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PW-REC as the result of the interfaces

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1. Setting the stage

▪ TOPIC: Recursion in prosodic phonology with special emphasis on the *Prosodic Word*.

▪ THE PROBLEM: Unclear under which conditions and why recursive structures arise in prosodic systems.

- No recursivity below the PW; Recursivity is limited to PW and PPhs.
- No recursivity in phonology at all (Jackendoff & Pinker 2005; Pinker & Jackendoff 2005).

▪ PROPOSAL:

✓ Recursion is not an inherent property of phonology but arises by the *mirroring* of recursive structures at the morphosyntactic level.[1]

(See also Kaye's (1974) *Morphological Recoverability* and van Oostendorp's (2002, 2006) *Principle of Integrity*.)

✓ Recursive structures are created by the extension of an already existing prosodic constituent, yielding a two-segment prosodic category.

✓ This "extended" constituent exhibits an ambiguous behavior because (a) it inherits the properties of its mother (head category), and (b) being a new entity, it may develop properties of its own (especially in the context of rhythmic re-adjustment rules).

✓ Main prosodic constituents that mediate the morphosyntax-phonology interface are the *Prosodic Word* (PW) and the *Phonological Phrase* (PPh), and hence REC is restricted to these levels.

▪ FOCUS: PW-REC substantiated with evidence from Greek and Turkish.

Organization of the paper:

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[1] This is essentially the view proposed in Selkirk (1995) where the variety of PW structures falls out either from different constraint rankings (i.e., grammars) or from differences in morphosyntactic structures.

2. Some background on PW and PW-REC

▪ The *Prosodic Hierarchy* (Selkirk 1980a,b; 1981/[1978], 1986; Nespor and Vogel 1982, 1986; Hayes 1989/[1984])) as an answer to the *Direct-Syntax Approach* (Kaisse 1983, 1985, 1990; Chen 1990; Odden 1987, 1990, a.o.)

→ **Non-isomorphism** between the morpho-syntactic and phonological component.

▪ *Strict Layer Hypothesis*: … > PW > Clitic Group > …

The ClGr (Nespor & Vogel 1986; Vogel 1988 et seq.; Hayes 1989 (/[1984])) was proposed to accommodate the application of several phonological rules that extended beyond the PW.

(For empirical and theoretical problems on the ClGr, see Booij 1988, 1995, 1996; Peperkamp 1997, Vigario 1999, 2003, a.o.).

▪ *Weak Layer Hypothesis*: … > PW (> PW-REC) > PPh (> PPh-REC) > …

(Itô & Mester 1992, 2007, in press; Selkirk 1995, 2000; Booij 1988, 1995, 1996, Peperkamp 1997; Hall 1999a,b; Vigário 1999, 2003, a.o.)

▪ Main motivation for PW-REC: (a) various types of enclitic – proclitic asymmetries; (b) level of clitic adjunction, i.e. PW and PPh (Inkelas 1989; Inkelas & Zec 1990), (c) "extended" domain of application of phonological rules and optionality, and so on.

☒ The **PHONOLOGICAL ARGUMENT**: Blocking or optional application of a PW-level phonological process.

In Dutch proclitics are parsed into a PW-REC structure with their host comes as evidenced by prevocalic schwa deletion (1), a PW-rule which is bloacked across PWs. Crucially, it is not enforced in proclitic plus host strings, (2).[2]

→ Booij (1996): Blocking of schwa deletion in this environment suggests that the proclitic recursively adjoins to its host, as shown in (2). As such, the left edge of the innermost PW serves as a buffer to block the application of the deletion rule in question.

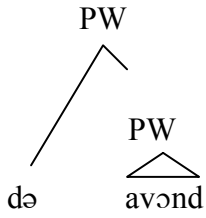
(1)	a.	/romə-ein/	[romɛin]	'Roman'	(Booij 1996: 226)
	b.	/haldə ık/	[haldık]	'fetched I'	

(2) /də avɔnd/ [də avɔnt]/*[davɔnt] 'the afternoon' (Booij 1996: 231)

☞ Rule blocking signals a REC structure.

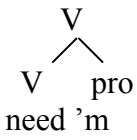
[2] Dutch clitics have been the topic of investigation of many researchers (Berendsen 1983; Gussenhoven 1985; among others). Recently, Grijzenhout and Krämer (2000) proposed an analysis where clitics are parsed by the PPh.

