TP}$	* $_{NP}$	
b. Tim's leaving if $_{NP}$[Kim] $_{TP}$['s _]					
wrong ►!!!	$_{\varphi}$(Kim's) Ø		*$_{TP}$	*$_{NP}$	
	$_{\varphi}$(Kim) $_{\varphi}$('s)	*			

There are several ways to derive the correct outcome; here we pursue the *Allomorph Priority* approach, where /is/ and /'s/ compete with each other as different allomorphs of the same input morpheme.[4] The important point is that a purely existential Syntax-Prosody Correspondence constraint is needed which requires only the existence of a correspondent, such as SP:MAX-XP, and not a constraint such as MATCH-PHRASE that demands at the same time exact correspondence.

6. Allomorph priority

In *allomorph priority*, all allomorphs enter the same competition, so /is/ and /'s/ are allomorphs of one morpheme that compete with each other in the same derivation, and ceteris paribus the second beats the first. PRIORITY (Mascaró (1996)) (or some economy constraint), preferring /'s/ to /is/, is fulfilled by candidates with enclitic *'s* (e.g., *Kim's*) but violated by

[4] For an alternative approach using M-PARSE, see Ito and Mester (2018), where the Ø-output emerges as the correct winner.

candidates with reduced and nonreduced vowels. Optionality arises through lack of ranking between two constraints, here shown by ALIGN-R (XP,φ) >> PRIORITY in (41a), and PRIORITY >> ALIGN-R (XP,φ) in (41b).

(41) *<I wonder if> Kim is/'s leaving.*

a.	NP[Kim]	TP[is/'s leaving]	HEADED-NESS	SP: MAX-XP	ALIGN-R (XP,φ)	PRIORITY: 's > is	PS: DEP-ω
►	φ(ωKim)	φ(σəs ωleaving)				*	
	φ(ωKim)	φ(ωìs ωleaving)				*	*
	φ(ωKim's)	φ(ωleaving)			*NP		

b.	NP[Kim]	TP[is/'s leaving]	HEADED-NESS	SP: MAX-XP	PRIORITY: 's > is	ALIGN-R (XP,φ)	PS: DEP-ω
	φ(ωKim)	φ(σəs ωleaving)			*		
	φ(ωKim)	φ(ωìs ωleaving)			*		*
►	φ(ωKim's)	φ(ωleaving)				*NP	

Sentences with gaps, however, incur SP:MAX violations, so the competition is over before allomorph variation arises, as shown in (42), where the outcome is *Kim ìs* with either ranking.

(42) *<Tim's leaving if> Kim is/*'s.*

a.	NP[Kim]	TP[is/'s _]	HEADED-NESS	SP: MAX-XP	ALIGN-R (XP,φ)	PRIORITY: 'S > IS	PS: DEP-ω
►	φ(ωKim)	φ (ωìs)				*	*
	φ(ωKim)	φ (σəs)	*				
	φ(ωKim's)			*TP	*NP		

b.	NP[Kim]	TP[is/'s _]	HEADED-NESS	SP: MAX-XP	PRIORITY: 'S > IS	ALIGN-R (XP,φ)	PS: DEP-ω
►	φ(ωKim)	φ(ωìs)			*		*
	φ(ωKim)	φ (σəs)	*				
	φ(ωKim's)			*TP		*NP	

High-ranked MAX-XP correctly predicts the sole winning candidate, and phrase-final *Kim's* is not a possible outcome.

Since allomorph priority is crucial in this explanation of the impossibility of phrase-final enclisis, it is reasonable to ask whether adding it to the approach in standard Match Theory will also solve the problem. In order to derive the *is/'s* variation for sentences like *Kim is/'s leaving*, MATCH-PHRASE (preferring *is*) and PRIORITY (preferring *'s*) must be unranked, so that both outputs are admitted as winning candidates, as shown in (43), just as the correspondence-theoretic MAX-XP analysis in (42).

