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M. Rita Manzini and Leonardo M. Savoia

Which syntactic information gets interpreted by phonosyntactic processes? Evidence from /u/ propagation in Southern Italian dialects

We address the classical problem of the relation between syntax and phonology starting from the view that phonology, as an interpretive component, works together with morphology and the lexicon as an externalization device (Berwick & Chomsky 2011). We consider a set of phonosyntactic phenomena (i.e. syntactically conditioned phonological phenomena), involving the spreading of /u/ and the preservation of final *-a* in some Southern Italian varieties. In section 1 we review the data concerning the phonology of /u/ propagation and the syntactic conditions placed on it – as well as treatments suggested for phonosyntactic phenomena within the minimalist framework. In section 2, after providing a phonological analysis within the framework of Savoia (this volume), we argue that the fine variation observed in phonosyntactic contexts of /u/ propagation requires the externalization component to read syntactico-semantic representations. In section 3 we provide a comparison with syntactic conditions on a different phonological process in the same dialects, final *-a* preservation, and draw some conclusions as to the nature of parametrization.

1 Variation in /u/ propagation and theoretical background

1.1 Empirical evidence

Harmonic processes between the pre-tonic vowel and the stressed vowel involving the [I]/[U] elements are observed in many varieties of the Abruzzi, Lucania, Northern Calabria, and Central Sicily (Tuttle 1985; Savoia 1987). These processes apply word internally, as well as in phonosyntactic contexts (Rizzi & Savoia 1993). Descriptively, propagation is the result of the spreading of [U] properties from an unstressed nucleus to the stressed nucleus (or [a] vowel) immediately to the right.

In *Saracena*, unstressed [u] spreads to underlying stressed /a/ to its right in open syllable, when the two nuclei are next to one other, yielding [ɔ:], for instance word internally in (1a). In (1b) underlying /a/ in open syllable has a long palatalized outcome, namely [ɛ:], in the absence of harmony. Stressed vowels other than /a/ are not affected, e.g. [i:] in (1c). The same phonological conditions hold in the phonosyntactic domains *Determiner-Noun* in (2) and *Clitic-Verb* in (3). Phonologically, (3c) shows that [a] is preserved in closed syllable. A stressed antepenultimate [a] is not affected either, as in (3d) – nor is an unstressed [a], as in (3e).

- | | | | | |
|--------|------------------|-------------------------|------------|-------------------|
| (1) a. | [stu'tɔ:mə] | '(we) put out' | | |
| | [stu'tɔ:və] | '(I) put out' | | |
| | b. [ca'mɛ:mə] | '(we) call' | | |
| | [ca'mɛ:və] | '(I) called' | | |
| | c. [mu'ri:mə] | '(we) die' | | |
| (2) a. | [u'pɔ:nə] | 'the bread' | b. [pɛ:nə] | 'bread' |
| | [u'nɔ:sə] | 'the nose' | [nɛ:sə] | 'nose' |
| (3) a. | [u'fɔ:jə] | '(you) it do' | b. [fɛ:jə] | '(you) do' |
| | [u'cɔ:mə] | '(I) it call' | [a'cɛ:mə] | '(I) it(f.) wash' |
| | c. [u/a'fattsə] | '(I) it(m./f.) do' | | |
| | d. [u/a'camənə] | '(they) it(m./f.) call' | | |
| | e. [u fa'tfi:mə] | '(we) it do' | | |
| | [u ca'mɛ:mə] | '(we) it call' | | |

Saracena

In *Cerchiara* in (4)–(6), phonological conditions are less restrictive than in *Saracena*. Harmonic spreading of pre-tonic /u/ to stressed syllable yields diphthongs (or sequences) such as [ua], taking place both in open and in closed syllable, and independently of penultimate or antepenultimate stress, cf. the (a) examples. Stressed nuclei different from /a/ may also be involved, cf. [uɛ] in (6a) or [ui] in (6b), excluding however nuclei resulting from metaphony, e.g. [i] in (4c), (5c). Harmonic spreading does not take place on unstressed nuclei, cf. (4b), (6c). Word-internal contexts are illustrated in (4), phonosyntactic contexts D-N in (5), and phonosyntactic contexts Cl-V in (6).

- | | | |
|--------|----------------|-----------------|
| (4) a. | [fuku'ɣuærə] | 'hearth' |
| | [pur'tuæβə] | '(I) brought' |
| | [pur'tuæβəsə] | '(you) brought' |
| | [pur'tuæmmə] | '(we) brought' |
| | b. [pɔrtənə] | '(they) bring' |
| | c. [ku'tfi:mə] | '(we) cook' |

- (5) a. [u 'nuæsə] 'the nose' b. ['næəsə] 'nose'
 [u 'puɛðə] 'the foot'
 [kul'l uætʃənə] 'that grape' ['l ætʃənə] 'the grape'
 c. [u 'priβətə] 'the priest'
 [su b'biccə] 'they are old'
- (6) a. [m u 'ðuæjə] '(you) me it give' b. [kə mə 'ðæjə] 'what (you) me give?'
 [u 'fuættəsə] '(I) it do' [a 'fættəsə] '(I) it(f.) do'
 [t u 'ðuitʃənə] '(they) you it tell' [t a 'ðitʃənə] '(they) you it(f.) tell'
 [u 'kuættʃənə] '(they) it chase' [a 'kættʃənə] '(they) it(f.) chase'
 c. [u kat'tʃæβəsə] '(you) it chased'

Cerchiara

In *Stigliano* in (7)–(9) (Savoia 1987), harmonic spreading affects all stressed vowels and also pre-tonic /a/. The presence of [ə] between the trigger of the harmony and the stressed nucleus does not block spreading, as in (9d). The outcomes of the harmony for stressed /a/ are [ɔ:] and [wɔ:] following a velar consonant in open syllable, and [wa] in closed syllable, cf. (7)–(9)(a). For pre-tonic /a/ the outcomes are [wɔ] after velar consonant and [ɔ] in other contexts, cf. (7)–(9)(c). For other stressed vowels we find the simple insertion of a [w] segment; outcomes of metaphony may also be affected. Word-internal contexts are illustrated in (7). In (8) and (9) we display the phonosyntactic contexts D-N and Cl-V, respectively. The relevant harmonic process is triggered by the masculine singular D in (8) and by the masculine singular accusative Cl in (9). While in dialects like *Saracena* and *Cerchiara* the vowel that triggers the harmony is overtly realized, specifically as *u* in the masculine singular determiner and in the accusative clitic, in *Stigliano* the original **u* in unstressed position is neutralized to [ə].

- (7) a. [tsəm'bɔ] 'to jump' a'. ['tsɔmbə] '(I) jump'
 [tək'kwɔ:və] '(I) touched' ['tɔkkə] '(I) touch'
 [addəm'mwənnə] '(I) ask'
 [nə'tʃwɛddə] 'nut-dimin' ['neutʃə] 'nut'
- (8) a. [lə 'nɔ:sə] 'the nose' b. ['na:sə] 'nose'
 [lə 'kwɔ:nə] 'the dog' ['ka:nə] 'dog'
 [lə 'dwɪftə] 'the finger' ['dɪftə] 'finger'
 [nə 'dwentə] 'a tooth' ['dentə] 'tooth'
 c. [lə trɔ'pe:ðə] 'the tripod' c'. [tra'pe:ðə] 'tripod'

- | | | | | | |
|--------|------------------|----------------------|-----|-----------------|-------------------------------|
| (9) a. | [lə 'fɔːjə] | ‘(you) it do’ | b. | [tʃə lə 'faːjə] | ‘(you) what
(for) him do?’ |
| | [lə 'lɪwaskwə] | ‘(I) it leave’ | | [la 'laskwə] | ‘(I) her leave’ |
| | [lə 'strwɛɪndʒə] | ‘(I) it tie’ | | [strɛɪndʒə] | ‘(I) tie’ |
| | [lə 'lɪiːvə] | ‘(you) it take away’ | | | |
| c. | [lə kwɔ' nɔskə] | ‘(I) it know’ | c’. | [la ka' nɔskə] | ‘(I) her know’ |
| | [lə fɔr'reːjə] | ‘(I) it would do’ | | [far'reːjə] | ‘(I) would do’ |
| | [lə sɔ'peimə] | ‘(we) it know’ | | [sa'peimə] | ‘(we) know’ |
| d. | [lə də'vɔːkə] | ‘(I) it.m empty’ | | [la də'vaːkə] | ‘(I) it.f empty’ |
- Stigliano*

In *Stigliano* we can differentiate [ə] corresponding to **u* from [ə] corresponding to **i*, **e*, **ɛ* precisely in that the former triggers harmony, both word-internally and in phonosyntax, while the latter doesn't. In phonosyntax, one may say that masculine singular features introduce the phonological specifications [+back, +round]/ [U], which though not realized in situ, are manifested through the harmonic process. Word-internal contexts are slightly different; however, alternating forms where the [+back, +round]/ [U] content overtly surfaces are available, as in (7a'). In this latter instance we will provide the relevant lexical bases with a phonological representation comprehensive of all properties not independently predictable, including [U]. As for the phonological content of segments we adopt an element analysis following in particular Harris & Lindsey (1995, 2000) and the revision in Backley (2011).