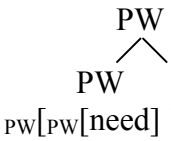
(3) *Recursive PW in Dutch proclisis*



▪ The **MORPHOSYNTACTIC ARGUMENT:** Selkirk (1995: 458-460) proposes that nested syntactic structures, such as the one given in (4), are translated by phonology into a PW-REC.

(4) a. *syntactic structure* b. *phonological structure*





$_{PW}[_{PW}$[need] ’m] (cf. *Needham* $_{PW}$[nid m̩])

Recursion is imposed by syntax forcing phonology to mirror the nested morphosyntactic structure by respecting the prosodic boundaries of the lexical word, i.e., the verb.

➔ The morphosyntactic argument was not really pursued fervently in the prosodic phonology literature and, as a result, it gradually lost strength and, eventually, it was silenced.

▪ **Problems surrounding PW-REC**:

» #1. Inconsistency: The non-application of a rule has received different interpretations by different researchers. Here is an example:

- Selkirk (1995: 451-452): The failure of the PW-level rule of aspiration to apply to the initial voiceless stop in a phrase such as [[***t***]o_{σ} [*London*]$_{PW}$]$_{PPh}$ suggests that the function word in this position does not initiate a PW. Thus, it must be parsed at the level of the PPh, thereby constituting a *free clitic*.

- Booij (1995, 1996): The non-application of such a PW-level rule in similar cases is taken as evidence that the function word is adjoined to the PW forming an *affixal clitic* construction.

» #2. Phonological properties of PW-REC: Unclear what phonological behavior is assumed to be displayed by recursive structures: Should the application of a new set of rules be legitimately used to argue for recursive structures, or should it constitute evidence for the existence of another domain (e.g., CG (Nespor and Vogel 1986; Hayes 1989), or any other domain within the Prosodic Hierarchy? (See Vogel in press for a discussion.) Analyses differ on this issue.

- Peperkamp (1997) makes a crucial distinction between the innermost and the outermost PW in Neapolitan, where the latter is reserved for post-lexical allomorphy.

(5) *Stress and consonantal allomorphy in Neapolitan* (Peperkamp 1997: 177-178)

a. pɔ́rta tə ‘bring-IMP yourself’ (cf. purtátə ‘you (pl.) bring’)

b. pɔ́rtaténnə ‘bring-IMP yourself of-them…’

Summing up:
- ✓ Recursivity is primarily used in the literature to distinguish affixal clitics from free clitics.
- ✓ The primary emphasis so far has been on showing that a clitic may not be part of a PW, and the PW-REC primarily arose from a necessity to prosodify such elements.
- ✓ It is often the case that the phonological argumentation is characterized by circularity and is surrounded by a veil of vagueness. Much less attention has been paid to defining the properties associated with this constituent.

▪ Main research questions: Is recursion necessitated in phonology? And, if yes, what is the motivation for its existence? Under which conditions does the PW-REC[3] arise and, more importantly, what are its phonological properties?

3. An interface perspective on recursion

▪ **PROPOSAL**: Recursion is not an inherent property of phonology but the result of its interface with morphosyntax. Essentially, recursive morphosyntactic structures should correspond to recursive phonological structures (and vice versa).

This approach on morphosyntactically driven recursivity is on a par with Selkirk's (1995) original motivation to derive differences in phonological structure through differences in morphosyntactic representations.

> Comment: Such an isomorphism may arise in phonology at the interface with the other components of grammar and is well-attested cross-linguistically (van Oostendorp 2002, 2006; Kaye 1974). The approach undertaken here by no means cancels out the *raison d'être* of the Prosodic Hierarchy as an expression of the *Indirect Reference Hypothesis* (Selkirk 1981/ [1978]).

Basic tenets of our analysis:

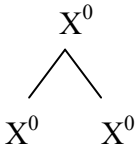
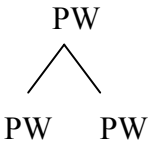
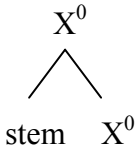
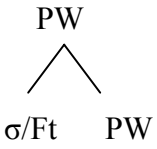
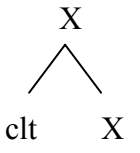
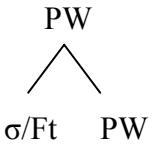
- Structures that are created outside the main lexical[4] or syntactic cycle, where the category of the whole construction is the same as one of its members, are mirrored as recursive constituents in phonology.
  Here we focus on:
  - Compound constructions where the whole construction inherits the properties of its head (6a-b).
  - Constructions that contain function words that are adjoined to syntactic heads, such as certain types of clitics (6c).[5]

[3] In OT, the constraint NONRECURSIVITY (NONREC), which militates against the propagation of recursively built prosodic structures has been employed to account – mainly via its violation – for the emergence of recursive prosodic structures. Kabak & Revithiadou (in press) show that this constraint is redundant and conceptually problematic and, more importantly, its effects can be subsumed by well-established interface constraints.