(43) *<I wonder if> Kim is/'s leaving.*

a.	NP[Kim]	TP[is/'s leaving]	HEADED-NESS	MATCH-PHRASE	PRIORITY: 'S > IS	MATCH-ω
►	φ(ωKim)	φ(σəs ωleaving)			*	
	φ(ωKim)	φ(ωìs ωleaving)			*	*
	φ(ωKim's)	φ(ωleaving)		*NP *TP		

b.	$_{NP}$[Kim] $_{TP}$[is/'s leaving]	HEADED-NESS	PRIORITY: 'S > IS	MATCH-PHRASE	MATCH-ω
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$($_{\sigma}$əs $_{\omega}$leaving)		*		
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$($_{\omega}$ìs $_{\omega}$leaving)		*		*
►	$_{\varphi}$($_{\omega}$Kim's) $_{\varphi}$($_{\omega}$leaving)			*$_{NP}$ *$_{TP}$	

The problem is that, with the same unranked constraints, phrase-final '*s* again emerges as the wrong winner with the ranking in (44b).

(44) <*Tim's leaving. I wonder if*> *Kim is/*'s.*

a.	$_{NP}$[Kim] $_{TP}$[is/'s _]	HEADED-NESS	MATCH-PHRASE	PRIORITY: 'S > IS	MATCH-ω
correct ►	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\omega}$ìs)			*	*
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\sigma}$əs)	*			
	$_{\varphi}$($_{\omega}$Kim's)		*$_{NP}$ *$_{TP}$		

b.	$_{NP}$[Kim] $_{TP}$[is/'s _]	HEADED-NESS	MATCH-PHRASE	PRIORITY: 'S > IS	MATCH-ω
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\omega}$ìs)		*		*
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\sigma}$əs)	*	*		
wrong► !!!	$_{\varphi}$($_{\omega}$Kim's)			*$_{NP}$ *$_{TP}$	

Different from the correspondence-theoretic MAX-XP analysis in (42), the unintended variation continues with the MATCH-PHRASE analysis. One might surmise that the situation would improve by adding ALIGN-R unranked with PRIORITY (just as in the successful MAX-XP analysis in (42)), and indeed it does, with Match-Phrase blocking phrase-final enclisis in (45b) *… *if Kim's.*

(45) <*Tim's leaving. I wonder if*> *Kim is/*'s.*

a.	$_{NP}$[Kim] $_{TP}$[is/'s _]	HEADED-NESS	MATCH-PHRASE	ALIGN-R (XP,φ)	PRIORITY: 'S > IS	MATCH-ω
►	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\omega}$ìs)				*	*
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\sigma}$əs)	*				
	$_{\varphi}$($_{\omega}$Kim's)		*$_{NP}$ *$_{TP}$	*$_{NP}$		

b.	$_{NP}$[Kim] $_{TP}$[is/'s _]	HEADED-NESS	MATCH-PHRASE	PRIORITY: 'S > IS	ALIGN-R (XP,φ)	MATCH-ω
►	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\omega}$ìs)			*		*
	$_{\varphi}$($_{\omega}$Kim) $_{\varphi}$ ($_{\sigma}$əs)	*		*		
	$_{\varphi}$($_{\omega}$Kim's)		*$_{NP}$ *$_{TP}$		*$_{NP}$	

But now there is no variation in the winner in (46) either, even when the enclitic is not phrase-final. The reason is that the desired winner still violates MATCH-PHRASE, which is violated both by $_{\varphi}$($_{\omega}$*Kim's*), which does not exactly match $_{NP}$[*Kim*], and by $_{\varphi}$($_{\omega}$*leaving*), which does not exactly match $_{TP}$[*'s leaving*].

(46) *<I wonder if> Kim is/'s leaving.*

a. NP[Kim] TP[is/'s leaving]	HEADED-NESS	MATCH-PHRASE	ALIGN-R (XP,φ)	PRIORITY: 's > IS	MATCH-ω
► φ(ωKim) φ(σəs ωleaving)				*	
φ(ωKim) φ(ωìs ωleaving)				*	*
φ(ωKim's) φ(ωleaving)		$*_{NP}$ $*_{TP}$	$*_{NP}$		

b. NP[Kim] TP[is/'s leaving]	HEADED-NESS	MATCH-PHRASE	PRIORITY: 's > IS	ALIGN-R (XP,φ)	MATCH-ω
► φ(ωKim) φ(σəs ωleaving)			*		
φ(ωKim) φ(ωìs ωleaving)			*		*
φ(ωKim's) φ(ωleaving)		$*_{NP}$ $*_{TP}$		$*_{NP}$	

If MATCH-PHRASE was defined as purely existential, then there would be no violation of MATCH- PHRASE in (46), and we would get variation, but that is exactly what correspondence theoretic MAX-XP already does.