As detailed by Rizzi & Savoia (1993), the various syntactic contexts that trigger propagation include in a generalized manner singular masculine determiners and the masculine singular object clitic, as illustrated in (1)–(9) in section 1.1. Beyond these, several additional contexts are documented where harmony may occur, though not in all varieties and optionally in some of them. Possible DP-internal triggers include not only determiners but also quantifiers, adjectives, and nouns as in (10)–(12)(a); AP internal contexts are also relevant. VP-internal triggers, as in (10)–(12)(b) include not only clitics but also auxiliaries, modals, and causative verbs as well as negation. As we already saw in (1)–(9), full realization of /*u*/ is not required to trigger harmony, which can equally be observed when the trigger (e.g. masculine singular morphology) surfaces as [ə]. In (10)–(12) the + sign indicates obligatory application of harmony, the – sign stands for impossibility and the ± sign corresponds to optionality.

- | | | | | |
|---------|-----|---|-------------------------------|--------------------|
| (10) a. | D-N | + | [u 'pɔːnə] | ‘the bread’ |
| | D-A | ± | [nu b'brɔːvə/b'bræːvə 'feʃʃə] | ‘a good son’ |
| | A-N | + | [nu b'bɛllu 'kɔːnə] | ‘a nice dog’ |
| | Q-N | ± | [tʃɪndə 'pɔːnə/'pæːnə] | ‘a hundred loaves’ |

- | | | | |
|----|----------|------------------------------------|---|
| | Q-A | ± [ntʃɛ t'tantu 'sɔ:nə/'sæ:nə] | '(he) not is so healthy' |
| | N-A | ± [nu 'feʃʃə 'sɔ:nə/'sæ:nə] | 'a son healthy' |
| b. | Cl-V | + [u 'ʎrɔ:pə] | '(I) it open' |
| | Aux-V | + ['sɯnnu stæ:tə/stɔ:tə] | '(I) am (i.e. have) been' |
| | Copula-A | ± [su s'sæ:nə/s'sɔ:nə] | '(they) are healthy' |
| | Caus-V | ± [m u 'fɔ:nə 'fɛ/'fɔ] | '(they) me it make do'
i.e. 'they make me do it' |
| | Mod-V | ± [u ʃu'li:mə 'fɛ/'fɔ] | 'lo vogliamo fare' |
| | V-DP | - [tə 'duɲnə 'pæ:n e k'kæ:sə] | '(I) to you give bread and cheese' |
| c. | DP-V | - [u pittʃu'liddə 'fɛr u ma'liɲnə] | 'the child is naughty' |
- Saracena*
- | | | | |
|---------|----------|---|-----------------------------|
| (11) a. | D-N | + [u 'nuæ:sə] | 'the nose' |
| | D-A | + [nu b'buɛllə 'kuænə] | 'a nice dog' |
| | A-N | + [u sə'kunnə 'fuiʎʎə] | 'the second son' |
| | Q-N | + ['kwandə 'puanə] | 'how much bread' |
| | Q-A | + [cu g'gruænnə] | 'more big' |
| | N-A | + [nu 'fwɪʎʎə 'ʎuæβəðə] | 'a son tall' |
| b. | Cl-V | + [u 'fuættəsə] | 'lo faccio' |
| | Aux-V | + [anə 'nuætə 'ji:rə] | '(they) are born yesterday' |
| | Copula-A | + [su g'gruæssə] | '(they) are fat' |
| | Mod-V | + [ʃɪl u ʃɔ 'fuæ] | '(he) it wants (to) do' |
| | Neg-V | + [ɔn'n uæddʒə 'βuistə] | '(I) not have seen anymore' |
| | P-DP | + [ku l'l uækə] | 'with the needle' |
| | V-DP | ± [ʃɪllə ʃɔ p'pʁæn e pprə'suttə]
[ʃɪllə ɔ p'pʁæn e pprə'suttə] | 'he wants bread and cheese' |
| c. | DP-V | - [u 'ʎuællə 'kæntəðə] | 'the cock crows' |
- Cerchiara*
- | | | | |
|---------|----------|-------------------------|---|
| (12) a. | D-N | + [lə 'nɔ:sə] | 'the nose' |
| | D-A | + [nə b'bwɛllə 'fɪʃʃə] | 'a handsome son' |
| | A-N | - [nə b'brɔ:və 'fɪʃʃə] | 'a good son' |
| | Q-A | - [ccu g'grannə] | 'more big' |
| | Q-N | - [ɔttə 'ka:nə] | 'eight dogs' |
| | N-A | - [nə 'sweccə 'ʎrannə] | 'a bucket big' |
| b. | Cl-V | + [lə 'fwattʃə] | '(I) it do' |
| | Aux-V | - [l' addʒə maɲ'dʒa:tə] | '(I) it have eaten' |
| | Copula-A | - [so vva'kantə] | '(they) are empty' |
| | Caus-V | - [tə lə fɔ'tʃejmə fa] | '(we) you it make do'
i.e. 'we make you do it' |

Mod-V	–	[lə ʏwə'lø:mə maŋ'dʒa]	‘(we) it want (to) eat’
V-DP	–	[tə'nejmə 'se:tə]	‘(we) are thirsty’
c. DP-V	–	[lə pəttʃə'nwennə 'caŋdʒə]	‘the child cries’

Stigliano

In (13) we provide a schematic representation of the syntactic distribution of harmony. *Stigliano*, which has laxer phonological constraints, shows the most severely restricted syntactic distribution, since only the contexts D-N/A and Cl-V are active. In *Cerchiara* and *Saracena* harmony applies within the DP, including the A-N context and in a large subset of VP-internal contexts, including Aux/Modal/Copula-V. *Saracena* nevertheless is more restrictive than *Cerchiara*, since harmony only variably applies in the Q-N/A contexts and negation is excluded from possible triggers. The V-DP context is variably admitted in *Cerchiara*, though it is once again excluded by *Saracena*.

(13)	<i>Saracena</i>	<i>Cerchiara</i>	<i>Stigliano</i>
a. D-N/A	+	+	+
A-N	+	+	–
N-A	±	+	–
Q-N/A	±	+	–
b. Cl-V	+	+	+
Aux-V	+	+	–
Copula-A	±	+	–
Mod/Caus-V	±	+	–
Neg-V	–	+	–
V-DP	–	±	–
c. DP-V	–	–	–

1.2 From /u/ propagation to minimalist syntax

The microvariation in (13) was originally analyzed by Rizzi & Savoia (1993). As aptly summarized by Elordieta (2008: 210), Rizzi & Savoia (1993) are among theorists holding that “phonological operations are directly sensitive to syntactic information, in terms of relations of c-command or m-command (i.e. government) holding between the elements participating in phonological processes” (cf. Manzini 1983). This kind of view is opposed by theories holding that “there is a distinct level of representation called Prosodic Structure which mediates between the syntactic and phonological components ... Phonological operations themselves do not refer to syntactic constituents, but to the already created prosodic constituents” (cf. Nespor & Vogel 1986 for an elaboration of this view).

Rizzi & Savoia characterize the variation in (13) in terms of structural relations of syntactic government between the harmony trigger (containing the licenced unstressed nucleus) and the target (containing the full licencing nucleus). In particular the trigger of propagation may govern the target: (i) as a functional head (*F-government*); (ii) in an agreement configuration (*Agr-government*); and (iii) in a configuration of mutual government (*M-government*). Under this model, the most severe restrictions associated with the variety of *Stigliano*, are due to the fact that harmony requires the combination of the two conditions of F- and M-government. However, *Cerchiara* and *Saracena* are less restrictive, in the sense that *Agr-government* or *M-government* are sufficient to trigger harmony. The model also seeks to capture optional environments for harmony. Thus optional application is triggered by simple government in *Cerchiara* and by *Agr-* or *F-* or *M-government* in *Saracena*, as in (14).