[4] This is naturally predicted by all *Lexical Phonology* models (Kiparsky 1982; Mohanan 1986; Kaisse and Shaw 1985).

[5] Under the same rubric fall also certain extra-cyclic elements such as adjunct modifiers, i.e., pieces of structure elements that are assembled parallel to the main derivation and merge with the rest of the derivation at a later stage (Uriagereka 1999; Nunes and Uriagereka 2000).

(6) *Morphosyntax-phonology mapping*

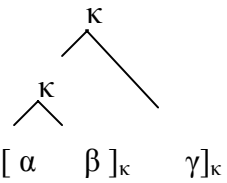
morphosyntactic structure	phonological structure
a. 	
b. 	
c. 	

- No recursion at the level of the *foot* or the *syllable* since the interface gives us primarily two main sites: the PW and the PPh.

- No need for the constraint NONREC: We achieve the 'mirroring' effect through the use of well-established interface constraints such as ALIGNMENT and WRAP (McCarthy and Prince 1993; Selkirk 1995; Truckenbrodt 1995, 1999) which all together strive for grouping X^0 as PWs. These constraints, along with LAYEREDNESS, HEADEDNESS, and especially EXHAUSTIVITY (Selkirk 1995) can derive all the attested prosodic structures without the necessity for NONREC.

- Phonological properties of PW-REC: We assume that recursion at the morphosyntactic level creates a two-segment category that corresponds to an innermost and an outermost phonological layer at the PF, as shown in (7).

- The outermost layer inherits properties of the mother constituent which may reiteratively or optionally apply within that layer of structure. Metrical calculations may be sensitive to this extra layer of structure, leading to the development of rhythmic structure building/ re-adjustment rules strictly associated with the PW-REC.

(7) 

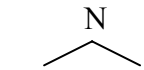
☒ Focus here is on the lowest interface site, namely the PW. The structures we explore come from roughly two morphosyntactic processes, compounding and cliticization.

4.1. Compounds forming recursive PWs

We first explore various types of composite constructions in Turkish and Greek that essentially project an X^0 bearing the same category label as at least one of its sisters, a

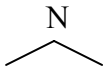
precursor for prosodic recursion in our approach. In Turkish, for instance, these constructions are nominal compounds containing bare nouns (8).[6]

(8) *Mapping of [[N+N]$_N$] compounds yielding [[N]$_{PW}$ [N $_{PW}$]$_{PW\text{-}REC}$*



kírk	*ayak*	'centipede'
fourty	foot	

(9) *Mapping of [stem [N]$_N$] compounds yielding [[stem [N]$_{PW}$]$_{PW\text{-}REC}$*



ner	*-o-*	*bojá*	'water-color'
water		color	

Under our approach, all such constructions should automatically be mapped onto recursive PWs at the phonological level due to high ranked interface constraints, namely WRAP defined in (11) and ALIGN-LEX. The tableau in (11) shows how these constraints evaluate a set of output forms.

(10) WRAP: Each X^0 is contained in a PW (Truckenbrodt 1995, 1999; Peperkamp 1997).

(11)

$[X^0\ X^0]X^0$	WRAP	ALIGN-LEX	EXH
a. $[X^0\ X^0]_{PW}$		**	
b. $[[X^0]_{PW}\ [X^0]_{PW}]_{PPh}$	*!		
☞ c. $[[X^0]_{PW}\ [X^0]_{PW}]_{PW}$			
d. $[[X^0]_{PW}\ X^0]_{PW}$		*!	
e. $[[X^0]_{PW}\ X^0]_{PPh}$	*!	**	*

WRAP ensures that every X^0, regardless of whether it is the lowest or the highest in the tree, is contained in a PW.

4.2. Function words forming PW-REC with their host

The Greek pronominal system has a set of weak forms of pronouns which are prosodically dependent on an adjacent host and constitute clitic elements. In Standard Greek, they always precede the non-imperative verb form which serves as their prosodic host (12a). With imperative forms and gerunds, however, they are always postverbal (12b).