Conclusion and factorial typology

In conclusion, we have shown that by insisting that syntactic constituents must in some form be matched in prosody, the theory developed here 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 literally be part of Correspondence Theory and have a purely existential force, and merely insist on the existence of a prosodic correspondent to a syntactic phrase. They are part of Faithfulness Theory: SP-Faithfulness (MAX and DEP). Detailed correspondence falls to other standard alignment and faithfulness constraints.

In separating MATCH itself from the details of syntax-prosody correspondence, the theory argued for here has some similarities to the two-stage view of prosodic structure formation couched in Minimalism developed in Selkirk and Lee (2015), Selkirk (2017), and Kratzer and Selkirk (2018), which distinguishes a phase-based "Spell-Out-by-Match" from the phonology proper, and incorporates prosodic structure faithfulness constraints, in a division of labor reminiscent of the proposal made here. We couch our proposal within classical parallel OT for three reasons. First, we have not encountered any evidence for the need for a serial theory, and the parallelism of classical OT appears to be the simplest and therefore best choice. Secondly, Cheng and Downing (2012) have raised grave doubts about the sheer feasibility of a phase-based "spell-out" conception of the syntax-prosody mapping (on the basis of data from Bantu), whereas a standard alignment-based mapping accounts for all the data straightforwardly. Thirdly, a feed-forward phase-based "Spell-Out-by-Match" does not have the means to perform the kind of bidirectional simultaneous optimization that we have seen at work in our proposal, where SP:MAX constraints directly compete with PS-DEP constraints.

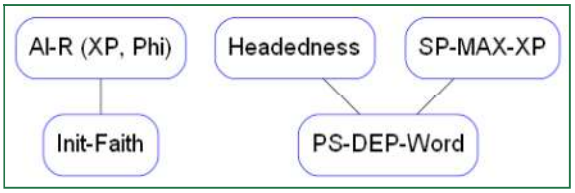
Finally, we assess the predictions of our constraint system by studying its factorial typology, as produced in *OTWorkplace* (Prince et al. (2015)). Since the full analysis, with PRIORITY, results in a typology with 17 languages which is too large to analyze here, we restrict ourselves to the core of the system consisting of the five constraints in (47), and the representative inputs in (48).

(47)	INIT-FAITH	The beginning of a (minimal) prosodic word is faithful to the beginning of the corresponding lexical word.
	SP:MAX-XP	A syntactic phrase is matched by a corresponding phonological phrase.
	AL-R (XP, Φ)	The right edge of a syntactic phrase corresponds to the right edge of a phonological phrase.
	HEADEDNESS	A prosodic category at level *i* immediately dominates a head at level *i-1* or *i*.
	PS:DEP-ω	A prosodic word corresponds to a lexical word.

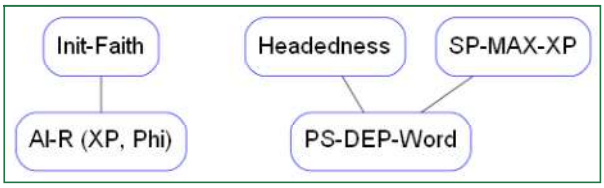
(48) Inputs:
a. [[Ray] [can]] / *I can eat more than __*
b. [[Ray] [is]] / *I don't know where __*
c. [[Tim] [is leaving]]
d. [[Tim] ['s leaving]]
e. [look [at __]] / *What did Mary __*

The typology contains the six languages in (49).

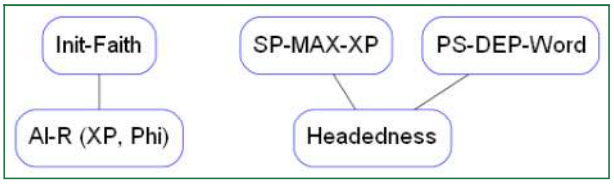
(49) <u>Lg#1</u>
a. φ(φ(ωRay) φ(ωcàn))
b. φ(φ(ωRay) φ(ωìs))
c. φ(φ(ωTim) φ(σəs ωleaving))
d. φ(φ(ωTim's) ωleaving)
e. φ(ωlook φ(ωàt))