(14)	<i>Saracena</i>	<i>Cerchiara</i>	<i>Stigliano</i>
Obligatory	Agr-gov or M-gov	Agr-gov or M-gov	F-gov and M-gov
Optional	Agr-/M-/F-gov	gov	

Elordieta (1997, 2008) points out empirical problems with the extension of the government model of Rizzi & Savoia to Vowel Assimilation in Basque. In particular “the ... branching configurations holding between the participial verb and an inflected auxiliary, a modal particle or a causative verb are identical”, though only the participle-auxiliary configuration triggers the rule. Therefore “the government relationships are the same in all cases between the different heads. Since both an inflected auxiliary and a modal particle ... are functional heads, F-government does not seem to be a solution, and neither does Agr-government in the sense of Rizzi & Savoia, as this relationship only holds between expressions displaying morphosyntactic agreement in gender and/or number, i.e. in nominal contexts” (Elordieta 2008: 260–261). He concludes that the way to capture differences in behavior between functional categories is to make reference to the different feature checking relations they enter into with the lexical heads that they are linearly adjacent to. “Certain phonological phenomena may be specified to apply in the domains or constituents formed by functional and lexical heads related by feature checking”, to be understood as in Chomsky’s (1995) minimalist program (Elordieta 2008: 210).

In a similar vein, Roberts (2005) studies Initial Consonant Mutation in Welsh in structures of the type Determiner-Noun, Particle-Verb and Verb-Object. He concludes that the relevant context is defined by head government, i.e. [_v Y XP]. In his analysis, an autosegment is associated with a syntactic head, e.g. the autosegment L(enition) to the head *v*. When the verb *V* raises to *v*, the initial consonant

of the DP object in [Spec, V] becomes associated with L, which overtly realizes the Accusative feature. In surface structure the verb ultimately raises higher, to a finite agreement position (PersonP) and is not adjacent to its object DP, which nevertheless overtly realizes L. In other words, minimalist feature checking (or Agree) defines phonosyntactic processes.

Recent proposals explain the syntactic distribution of phonological phenomena by having recourse to the notion of phase and to the Phase Impenetrability Condition (PIC) of Chomsky (2001, 2007) (Kratzer & Selkirk 2007; Cheng & Downing 2009; D'Alessandro & Scheer 2013; Newell & Piggott 2014 among others). These works share the assumption that syntactic objects constructed by narrow syntax are immediately visible and legible to phonological operations (Sensory-Motor interpretation). In other words, there is no theoretical or descriptive necessity to introduce an intermediate prosodic representation which re-organizes the syntactic string in terms of phonological categories, before its interpretation at the interface level. The insight of these works is that there are sequences of syntactic objects – words or morphemes – that form a unique overall domain for phonological processes, though the same processes can be blocked if apparently similar sequences include a phase boundary.

D'Alessandro and Scheer (2013: 2) observe that “the very essence of phase theory is to define items that are bigger than the word, and to send them to PF (and LF). Against this backdrop, our first goal is to show that there can only be one chunk-defining device: theory cannot afford to have the same work done twice. We argue that this unification must be in favor of the derivational mechanism: phase theory has independent syntactic motivation, while this is not the case for prosodic constituency on the phonological side”. Similarly, according to Newell and Piggott (2014), a prosodic domain like Phonological Word is constructed on the basis of syntactic phases, though it has a representational nature which is independently preserved after phases are interpreted and thus no more legible to the sensory-motor (SM) interface.

As already stressed by Chomsky & Halle (1968), phonology systematically applies inside the word domain, whereas the application spanning two separate constituents typically involves constraints. In general, phonological models assuming cyclical application of phonological rules, for instance prosodic rules, allow for word internal domains, formed by means of morphological derivation, and possibly extended with clitic elements. In *Lexical Phonology* (Kiparsky 1982a, 1982b) and other cyclic models like Halle & Vergnaud (1987), Halle and Idsardi (1995) phonological rules are sensitive to the properties of affixes in the process of word formation. Newell & Piggott (2014) highlight differences between this type of solution and the phase-based analysis they propose. They argue that only a phase-based analysis can distinguish between different behaviors of the same

morphological exponent depending on its point of insertion in a phase domain; a simple cyclical application depending on word internal stratification of affixes is not able to capture this difference.

Specifically, they consider hiatus avoidance in Ojibwe, an Eastern Algonquian language. This language disallows vowels in hiatus inside the word and it has recourse to vowel fusion, deletion, or consonant epenthesis to eliminate hiatus contexts created by morphological derivation. However a subset of verbal or nominal affixes tolerates hiatus. Thus we find sequences in which hiatus is resolved by means vowel fusion/deletion, as in (15a), as well as sequences which preserve hiatus, as in (15b).

- (15) a. niwe:zi:na:na:nig
 ni-we:zi:-in-a:-ina:ni-Ø-ag
 1-PAINT-FINAL-TS(3 THEME)-1PLURAL-IND-3PLURAL ‘we paint them’
 b. gí:anò ki:
 gi:-anoki:
 ‘PAST-WORK’ ‘he worked, hunted’

(Newell & Piggott 2014: 336, 338)

The question is defining the domains which admit or exclude hiatus. Newell & Piggott conclude that for verbs the relevant domain of exclusion is the Event, including a set of possible phases (the verbal root \sqrt{P} , v , Voice, Asp, and Agr) which are suspended in virtue of a condition of ‘phase extension’ requiring that “If the combination of a phase-head and its complement contains an uninterpretable feature, transfer to the interfaces will be delayed until the merger of a later head with the capacity to check this feature. If no such delay is motivated by either the featural properties of H or Z, Spell-out can occur as early as the merger of the category-defining head” (Newell & Piggott 2014: 345, cf. Svenonius 2004). The authors further propose that morphological elements, like tense formatives, which admit hiatus are inserted out of the Event domain, in a different phase; the PIC between the two different phases creates an interpretive barrier which justifies the non-application of hiatus resolution, in spite of the phonological similarity of the sequences involved.

Analogously, D’Alessandro and Scheer (2013) consider the different behavior of the same auxiliary in the active perfect (transitive/ intransitive) and in the passive of the Abruzzo dialect of Arielli. In this dialect, the perfect auxiliary forms are independent of verbal class and voice and only dependent on person. D’Alessandro and Scheer note that in passive configurations they determine *Raddoppiamento Fonosintattico* of the initial consonant of the following participle, while in the active this process does not apply, as in the examples in (16). In the active, as in (16a), there is a vP phase, blocking *Raddoppiamento* in the phonology.

On the contrary in the passive (16b), *v* is defective, i.e. it is not a phase head; as a consequence the auxiliary and the participle are comprised in the same phase and *Raddoppiamento* can take place.

- (16) a. so vistə
 I.am seen
 ‘I have seen’
 b. so vvistə
 I.am seen
 ‘I am seen’

The most problematic point of a phase-based theory of phonotactic phenomena is how it can account for subtle (and idiosyncratic) differences in phase organization of similar languages, as in the case of different restrictions on propagation analyzed above. As D’Alessandro & Scheer (2013: 2) note, “phase theory is unable to describe all phonologically relevant chunks, as these are too small and too diverse to be delineated in the current working. In order to qualify as the only chunk-defining device in grammar, phase theory needs to be made more flexible: in other words, it needs to be adapted to the demands of phonology”. This means that two major dimensions of variation are introduced by the authors. First, different languages may have different phasal heads, hence phasal domains.

Second, the PIC need not be activated both in the syntactic component and in the phonological component, but may be activated only in one of the two. Thus consider the failure for *Raddoppiamento* to apply in (17), between the auxiliary and an unaccusative verb. Syntactically, we expect the same configuration as in (16b), characterized by no *vP* phase/a defective *vP* phase and allowing for promotion of the internal argument to the subject position – yet in the phonology, *Raddoppiamento* is blocked as in (16a). This phonology-syntax mismatch is resolved by taking *vP* to be a phase; “a PIC is associated with this access point at PF. In syntax, however ... no PIC is associated with *v*”. According to D’Alessandro & Scheer the parameters they propose are compatible with the ‘Borer-Chomsky conjecture’ as to the lexical nature of parametrization. They assume that phasehood is a lexical property associable to certain heads; furthermore for Arielli in (16)–(17), they suggest that “PIC at PF is linked to an active value for the voice feature on *v*. This feature value seems to be the syntactic correlate to the PIC effect at PF”.