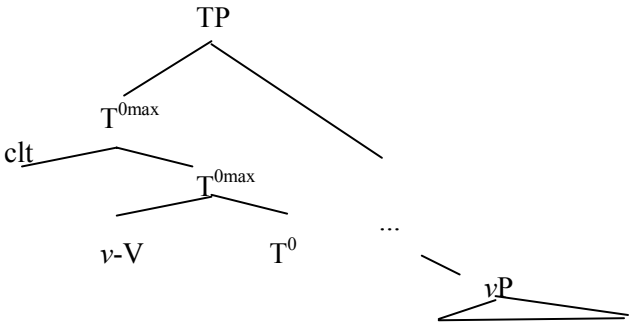
[6] Nominal compounds that are created via the so-called "compound marker" (N+N-CMPM) structurally resemble Genitive-Possessive constructions, which are truly syntactic phrases (see Kornfilt 1984: 62-66; Kabak & Vogel 2001: 349-351). Since such compounds appear to be "phrasal" in nature and behave like phonological phrases in the context of syllabification facts, they most likely constitute Phonological Phrases. It should be noted however that such compounds exhibit the leftmost compound stress pattern instead of phrasal stress. This atypical behavior begs for further research.

(12) a. mas málose
CLT-1.PL.GEN scold-PAST.3.SG
'S/he scolded us.'

b. ðóse tó mu
give-2.SG.IMP CLT-3.NT.SG.ACC CLT-1.M.SG.GEN
'Give it to me!'

Philippaki-Warburton and Spyropoulos (1999) have shown that object clitic pronouns do not have the properties of affixes.[7] They rather behave as the arguments proper of the clause and participate in certain syntactic operations. The distribution of object clitics with respect to the verb form is derived by means of a cliticization movement rule, as shown in (13) (Philippaki-Warburton and Spyropoulos 1999; Philippaki-Warburton et al. 2004).

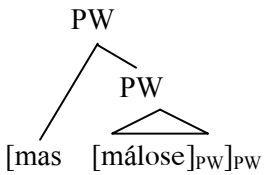
(13) *Syntactic structure of proclitic object pronouns in Greek*



'S/he scolded us.'

Cliticization does not extend the structure, but rather creates a recursive syntactic constituent which contains the clitic and the functional category that hosts the verb form. This is translated in the phonology as a recursive PW:

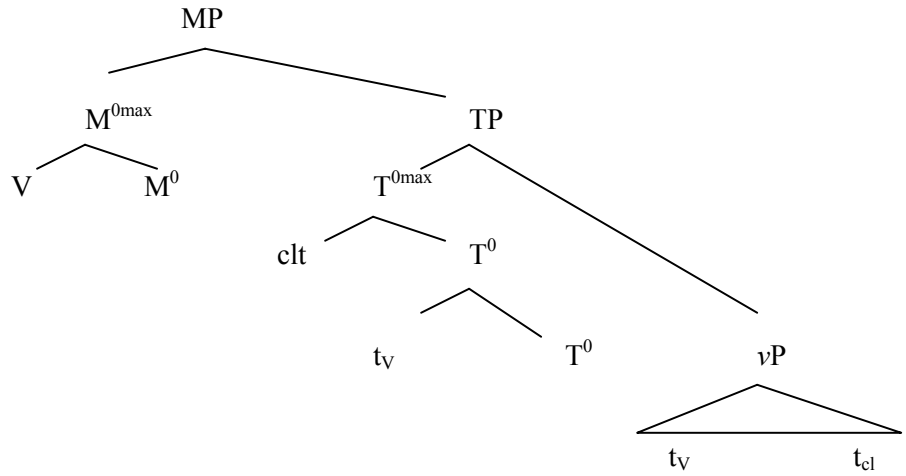
(14) *Prosodic structure of proclitic object pronouns in Greek*



Object clitics follow the imperative verb forms results from the morphosyntactic licensing of the imperative mood in Greek. The imperative is the only affixal mood in Greek, hence it requires the overt movement of the verb form to a Mood functional head above the T head (Philippaki-Warburton 1998, among others):

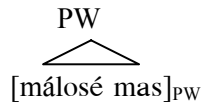
[7] For a different view on the issue see Joseph (2003) and Condoravdi and Kiparsky (2001).

(15) *Syntactic structure of enclitic object pronouns in Greek*



Object clitics are left behind by the movement of the verb to the c-commanding Mood head and, consequently, they belong to its complement domain.