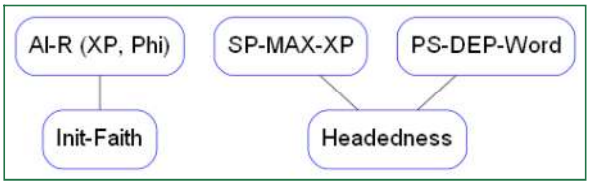
<u>Lg#2</u>
a. φ(φ(ωRay) φ(ωcàn))
b. φ(φ(ωRay) φ(ωìs))
c. φ(φ(ωTim) φ(σəs ωleaving))
d. φ(φ(ωTim) φ(ω'sleaving))
e. φ(ωlook φ(ωàt))



<u>Lg#3</u>
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))

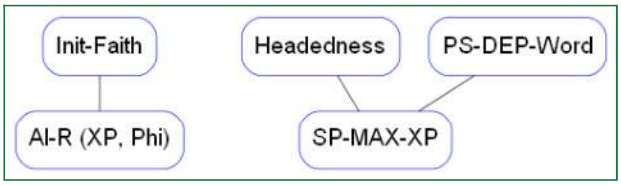


<u>Lg#4</u>
a. φ(φ(ωRay) φ(σcən))
b. φ(φ(ωRay) φ(σəs))
c. φ(φ(ωTim) φ(σəs ωleaving))
d. φ(φ(ωTim) φ (ω'sleaving))
e. φ(ωlook φ(σət))



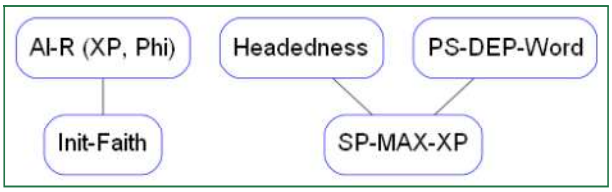
Lg#5

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)



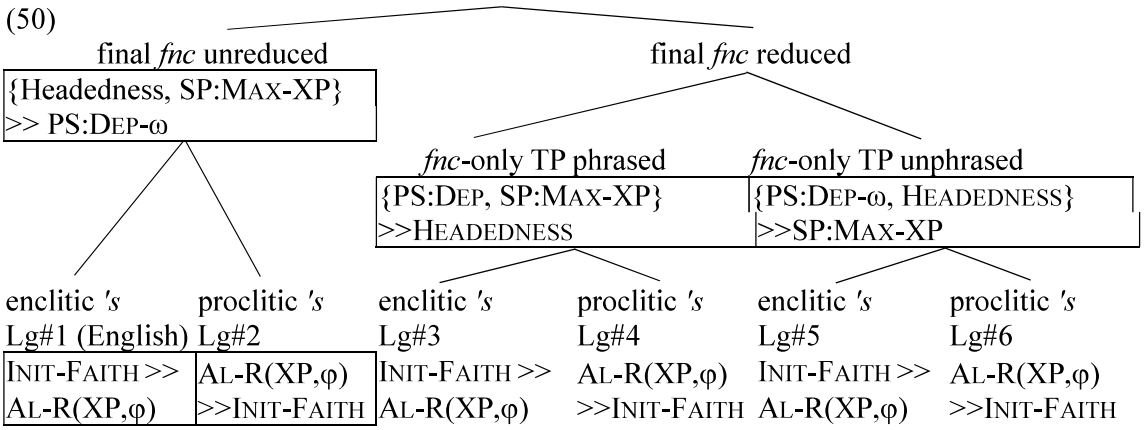
Lg#6

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 typology has the rather simple structure depicted in (50).

(50)



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 (48d), violating word-initial positional faithfulness, which ranks below MAX-XP. 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 (MAX-XP, DEP-ω >> HEADEDNESS). Monoconsonantal *'s* is either enclitic (Lg#3) or proclitic (Lg#4), depending on the relative ranking of INIT-FAITH and ALIGN-R(XP,φ). Lg#5 and Lg#6 show reduced final *fnc* by leaving the *fnc*-only TP unphrased (HEADEDNESS, DEP-ω >> MAX-XP). Again, monoconsonantal *'s* is either enclitic (Lg#5) or proclitic (Lg#6), depending on the ranking of INIT-FAITH and ALIGN-R(XP,φ).

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.

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