- (17) so rəməstə
 am-1st.sg stayed-sg
 ‘I have stayed’

When it comes to evaluating phase-based approaches we note, first, that a well-known divide separates word internal domains from phonosyntactic ones.

Thus, Newell & Piggott (2014) for Ojibwe reconstruct the contrast between the application of a phonological rule inside the word, where it is obligatory, and in contexts external to it, where it does not apply or it applies with restrictions, in terms of phases. Our data indeed show that propagation systematically affects the word internal contexts in (1a, 4a, 7a). Modelling the notion of word in terms of the notion of locality/cyclic domain – or phase – is appealing for more than one reason; in particular it would resolve the tension between the listing of morphemes as atomic lexical items and the necessity to predict that words are nevertheless insulated from most processes active within syntax (the lexical integrity hypothesis).

In the next section we will be more directly concerned with syntactic domains of application. Capturing the varying conditions on phonosyntactic rules in terms of the sole notion of phase, as D'Alessandro & Scheer (2014) do, involves a considerable enrichment of this notion. Thus the need to account for fine variation means that any projection potentially becomes a phase – and the child who learns a language additionally faces decisions as to whether a PIC attaches to this phase in the phonology or in the syntax. We note also that \pm phase or \pm PIC are not lexical parameters, since they involve not bona fide properties of lexical items, but rather encode derivational instructions. In general, while the terminology of Chomsky (2001, 2007) is maintained, it is largely voided of its actual content.

First, if phases are heavily parametrized, it is not obvious that they can keep regulating movement within the sentence (A-movement) and out of it (A'-movement) as well as agreement (from a phase head to its complement and the edge of the lower phase). The parametrization of the PIC should go some way towards resolving this issue in D'Alessandro and Scheer (2013) model. Yet unless it is necessarily connected to the syntactic PIC, and the syntactic PIC to Spell-Out, the notion of phase may become empirically vacuous. In other words, in the worst instance, reference to phases in fact introduces an intermediate level of representation, gathering words/morphemes in chunks legible to the SM interpretation, which configures a sort of surreptitious prosodic organization.

Similarly, in the original minimalist conception (Chomsky 2001), probes, i.e. uninterpretable feature sets triggering checking by an interpretable set, coincide with phase heads – i.e. essentially *v* and C (with I 'inheriting' from C). In order to define the fine parametric variation in phonosyntactic triggers, we may want to elaborate a finely grained repertory of heads against which other heads are checked, as suggested by Elordieta (1997, 2008). This has the advantage of achieving descriptive adequacy – but in the process, the independently needed notion of probe gets complicated so as to become again a way of encoding the facts.

In short notions connected with locality and cyclicity like those of phase, the PIC, and agreement probes are insightfully brought to bear on the

definition of phonosyntactic domains by recent minimalist literature. However the restrictive syntactic formulations of such notions are changed in the process – in other words it is not the syntactic notions of phase, PIC, or probe that is being referred to but some different, richer notion. We shall return to specific problems they may encounter in accounting for the data in (13) at the end of the next section.

2 The present account

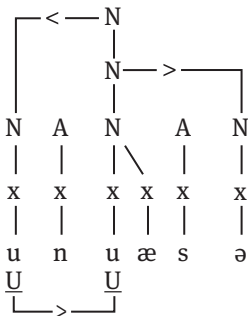
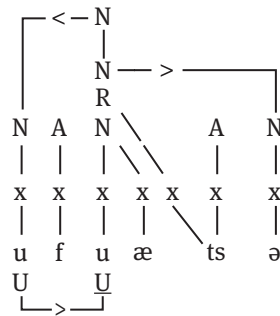
2.1 Phonological analysis

In this section we discuss the phonology of propagation including its variation. As we saw, in some varieties (here *Saracena*, Calabria), only /a/ of the stressed syllable immediately following /u/ undergoes harmony. In other varieties (here *Stigliano*, Lucania and *Cerchiara*, Northern Calabria), all non-round vowels in stressed position are possible targets of harmony. In the varieties of Lucania pre-tonic [a] is also targeted by the process. The government phonology framework (Kaye *et al.* 1990) allows for an interesting explanation of the observed micro-variation, interpretable as the result of the interaction between different nuclei, the requirements on the segmental content of the involved positions and metrical properties connected to quantity sensitivity. Specifically, propagation applies in the prosodic domain of a stressed nucleus – a fact that we will return to.

Consider first the more restrictive *Saracena* data. As shown in (1b), underlying /a/ in open stressed syllable has the palatalized outcome [ɛ:], as generally attested in South Italian systems, characterized by sensitivity to syllabic structure. In these systems, in the context of open syllable, i.e. a nucleus with two positions, the phonological element [I] is added to /a/, changing it to [A, I] ([ɛ:]). A more complex and recognizable configuration of the vocal tract is thereby obtained, which strengthens its contrastivity. By contrast, when /u/ propagation is at work, the [ɔ] result is obtained, which satisfies requirements of a more recognizable phonological content, again in an open syllable context. In (18) we therefore tentatively unify velar harmony with the palatalization connected to syllabic structure under the same mechanism. In the contexts of closed syllable or antepenultimate stress, the requirement in (18) is not met, excluding harmony as well as palatalization.

(18) *Palatalization/Velarization of /a/ (Saracena)*

[A] associated with a branching nucleus is licenced within the expression including [I/U]

(21) *Cerchiara*(22) *Cerchiara*

In the *Cerchiara* variety, harmonic spreading is blocked by a metaphonetic stressed nucleus. In both propagation and metaphony, the stressed vowel licences properties which are present in weak positions. Therefore the stressed vowel licences also the properties associated with metaphony. Moreover, in these varieties, metaphony is at least partially morphologized, in that original post-tonic [+high, +ATR] vowels are no longer or only variably realized. Post-tonic vowels are generally neutralized in [ə], as in the examples in (1)–(9). We surmise that metaphony corresponds to a morphologized process whereby the stressed nucleus subsumes and licences the [+high, +ATR] content introduced by the morphological category masculine singular or plural in nouns. If metaphony and propagation can be unified under the same schema in (23), then the restriction against the application of propagation to metaphony contexts depends on the fact that each nucleus can licence only once. More precisely, metaphony applies in the most restricted domain formed by the foot headed by the stressed nucleus, while the domain of propagation includes this inner domain and the phonological material in pre-tonic position. We conclude that if a single constraint is involved, in this variety an ‘Elsewhere’ condition favors its application in metaphony.

(23) *Metaphony/Propagation*

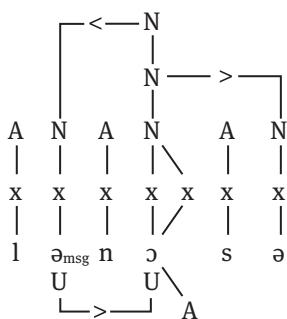
An [I/U] head is licenced in the position that governs the prosodic domain.

Lastly let us consider *Stigliano*, where the application of harmonic spreading involves all stressed nuclei, including metaphonetic ones. In *Stigliano* as well, there is a restriction against *[I,U], whereby the combination of [U] and [I] within the same vowel is excluded. This explains the fact that with input vowels [i e ε] the harmonizing element is inserted as the first component of a sequence [wi], [we], [wε]. What is more, [w] is inserted independently of the structure of the rhyme, and spreading does not take into account the properties of the onset. In other words, spreading only sees the articulatory properties of the host vowel. The latter must be a phonetically full unrounded vowel. Hence, considering

that in this variety phonetically full vowels include [a] or vowels under stress, propagation affects a stressed vowel or a pre-tonic [a].

Unstressed [a] behaves in fact differently from other vowels, in that it can take on the [U] element, yielding [ɔ], as in (24). In closed position, [w] is inserted, creating a [wa] sequence, suggesting that the availability for [a] to velarize depends on additional factors. Thus the [ɔ] outcome in open syllable satisfies a requirement of the type discussed above for *Saracena* in (18). In closed syllable/ antepenultimate stressed position, on the contrary, no such requirement holds, and an [U] element in initial position is inserted. What is also noteworthy in (24) is that the [U] trigger is associated with masculine singular morphological content, rather than with a phonetically realized [u] segment. In other words, we are dealing with a phenomenon that, as in the case of metaphony, cannot be reduced to a simple phonological mechanism, but is triggered by morphological restrictions. Thus we assume that a given interpretive content, here masculine (singular) nominal inflection, is associated with a set of phonological properties which are realized on the non-neutralized, stressed vowel.