(16) *Prosodic structure of enclitic object pronouns in Greek*



☒ **Expectation**: Since enclitics are not adjuncts, they should not be expected to be parsed at the outer layer of the PW any more.

☑ This expectation is indeed met since enclitics, unlike their proclitic counterparts, are incorporated into the PW of their verbal host.

Phonological arguments for (15) and (16) are provided in Section 5.1.2.

5. Phonological properties of PW-REC

5.1. Segmental rules and optionality

5.1.1. Compounds

Greek

Greek distinguishes three types of compounds: (a) stem-word, (b) stem-stem, and (c) word-word compounds. Here we focus on the former two types, representative examples of which are given in (17) and (18), respectively.

(17) *[[STEM [WORD]] compounds* (Nespor & Ralli 1996; Nikolou 2008)

a.	/ner-o-boɣ-já/	nerobojá	<	neró, boɣiá
	water-LinkV-color.NOM.SG	‘water-color’		
b.	/xart-o-petsét-a/	xartopetséta	<	xartí, petséta
	paper-LinkV-napkin.NOM.SG	‘paper napkin’		

c. /ton-o-salát-a/ tonosaláta < tónos, saláta
tuna-LinkV-salad.NOM.SG ‘tuna salad’

d. /nixt-o-filak-as/ nixtofílakas < níxta, fílakas
night-LinV-guard.NOM.SG ‘night guard’

e. /palj-o-ɣinék-a/ paljoɟinéka < paljós, ɣinéka
bad-LinkV-woman.NOM.SG ‘lousy woman’

(18) *[[STEM STEM] SFX] compounds* (Nespor & Ralli 1996; Nikolou 2008)

a. /kukl-o-spit-o/ kuklóspito < kúkla, spíti
doll-LinkV-house-NOM.SG ‘dool-house’

b. /palj-o-ɣinek-o/ paljoɟíneko < paljós, ɣinéka
bad-LinkV-woman-NOM.SG ‘lousy woman’

c. /alat-o-piper-o/ alatopípero < aláti, pipéri
salt-LinkV-peper-NOM.SG ‘salt and pepper’

d. /nixt-o-imer-os/ nixtoímeros < níxta, (i)méra
night-LinkV-day-MASC.NOM.SG ‘the one of day and night (adj)’

✓ Stem-Word compounds: Stress on the second member.
✓ Stem-Stem compounds: Antepenultimate (APU) stress (i.e. the default stress for Greek).

→ We take this difference to be a direct reflection of their different prosodic status:

(19) *prosodic structure of Greek compounds* (Nespor & Ralli 1996)

a. [stem [word]] → [stem [word]$_{PW}$]$_{PW}$
b. [[stem stem] sfx] → [stem stem sfx]$_{PW}$

✓ The recursivity of (19a) derives from their recursive morphosyntactic status.

▪ Vowel-deletion applies within the PW, e.g. /akú-un/ → [akún] ‘listen-3PL’, /palj-o-a^{m}bel-o/ → [paljá^{m}belo]$_{PW}$ / *[paljoá^{m}belo]$_{PW}$ ‘lousy vineyard’, /kak-o-osm-os/ → [kákozmos]$_{PW}$ / *[kakóozmos]$_{PW}$ ‘bad smelling’.

The rule shows optionality in PW-REC constructions:

(20) *vowel deletion in PW-REC is optional*

a. /aɣri-o-axlað-já/ àɣrjoaxlaðjá ~ aɣrjaxlaðjá
‘wild pear tree’

b. /kolokiθ-o-anθ^-os/ kòlokiθoanθós ~ kolokiθanθós
‘zucchini flower’

c. /psevð-o-orof-í/ psèvðoorofí ~ psevðorofí
‘false roof’

▪ Nikolou (2008) shows that deletion may be enforced in both compound types but it is quantitatively preferred in compounds that form a single PW.

➔ Deletion is optional or less preferred in PW-REC.

▪ Nikolou (2008) argues that [Prefix-Word] constructions, which are also parsed in to a PW-REC, are liable to the optionality of the same V-deletion rule as well:

(21) *para-* 'next to, over'[8]

a.	/para-akriv-én-o/ 'make too costly-1SG'	pàraakrivéno ~ parakrivéno
b.	/para-akon-íz-o/ 'over-sharp-1SG'	pàraakonízo ~ parakonízo
c.	/para-eklisias-tik-ós/ 'next to ecclesiastic'	pàraeklisjastikós ~ pareklisjastikós

▪ More importantly, the REC status of the constructions in (21) is further substantiated with two additional pieces of arguments:

▪ **Argument #1**. In Greek, the augment *e-* occurs in past forms of the verb only with monosyllabic bases, /σ-/, in order to host the APU stress which is the exponent of the PAST (Spyropoulos & Revithiadou 2008):

(22)		[-perf, +past]	[+perf, +past]
ɣráfo 'to write'	1SG	a. éɣrafa	c. éɣrapsa
	1PL	b. ɣráfame	d. ɣrápsame

With larger bases, the augment is not realized:

(23)		[-perf, +past]	[+perf, +past]
ðjavázo 'to read'	1SG	a. ðjávaza	c. ðjávasa
	1PL	b. ðjavázame	d. ðjavásame

▪ Compounds which form a PW-REC show variation in the realization of the augment (24), whereas those which form a PW do not (25); the latter are never augmented because the disyllabic requirement of their base is satisfied with material from the prefix.

(24)

a.	pàraévreksa	~	parávreksa	'over-water-PAST.1SG'
b.	pàraévrasa	~	parávrasa	'over-boil-PAST.1SG'
c.	pàraéɣrapsa	~	paráɣrapsa	'write excessively-PAST.1SG'
cf. also	kùtsoéɣrapsa	~	kutsóɣrapsa	'write with difficulty-PAST.1SG' < kutsós 'lame', ɣráfo 'write'
	xàrtoépeksa	~	xartópeksa	'play cards-PAST.1SG' < xartjá 'cards', pézo 'play'

[8] See Ralli (2002) for the recursive status of *para-* and similar prefixes in Greek.

(25) a. katávreksa / *kataévreksa ‘sprinkle-PAST.1SG’
b. paráɣrapsa / *paraéɣrapsa ‘write off-PAST.1SG’

▪ **Argument #2**. Allomorphy: /σ-/+ -simo, /σσ(σ*)-/ + -ma (Malikouti-Drachman & Drachman 1989, 1995) :

(26) a. /kata-vréx-o/ [katavréxo]$_{PW}$ → katávreɣma ‘sprinkling’
b. /para-vráz-o/ [pàra[vrázo]$_{PW}$]$_{PW}$ → pàravrásimo ‘over-boiling’
c. /para-vréx-o/ [pàra[vréxo]$_{PW}$]$_{PW}$ → pàravréksimo ‘over-watering’

Turkish

▪ **Absence of consonant cluster resolution**: Consonant cluster resolution applies to morphosyntactic constructions forming a PW and a PW-REC, but not to syntactic phrases, which are arguably parsed into PPhs.

✓ *CC# (when sonority sequencing is violated)
✓ Illicit syllable types give rise to epenthesis.
✓ Syllable repair strategies are blocked when the choice of resyllabification is available.
✓ Where? When a following vowel-initial element is part of the same PW (a-examples) or PW-REC (b-examples) but crucially not when it is contained in a syntactic phrase (c-examples) in (27-29) below.

(27) a. /kayn-(s)I/ [ka**y.n**ı]$_{PW}$ ‘his/her in-law’
in.law-3POSS **kayını* (cf. *kayın, *kayn)*

b. /kayn ana/ [[ka**y.**]$_{PW}$ [**n**a.na]$_{PW}$]$_{PW}$ ‘mother-in-law’
in.law mother **kayınana*

c. /kayn eziyet-i/ [[ka**yın**]$_{PW}$ [e.zi.ye.ti]$_{PW}$]$_{PPh}$ ‘torment of an in-law’
in.law torment **kayn eziyeti*

(28) a. /kayb-(s)I/ [ka**y.b**ı]$_{PW}$ ‘his/her lost’
lost-3POSS **kayıbı* (cf. *kayıp, *kayp)*

b. /kayb et-mEk/ [[ka**y**]$_{PW}$ [**b**etmek]$_{PW}$]$_{PW}$ ‘to lose’
lost LV- INF **kayıb et*

c. /kayb adam/ [[kay**ı**p]$_{PW}$ [adam]$_{PW}$]$_{PPh}$ ‘a lost man’
lost man **kayb adam*

(29) a. /seyr-(y)A/ [se**y.r**e]$_{PW}$ ‘watching (DAT)’
registration-DAT **seyire* (cf. *seyir, *seyr)*

b. /seyr et-mEk/ [[se**y**]$_{PW}$ [**r**etmek]$_{PW}$]$_{PW}$ ‘to watch’
watching LV- INF **seyir etmek*

c. /seyr an-ı/ [[se**yir**]$_{PW}$ [anı]$_{PW}$]$_{PPh}$ ‘watching time’
watching time-CMPM **seyr anı*

5.1.2. Clitics

▪ The rule of *s*-voicing, which takes place before sonorants and voiced fricatives, applies obligatorily to the PW (30). The fact that the rule in question also applies to a domain created by the adjunction of the object clitics to a verbal host (31) suggests that this extended domain also exhibits PW-level properties, hence yielding empirical support for recursion at the PW level.