(24) *Stigliano*

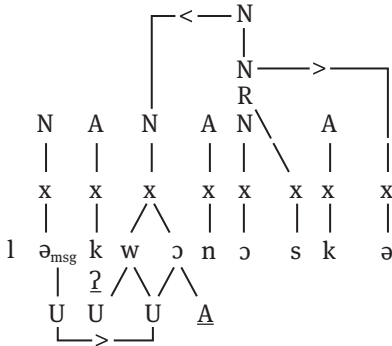


A second context where harmonic [ɔ] is realized in *Stigliano* is the pre-tonic one. Therefore harmonic spreading treats stressed nuclei and unstressed [a] nuclei in the same way, suggesting a finer grained account of the phenomenon. We surmise that [a] shares a set of basic properties with stressed vowels, namely a full and clear acoustic configuration, with a degree of perceptibility not inferior to that which characterizes stressed nuclei. In other words the role of prosodic head is a product of phonetic properties of length, sonority, and perceptibility, which are normally associated with the stressed nucleus. Nevertheless [a] displays these properties to a degree sufficient to be implicated in harmonic processes.

In unstressed position, the contrast between open syllable and closed syllable/ antepenultimate stressed position is not relevant. The simplest outcome of the harmonic process is then manifested, as velarization in [A,U]. The representation in (25) characterizes sequences where a velar consonant selects the insertion

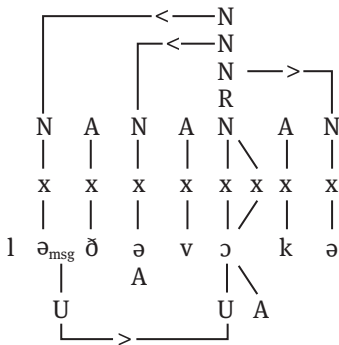
of [w] even in unstressed position, favoring a more autonomous realization of the [U] element. Following Backley (2011), we adopt the hypothesis that the [U] element characterizes a velar consonant. Consonants with properties different from [U] do not interfere with spreading. On the contrary a velar onset consonant concurs to licence the realization of [w] even in the presence of velar outcomes [ɔ], manifesting the [U] property of the velar consonant, as in (25).

(25) *Stigliano*



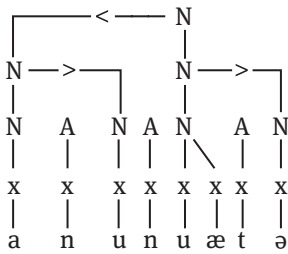
The transparent nature of centralized weak vowels [ə], i.e. of the [A] non-dominant type, becomes evident when one or more weak vowels intervene between the pre-tonic trigger and the stressed nucleus. In such contexts, [ə] allows spreading across it, as in (26). We conclude that in the *Stigliano* propagation, the process is restricted only to full vowels, i.e. those endowed with a dominant element [A]/ [I]/ [U], excluding thus [ə], associated with a non head [A]. Harmony amounts to the licencing of [U] by the full/stressed nucleus; intermediate weak vowels are simply not legible to the process.

(26) *Stigliano*



Besides the word and the clitic group, exemplified so far, other prosodic strings may be available for the application of phonological processes. For instance in [anu^hnuætə] ‘(they) have (been) born’ in (27), the rightmost stressed nucleus targeted by the harmonic process, is the nucleus that licences the entire prosodic constituent; in this sense it is an adequate phonological licenser for propagation.

(27) *Cerchiara*



In section 1.2 we have discussed recent approaches to the analysis of phonotactic processes, including a phase-based one, agreeing with them on the crucial assumption that phonological interpretation depends on syntactic information, without recourse to intermediate representations. In the structures in (20)–(27), however, it is crucial to make reference to the prosodic domain of the stressed nucleus that hosts [U], for which we may conveniently employ conventional labels such as word, clitic group, and so on. This is not to say that syntactic domains are encoded by prosodic objects. Rather, at the SM level a string of syllables gathered in feet forms a phonological word; a sequence of words forms a larger prosodic domain headed by the rightmost stressed vowel. In general, these prosodic domains are defined by the SM component in terms of its own primitives like timing slots, prominence, and prosodic groupings. In this way, the phonological merger of more elementary domains into larger ones creates the structures that make syntactic input legible at the SM level – without any precompiling of the syntactic information itself.

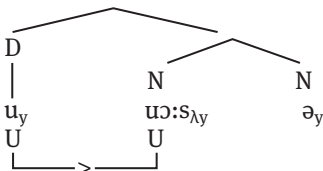
2.2 Syntactic contexts of obligatory and impossible application

The harmonies we are discussing are triggered by syntactic elements which systematically include the masculine singular determiner as well as the masculine singular (object) clitic. What do these contexts share that sets them apart from other contexts subject to variation and optionality?

The minimalist model of agreement based on feature checking between an uninterpretable probe and an interpretable goal, is not of easy application in contexts like the Romance DP characterized by agreement of essentially all of the heads present in the structure. Consider standard Italian *l-a ros-a* ‘the-f rose-f’. If the D (*la*) is the probe (being presumably the phase head), then its features are uninterpretable; but this runs counter the fact that *la* bears the referential properties of definiteness and is indeed interpretable in isolation, namely as a (clitic) pronoun. Manzini & Savoia (2005, 2007, 2011) assume that all features are interpretable. Following Higginbotham (1985), in the expression *ros-a* ‘rose-f’, *ros-* ‘rose’ is a predicate with an open argumental slot (the so-called R-role), denoting the set of individuals who have the property of being ‘rose’. Manzini & Savoia propose that the nominal inflection (N)-*a* contributes an elementary descriptive content (feminine) towards the saturation of the R-role.¹ The determiner concurs with the N inflection to the saturation of the R-role, introducing in this instance reference to a definite individual. In order for the determiner and the N inflection to be interpreted as discontinuously fixing the referent for the argument slot of the noun, agreement must hold between them, i.e. identity (or non-distinctness) of their referential features. If desired, a single copy of the agreement features may be preserved at the LF interface, namely the highest one (leaving the other copies as bound variables), matching minimalist Agree.

Going then on to /u/ propagation, the structure in (28) represents the D-N configuration in one of the relevant varieties, cf. example (12a). Pursuing the line of syntactic analysis sketched above, the lexical base *nas-* ‘nose’ has a purely predicative content, while the nominal inflection (N) *-ə* and the determiner D introduce referentially relevant properties for the saturation of the predicate (masculine). Together D and the N inflection individuate a single referent for the R-role of the predicate, characterized as definite and masculine singular.

(28) *Saracena*



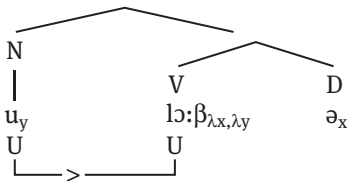
¹ For discussion of the notion of nominal inflection N as understood here, see also Savoia (this volume, fn. ??), Franco et al. (2014).

Q: Please check and confirm that the – has been displayed as you intended throughout

Q: Please replace question marks with the appropriate information.

The Cl-V context in (29) is similar. Here too we have a predicate ‘wash’ which takes two arguments. One of the two arguments, the external argument, is saturated by the verb finite inflection; recall that the varieties we are considering have pro-drop. The other argument, namely the internal one, is saturated by the clitic – whose inflection contributes nominal content N to it. Therefore structures like (28) and (29) can be assimilated on the basis of the fact that in either instance the trigger of /u/ propagation, i.e. the determiner in (28), and the clitic in (29), saturate an argument of the predicative base – and precisely the internal argument in both instances, contributing nominal properties to it.

(29) *Saracena*



It is worth noting that our data exemplify contexts in which enclitic pronouns in imperatives are affected by propagation, including the most restrictive of three dialects, namely *Stigliano*. Since for reasons entirely independent of the phenomenon at hand, it is the enclitic that attracts the main stress in the clitic group, the trigger of the spreading is either a vowel in the verb base, as in (30a) or in its inflection, as in (30b); the target is the enclitic. In this instance therefore the argument-of relation is reversed with respect to (28)–(29) (the trigger is the predicate and the target is the argument).