(30) a. /pros-méno/ pro**.zm**éno ‘anticipate-1SG’
b. /ɣeras-ménos/ ʝe.ra**.zm**é.nos ‘aged’

(31) a. /mas málose/
CLT-1.PL.GEN scold-PAST.3.SG
ma**z. m**álose
‘S/he scolded us.’

b. /mas ðjavázi/
CLT-1.PL.GEN read-3.SG
ma**z. ðj**avázi
‘S/he reads for us.’

✓ [z] syllabifies together with the following morphological element (affix or root) in (30).
✓ [z] is ambisyllabic in (31) since complete resyllabification is blocked between the proclitic and the verb: *maz.má.lo.se.*/ **ma.zmá.lo.se*.

▪ V-deletion applies optionally between a proclitic and its host, that is, within the PW-REC (32). The process is blocked only when the construction is produced in careful speech or is rendered with emphatic stress (33).

(32) a. mutafíni
/mu to afíni/
CLT-1.SG.GEN CLT-3.NT.SG.ACC leave-3.SG
‘S/he leaves it to me.’

b. monomázi
/me onomázi/
CLT-1.SG.ACC name-3.SG
‘S/he names me.’

c. melέŋçi
/me elénxi/
CLT-1.SG.ACC control-3.SG
‘S/he controls me.’

(33) A. Pjó íne to próvlima me ton Perséa?
‘What is the problem with Perseus?’

B. E, pjó náne? [Sinéxia me afíni]$_F$.
‘Well, what could it be? HE CONSTANTLY DUMPS ME.’

Summing up:
- ✓ PW-rules are also observed in the outermost domain although there may be some level of optionality involved due to other reasons such as focus, sentence stress, as well as the type of register.
- ✓ *None* of these segmental rules are specific to this domain. Since we are dealing with an extended domain, hence an extra layer of metrical structure, it is only natural that the inherited properties may show a lesser degree of pertinacity.[9]

☒ The domain we claimed to be the PW-REC induces special rhythmic phenomena → Evidence for the CG or the *Composite Group* (Vogel 2008)?

☑ No, this is only epiphenomenal, and crucially arises from the way in which the rhythmic algorithm interprets the extra layer of structure associated with the PW-REC. Another related factor is also the length of the resulting constituent, which often calls for further prosodic organization by means of footing, for instance.

To the best of our knowledge, the recursive domain does not induce any unique segmental rules in the languages under examination, as well as cross-linguistically.

5.2. Rhythmic structure-building and re-adjustment rules: Unique PW-REC processes?

Here we demonstrate that the extended PW domain may show spurious metrical structures or serves as a domain where special rhythmic re-adjustment processes take place.

5.2.1. Compounds

Turkish

Compounds in Turkish contrast with corresponding GNPs since non-primary stress is conflated in the PW-REC domain:

(34) *Leftmost prominence in Turkish nominal compounds*

a. kírk ayak ‘centipede’

*		PPh
*		PW-REC
*	*	PW
kırk	ayak	

▪ In cases where two (lexical) stresses are contained within a morphological word, the leftmost one always wins (e.g., /Ávrupa-lı-laş-árak/→ [Ávrupalılaşarak] ‘by becoming European’).

[9] Unique segmental rules are hard to attest in a constituent between the PW and the PPh, which in turn makes it difficult to substantiate the CG (Nespor and Vogel 1986; Hayes 1989(/[1984]).

b. kírk ayàk ‘forty feet’

* PPh
* * PW
kırk ayak

Greek

▪ Optional development of secondary stress (due to *LAPSE-LEFT):

(35) a. àrxondoʝinéka ‘classy woman’
b. mèɣaloapateónas ‘big crook’
c. pàraakrivéno ‘make too costly-1SG’

5.2.1. Clitics

In several varieties of Greek, especially those spoken in Northern Greece, a sequence of proclitics are long enough to be footed and hence to develop secondary/rhythmic stress:

(36) *Rhythmic stress in proclitics*
a. (mù to) ðjavázi
/mu to ðjavázi/
CLT-1.SG.GEN CLT-3.NT.SG.ACC read-3.SG
‘S/he reads it to me.’

b. (màs tuz) ðjaléʝi
/mas tus ðjaléɣi/
CLT-1.PL.GEN CLT-3.M.SG.ACC choose-3.SG
‘S/he chooses them for us.’

c. (màs tuz) maʝirévi
/mas tus maɣirévi/
CLT-1.PL.GEN CLT.3.M.SG.ACC cook-PAST.3.SG
‘S/he cooks them for us.’

✓ It looks like this rhythmic stress is a unique property of the extended constituent but its triggering force should be sought in the binarity of the adjoined material.

6. Why PW-REC?

▪ Can we dispense with PW-REC?

▪ Gouskova & Roon (2008): In Russian, compounds have two prominences (one for each stem). In high frequency compounds, both prominences surface provided higher ranked rhythmic conditions of the system are not violated.

(37)

/rabót-, -o-, sposób-, nostʲ/	STEM → PROM	ER-L	MAX
☞ a. rabòt-o-sposóbnostʲ		*	
b. rabot-o-sposóbnostʲ	*!	*	*

Stem prominence is always preserved in low frequency compounds as a cue of their morphological complexity.

Applying this analysis to Turkish, we get the desired leftmost prominence in compounds:

(38)

/kırk ayak/	STEM → PROM	ER-L
☞ a. kírk ayak	*	
b. kırk áyak	*	*!

▪ Problem 1: If a compound forms a single prosodic word, then for word-internal phonological processes, reference to stems must be made.

✓ Turkish: Hiatus resolution by means of *vowel assimilation* (VA), which is an optional process (Kabak 2007). Within words, VA is from left to right:

(39)	a.	sağır	→	saır ~ saːr / *sıːr	'deaf'
	b.	yoğurt	→	yourt ~ yoort / *yuurt	'yogurt'

But in compounds, the direction of assimilation changes and applies from right-to-left (regardless of the frequency of the compound):

(40)	a.	yirmí altí	yirmáaltı
		twenty # six	'twenty-six'
	b.	Asĺı ablá	Asláabla
		Aslı # elderly-sister	'sister Asli'

The change of directionality in the application of VA does not pertain to directionality per se, but rather to *positional faithfulness* (Beckman 1997, 1998): Elements in PW-initial position remain faithful to their featural specification thus causing the preceding vowel to assimilate. Under the alternative approach, faithfulness to the initial syllable of the second stem must be invoked.

▪ Problem 2:

✓ Greek Stem – Stem compounds exhibit APU stress → Avoidance of stem stress.

✓ Stem – Word compounds, however, exhibit APU and lexical stress and optional rhythmic stress on their first member, a pattern commonly attested – under certain conditions - in other post-lexical constructions (e.g. clitics) as well. Furthermore, the second element in this type of compounds has clearly PW properties, as shown by the stress pattern of the whole construction as well as by the behavior it exhibits with respect to the prosodic allomorphy rules discussed above. (See examples *kùtso-éɣrapsa ~ kutsóɣrapsa* 'write with difficulty-PAST.1SG' in (26)).

→ In Greek compounds, stems do not project their prominence unless they form a word. Moreover, the development of secondary/rhythmic stress is a property of all constituents that form a PW-REC, and not just of stems.

7. Conclusions

✓ Recursion is not an inherent property of phonology but the result of its interface with morphosyntax. By definition then, recursion is only confined to the level of the PW and the PPh since these are the main interface sites.

✓ We reviewed different instantiations of recursivity in the prosodic phonology literature and highlighted various conceptual and functional issues related to the notion of recursivity.

✓ An in-depth examination of two typologically distinct languages, namely Turkish and Greek, revealed that inherently recursive morphosyntactic structures give rise to 'extended' PW whose phonological reflections reincarnate segmental as well as prosodic phenomena observed at the level of the PW.

✓ Our analysis also accounted for the 'left-right asymmetry' problem (e.g., proclitics vs. enclitics in Greek), which is shown to be born out from an asymmetry at the relevant morphosyntactic representations.

✓ Finally, we have shown that the PW-REC is necessary in order to account for various processes that take place in compounds and cannot be adequately accounted for by mere reference to the notion of stem.

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