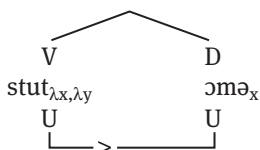
- (30) a. [[kʊs] 'weilə] *Stigliano*
 'sew it'
 b. [[purtamu] n'n-wellə] *Cerchiara*
 'bring to.him.it'

In short, in terms of the present proposal, obligatory application of /u/ propagation in all of the varieties considered corresponds to contexts where the trigger bears an argument-of relation to the target, as in (31). This can also be expressed in probe-goal terminology, assuming that D is both a phase head and a probe in (28), while v is a phase head and a probe in (29)–(30).

- (31) The Trigger is an internal argument of the Target or vice versa
 (The Trigger probes for the Target or vice versa)

A word is in order on the application of harmonic processes word internally. In practice, all of the examples of word-internal /u/ propagation in (1)–(9) involve a morphologically complex word, where the trigger of the spreading is a verbal or nominal base and the target is either a person inflection with verbs or word formation suffix for nouns. A V-D example is analyzed in (32), where the inflection -ɔmə ‘1pl’ lexicalizes the EPP argument (i.e. the external argument) of the verb *stut* ‘put out’ to which it attaches. Therefore the argument-of relation is once again involved in propagation, as under (31). Since morphological merger creates left branching structures, propagation has the effect of strengthening the PF externalization of the predicative content of the lexical base (the trigger) on the person and number inflection (the target) – essentially as in enclisis examples like (30).

(32) *Saracena*



Something similar can be said of an N-Suffix example like [nə'tʃ-wəddə] ‘nut-diminutive’ of *Stigliano*, where the target of propagation, i.e. the diminutive suffix, is effectively a classifier (for ‘small size’), hence part of the system for ultimately fixing the referential content satisfying the predicative base of the noun (the trigger). Though here we focus essentially on conditions for phonosyntactic application, it may be worth noting that no unification seems to be possible between (31) and the word-internal facts, if (31) is stated in terms of probe-goal relations.

Let us then move to the contexts that are obligatorily activated in *Cerchiera* and *Saracena*, though the restrictive variety of *Stigliano* excludes them. DP-internally these coincide with A-N, as in (33). The internal structure of the noun is as already detailed in (28), the internal structure of the adjective is the same (the predicative base satisfied by the inflectional content). Now, the noun and the adjective introduce two separate predicates, in (33) ‘nice’ and ‘dog’. The desired interpretation of the A-N structure is that there is a single individual that satisfies both properties, i.e. lies at their intersection (namely it is both ‘dog’ and ‘nice’ for a dog). The semantic operation that yields this interpretation is called theta-identification by Higginbotham (1985). The syntactic operation corresponding to it is again agreement, understood here as the matching of locally identical phi-feature exponents that concur to denoting a single referent (here controlling two argument slots). Therefore in (33) the trigger x (the N inflection of

that the *pro* subject is a goal both for the *v* probe (the lexical verb) and for the *I* probe (the auxiliary). Yet, when a transitive verb is involved, the auxiliary and the verb probe different arguments (cf. [æddʒə 'βuistə] 'I.have seen' of *Cerchiara*, discussed above). It is therefore difficult to think of a natural class encompassing these different contexts and differentiating them from those in (31).

(35) The Trigger is an argument of the Target via theta/event-identification.

Now, certain configurations block /u/ propagation in all varieties, including the less restrictive variety of *Cerchiara*. Not surprisingly they are independently known to block various other phonosyntactic processes considered by the literature – the most obvious example being the subject-predicate configuration, i.e. DP-IP. In terms of government (Rizzi & Savoia 1993), phonosyntactic rules are prevented from applying in this configuration, since none of the heads embedded under DP governs any of the heads embedded under I (though the N head and the V head may be adjacent). However, the notion of government introduced by Vergnaud (2008[1977]) is eliminated by the minimalist model as decomposed in favor of more elementary relations. One is feature checking, that connect a superordinate head (the probe) to a lower constituent (the goal). This takes care of the role played by heads in government. The other crucial component of government is locality. Under the classical definition of government a superordinate head X had in its government domain its sister node or a daughter node of its sister. In other words a head X embedding a complement YP has in its government domain the Spec of Y but not the complement of Y. This locality part of the definition of government is taken charge of in minimalist theory by the notion of phase. Indeed, as discussed in some detail in section 1.2, several theorists have studied the relevance of the notion of phase to phonosyntactic phenomena.

An approach to the fine variation in /u/ propagation along the lines of (31) and (35) does not exclude that more general constraints will apply, such as the Phase Impenetrability Condition. Indeed phases and the PIC provide an immediate explanation for the impossibility of propagation between DP and IP. In particular if DP is phase, the NP complement of D will have already been sent to Spell-Out when it merges with VP/TP, making it inaccessible, among others, to phonosyntactic rules.² The interesting question is whether phasal organization

² Prosodic conditions prevent us from checking the context V-DP, since following the V-final inflection we need a stressed syllable (not provided by D). Therefore we have resorted to contexts, where the verb is followed by a D-less mass noun. It is possible that the optionality in propagation in *Cerchiara* reflects the possibility of computing or not a DP-phase, based on the presence (or absence) of an empty D. We leave the entire matter open.

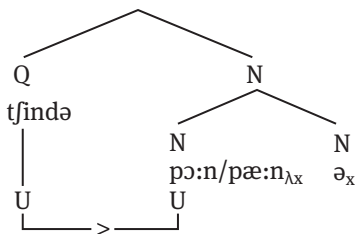
may be sufficient to define contexts of impossible application in general, as well as those of optional application in *Saracena*.

We may interpret the systematic optionality that characterizes speakers of this variety as the coexistence of two different grammars. *Saracena* speakers thus entertain a more restrictive grammar where only the contexts of application discussed in section 2.2 are allowed – and a grammar more similar to *Cerchiara*, where /u/ propagation is potentially excluded only in the presence of intervening phases. This latter generalization may indeed be sufficient to account for *Cerchiara*. However we note that there is at least one context of application in *Cerchiara* which does not allow /u/ spreading in *Saracena* at all, namely Neg-V. No phase presumably intervenes between the Neg clitic head and the V head in T, predicting that propagation will be possible, indeed as in *Cerchiara*. At the same time however, an account for the contexts of optional and impossible application in *Saracena* requires looking into the finer details of syntactico-semantic structure.

2.3 Syntactic contexts of optional application

We are now faced with the question whether the parametrization schema emerging from (31) and (35) is sufficient to capture the contexts where /u/ propagation applies optionally in *Saracena*. Within the DP, *Saracena* displays optionality in the Q-N context. From the point of view of syntactic constituency the Q-N environment appears to be the same as the D/A-N one, as shown in (36). Nevertheless the agreement structure may differ; Q elements may bear a nominal inflection agreeing with the noun, but they may equally not agree, as with the numeral in (36). Furthermore the logical relations vary. Q elements introduce a relation between the N predicate (their restrictor) and the main sentential predicate (their scope). The context for propagation can therefore be described as one in which the trigger (the Q element) is restricted by the target (the embedded noun or adjective). This logical relation allows propagation in *Saracena*, but does not require it.

(36) *Saracena*



In turn, a standard way to construe the sentential negation is as a negative quantification over the event or situation. Thus ‘I didn’t see’ means roughly ‘There is no situation/event of me seeing at (past) time t’. In other words, the IP/VP provides the scope of the event variable introduced by the quantifier. Given the similarities with the Q-N contexts in (36), we may wonder why propagation in the context Neg-I/V doesn’t have some degree of optionality in *Saracena*, but it is instead impossible. One difference that comes to mind is that Q elements agree with their restrictor N, while Neg does not agree with the verb. It is true that in (36) a non-agreeing Q can trigger propagation on N; nevertheless the phi-features content of N is in the restrictor scope of Q. We therefore propose that the context of application relevant for (36) is as in (37).

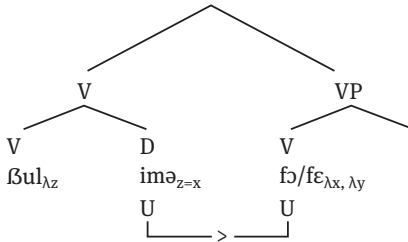
(37) The Trigger quantifies over the Target, where trigger or target have phi-content

Note that in (31) and (35), either the trigger or the target (or both) are characterized by phi-features content. If the trigger has phi-features content, then this is being spread on the target – however the trigger may also spread segmental content of a lexical base onto an item lexicalizing phi-features as for instance with enclitics. This leads us to suspect that in the variety of *Saracena* the presence of phi-content on the trigger or the target is necessary. The question then is if it is sufficient.

Within the sentential domain, optionality is associated with the context Mod-V or Caus-V. Both environments involve behaviors characterizing them as complex predicates of sorts, rather than as a sequence of two predicates. Let us consider for instance the Mod-V environment with ‘want’ in (39), corresponding to a core instance of ‘restructuring’ in the sense of Rizzi (1982). The syntactic structuring of the expression is not very different from that of an Aux-V context. In fact, for Manzini & Roussou (2000) control is an operation directly binding a theta-role, i.e. an argument slot; in other words, no PRO is present. Nevertheless the two structures are far from identical. In Aux-V environments, the argument structure of the two verbs is shared and there is a single event interpretation. The same is not true of restructuring environments, where an expression like (38), ‘we want to do’, consists of two individuated states/events (a mental state of ‘wanting’ and an event ‘doing’) and the matrix EPP argument simply controls the embedded empty EPP argument. A necessary precondition for restructuring appears to be the lack of independent temporal specifications on the two verbs, in other words the sharing of temporal reference (Wurmbrand 2001). The optionality of /u/ propagation in (38) may then be sensitive to the fact that

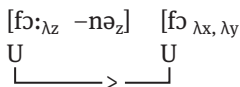
the EPP argument of Mod (its trigger) is not a direct argument of V, but controls one of the argument slots of V (its target).

(38) *Saracena*



Causative contexts, e.g. ‘make(3pl) do’ in (39), are similar to restructuring ones, in that they there are well individuated causation and caused events – though the embedded event lacks independent temporal structure. Therefore, a Caus-V structure does not involve unification of argument structures of the type found in Aux-V environments. However, in causative contexts there is no control from the matrix EPP argument to the embedded one either. Rather all arguments are independently lexicalized; in the absence of a temporal structure, the embedded subject (the causee) is assigned either accusative (if the embedded verb is intransitive) – or else an oblique case (dative). We conclude that the absence of intermediate temporal structures (i.e. of a CP phase) is sufficient to determine that the matrix and embedded V are computed as a complex predicate. Hence the matrix inflection, as an exponent of the EPP argument, can trigger /u/ propagation optionally on the lower V member of the complex predicate (its target).

(39) *Saracena*



In general, in Mod/Caus-V contexts, the trigger of the spreading, i.e. the finite inflection of Mod/Caus is not an argument of its target, i.e. the lexical V – nor do Mod/Caus and V denote a single event, in the way of Aux-V contexts. In other words the conditions in (31) and (35) do not hold and this means that propagation is not obligatory. At the same time restructuring/ causativization imply a shared higher tense domain between the two predicates – equivalently the absence of a C-T phase associated with the embedded predicate. This licences a weak relation between the matrix

finite inflection and the embedded verb, belonging to the same complex event predicate, sufficient for optional application of propagation, along the lines of (40).³

(40) The Trigger is an argument of the Target via Tns identification.

Let us go back to one of the contexts that we examined first, namely Cl-V. One of the empirical correlates of restructuring and of causativization is clitic climbing, whereby a clitic associated with the modal/causative verb is interpreted as an argument of the embedded lexical verb. By general consent, the structural representation resulting from clitic climbing is like that of an ordinary Cl-V pair, where Cl is the argument of lexical V. However spreading is not obligatory in Cl-Modal/Causative contexts, unlike contexts Cl-V, where V is lexical. With restructuring verbs in (41) optionality prevails, though propagation may also not apply at all, in particular with motion verbs in (41a-a'). With causative verbs in (42), propagation applies again optionally.

- (41) a. [u/a 'vɛ:və a cca'mɛ]
 him/her I.go to call
 'I'll go and call him/her'
 a'. [u/a vɛj a f'fɛ]
 it.m.f I.go to do
 'I'll go and to do it'
 b. [u 'sɛ:pə/'sɔ:pə f'fɛ]
 it s/he.knows to.do
 'S/he knows how to do it'
 c. [u/a stɛ fa'tʃinnə]
 it.m/it.f s/he.is doing
 'S/he is doing it'
 c'. [u 'stɛ:jə/'stɔ:jə fa'tʃinnə]
 it you.are doing
 'You are doing it'
- (42) a. [u 'fɔ:nə/'fɛ:nə 'dɔrmə]
 him they.make to.sleep
 'They make him sleep'

³ Limitations of space prevent us from dealing in detail with every single context of application. We note that N-A and Copula-A pattern with Caus/Mod-V contexts in being optional in *Saracena*. This suggests that Copula-A is a raising structure ('they are healthy' from 'are [they healthy]', along the lines of Moro (1997)). Something similar may be true of predicative adjectives, cf. 'a son (who is) healthy'.

- b. [n u 'fɔːjə/'fɛːjə 'fɛ]
 him it you.make do
 'You make him do it'

Saracena

In Cl-Mod/Caus contexts of the type in (41)–(42) the clitic is not a direct argument of the restructuring/causative verb, unlike in (31), and we correctly exclude obligatory application of propagation. At the same time, in the discussion surrounding (40) we suggested that the temporal structures of the two predicates are identified in Mod/Caus-V contexts. One of the correlates of this (or in other words of the lack of an independent temporal structure associated with the embedded predicate) is clitic climbing – i.e. the realization of all clitic material in the sole inflectional domain available, that of the Mod/Caus verb. Under the theory of cliticization of Sportiche (1996), Manzini & Savoia (2005, 2007), clitics are in fact directly merged in a dedicated functional domain. In this sense Cl-Mod/Caus appears to instantiate one of those weaker relations between the trigger of propagation (Cl) and its target Mod/Caus that licences only optional application – as indeed predicated by (40).

One may also wonder why within the restructuring set, some verbs do not appear to allow for propagation at all. It is tempting to correlate this with the presence of a prepositional introducer *a* for the embedded sentence, indicating the presence of P/C phase above the embedded predicate. Kayne (1989) argues that restructuring is a label for a set of processes that do not necessarily pattern together. Just one example from standard Italian is provided in (43). Both 'want' and 'try' licence clitic climbing. However 'want' in (43a) is compatible both with the auxiliary 'have' that it selects and with the auxiliary 'be' selected by the embedded unaccusative verb. On the contrary 'try' in (43b) is not compatible with the 'be' auxiliary of the embedded verb.

- (43) a. Abbiamo voluto/siamo voluti sparire
 we.have wanted/we.are wanted to.disappear
 'We wanted to disappear'
 b. Abbiamo provato/*siamo provati a sparire
 we.have tried/we.are tried to disappear
 'We tried to disappear'

Following Kayne, we suggest that the different acceptability of propagation in Cl-Mod/Asp contexts like (41) is part of a larger set of phenomena, whereby predicates allowing clitic climbing may or may not allow restructuring proper. Indeed motion verbs maintain their 'be' auxiliary independently of the nature of the embedded verb. If we factor away clitic climbing and assume the presence of a

phase boundary between the two predicates in (41a-a'), the conditions required in (40) for spreading from the clitic to the verb do not hold, predicting that spreading is impossible.

The data in (41)–(42) are crucial in rejecting some conceivable simplifications of the schema of parametrization that is emerging from (31), (35), (37), and (40). In particular one may consider that optional application in *Saracena* is observed whenever trigger or target are endowed with phi-features, as in (37), and the general condition holds that they are not separated by any phase. For instance in (41)–(42), the clitic is not an argument of the modal/causative verb, excluding obligatory application. However, phi-features are the trigger and there are no intervening phases, which would predict optionality under the alternative account being considered. Yet this is not sufficient to distinguish between (41a-a') and the other examples in (41)–(42). In order to do so, we need reference to the fact that the target of spreading is or is not part of a complex predicate in the sense defined by (40) (lack of independent tense structure associated with the embedded event). Therefore (40) is not dispensable.

2.4 Intermediate conclusions

Summarizing so far the account of variation in /u/ propagation that emerges from the partial schemas in (31), (35), (37), (40) is as outlined in (44).

(44) argument-of	+ <i>Stigl</i> , + <i>Sar</i> , + <i>Cerch</i>	(31)
argument-of via theta/event identification	+ <i>Sar</i> , + <i>Cerch</i> ,	(35)
argument-of via Tns unification	± <i>Sar</i> , + <i>Cerch</i>	(40)
quantifier over	± <i>Sar</i> , + <i>Cerch</i>	(37)

The schema of parametrization in (44) implies that propagation is sensitive to the nature of the relation between the trigger and the target, as defined not only by broad structural notions such as phase or broad operations such as feature checking. Satisfaction of an argument predicate structure is a core environment for propagation. Other relations such as operator-restrictor ones introduce a degree of optionality. Variation is determined by whether the argument of relation is direct, or resulting from the deficiency of event or

temporal structures, yielding complex predicates with different degrees of internal cohesion. It is also sensitive to whether phi-feature content is being propagated (or target by propagation) – or no such content is present as in Neg-V environments. Therefore segmental harmony processes appear to read directly not only the syntactic tree but also the content of its nodes and the interpretive relations they enter into.

The parameters for the application of spreading proposed by Rizzi & Savoia (1993) are compatible with the idea that PF and in particular phonosyntactic processes, only read the abstract node organization of syntax (i.e. sisterhood, dominance and derived notions such as c-command and government), with no access to the LF content of these nodes or to the relations that the node entertain at LF. Hence variation is obtained essentially by refining structural relations, so that government yields F-government, M-government, Agr-Government. Leaving aside empirical matters, this means that the configurations in (44) are not unified under government, but simply encoded into the different notions which government comes to label.

Going on to the minimalist framework, we have already noted that argument-of contexts like D-N, cf. (31), can be mimicked by phi-feature checking. Contexts like A-N, cf. (35), can be modelled by something like Multiple Agree – i.e. though A and N do not check one another, both check D. However some of the relations that we saw to be relevant for optional propagation, for instance Q/Neg-restrictor/scope do not involve phi-feature checking at all. In Caus-V contexts, the phi-features of Caus are checked by an argument (the causer) not originating in the structure of V at all and hence incapable of checking it, albeit abstractly; a similar argument was made in section 2.2 for the Aux-V context.

We are then left with the possibility, notably suggested by D'Alessandro & Scheer (2013), that the notion of phase be refined to capture fine variation in phonosyntactic environments. When such a possibility is applied to the interlinguistic variation depicted in (13), differences in phase organization would mean that for example A-N and Aux-V/v are not separated by phases in the *Saracena* and *Cerchiaro* varieties but they are in the *Stigliano* variety, that no phase intervenes in Neg-V in *Cerchiaro* though it does in *Saracena* and *Stigliano*, and so on, in spite of the strict overall closeness of these dialects. As for the parameter regarding the PIC it seems to us that a restrictiveness problem arises. Upon noting that a certain configuration blocks phonosyntactic rules, one can postulate a phase head; if the syntax does not seem to detect it, we can say that the PIC is not active in the syntax for that phase head. Vice versa, if we need a head to be a phase in the syntax, without there being any detectable effect at PF, we can say that the PIC is not active in the phonology.

By contrast, here we have stuck with the restrictive notion of phase (always associated with a PIC) proposed by Chomsky – and with the restrictive repertory of heads justified by locality conditions on movement and Agree (C, v, D). In our view the phasal domains so defined set the limit conditions for the application of phonosyntactic processes (as of syntactic processes). Within this domain parameters may apply that are not themselves defined in terms of phases, as in (45).

3 Preservation of word final *-a* and the nature of variation

The fine grained variation associated with /u/ propagation summarized in the table in (13) ought to be replicable – either with different languages or with different phenomena in the same languages. Recall that one of the core environments for /u/ propagation (obligatory in all varieties considered) is masculine (singular) agreement between a clitic/determiner and a noun/verb, resulting in realization of the [U] phonological primitive associated with masculine (singular) on the predicative base. In what follows we shall briefly examine a somewhat complementary phenomenon, namely the preservation of word final *-a* in syntactically conditioned environments, whereas in the absence of such conditions, final unstressed nuclei, including /a/ itself, are weakened to [ə] in the relevant varieties (cf. Rohlfs 1966 [1949]: 177).

In reality the preservation of final unstressed vowels in phonosyntactic environments may concern /u/ as well; thus in *Saracena* and *Cerchiara*, final [u] is found only in the contexts in which propagation is also found. We however know from *Stigliano* that the preservation of /u/ is independent of propagation, since the latter can equally well be triggered in the presence of a final [ə]. Furthermore even in *Saracena* and *Cerchiara* the preservation of /u/ only characterizes a subset of triggers for propagation. Specifically the data in (10)–(12) show that final /u/ is never preserved on lexical bases (adjectives, nouns, lexical verbs).

In the three dialects under examination, however, the preservation of final /a/ is quite systematic, as shown by the data in (45)–(47). In nominal contexts, [a] is normally preserved as the final inflection for feminine (singular), as illustrated in the (a) examples. Non-etymological final /a/ is also attested, specifically with quantifiers, cf. for instance the Q-N contest in *Stigliano* in (37a). In verbal contexts, *Cerchiara* and *Saracena* preserve final /a/ only on clitics; *Stigliano* preserves it on a set of verbal constituents which include auxiliaries,

N-A	+	[na 'fimməna 'ʎavətə]	'a woman tall'
Q-N	+	['pikka: 'karnə]	'little meat'
b. Cl-V	+	[a 'avə]	'it I.wash'
Aux-V	-	[a'vi: n'næ:tə]	'(s)he.had born'
Caus-V	-	[mə fa'tʃi: d'durmə]	'me (s)he.made sleep'
Cop-A	-	['jɛrə g'gavətə]	'she.was tall'
V-AdvP	-	['durmə p'pikkə]	'she.sleeps little'
c. DP-V	-	[kwilla 'fimməna 'durməðə l'læ]	'that woman sleeps there'

Cerchiara

The data in (45)–(47) are tabulated in (48). If we compare (48) with the table in (13) concerning the syntactic contexts for /u/ propagation, it is evident that (13) and (48) only partially overlap in the varieties under study. As it turns out, in *Stigliano* final /a/ realization applies has a much wider domain of application than /u/ propagation; the reverse appears to be true in *Saracena* and *Cerchiara*. Therefore *Saracena/Cerchiara* have fewer contexts of application for /a/ preservation than *Stigliano*. At the same time, contexts where the realization of final /a/ is optional *Stigliano* includes all those where /u/ propagation is optional in *Saracena*. In other words, the distribution of /a/ propagation follows in this respect the parameters set out in (45). Furthermore in *Saracena* and *Cerchiara*, final /a/ realization applies only within the DP/AP and on clitics, i.e. when /a/ externalizes nominal class (gender). The possibility of such a parameter is implied by reference to phi-features in the table in (44).

(48)	<i>Cerchiara/Saracena</i>	<i>Stigliano</i>
a. D-N/A	+	+
A-N	+	+
N-A	+	+
Q-N/A	+	±
b. Cl-V	+	+
Aux -V	-	±
Copula-A	-	±
Mod/Caus-V	-	±
V-DP	-	±
c. DP-V	-	-

From a phonological point of view, we may treat /a/ as an underlying form which in phonologically and syntactically appropriate contexts is not weakened to [ə] by the rule that otherwise neutralizes unstressed final vowels. What is directly relevant for present purposes are the syntactic conditions on preservation. Relevant data are discussed for the Naples variety by Bafile (1997) and by Ledgeway (2009). Bafile (1997) proposes that the relevant syntactic context is

determiner – lexical head, while for Ledgeway (2009) the preservation of *-a/-u* corresponds to the lexical properties of a ‘restricted number of items’. When these items form a constituent with the following word, the weakening of the vowel to [ə] may not take place, yielding the realization of the full vowel as a result.⁴

In terms of the parameters developed in (44), *Cerchiara* and *Saracena* preserve /a/ only in phonosyntactic environments where /a/ externalizes nominal class/gender. This parameter of variation is easily added to the schema in (44). Furthermore, as already noted, *Stigliano* has optional preservation of /a/ in all contexts where propagation of /u/ is optional in *Saracena*, and in the additional Aux-V context. In other words, the fundamental split between an N inflection trigger and others is observed in *Stigliano* as well, where obligatoriness is reserved for it, thus excluding Aux-V. These conditions are summarized in the table in (49), which both confirms the parameters of table (44) and further refines them.

(49)	N class/gender	other phi-features
argument of	+ <i>Cerch/Sar</i> , + <i>Stigl</i>	
argument of		
via theta/event identification	+ <i>Cerch/Sar</i> , + <i>Stigl</i>	± <i>Stigl</i>
argument of (via other)		
quantifier of	+ <i>Cerch/Sar</i>	± <i>Stigl</i>

Putting the summary of /u/ propagation in (44) together with that of /a/ preservation in (49), we conclude that the realization of final /a/ and the spreading of /u/ jointly insure the externalization of nominal morphology in the key argument-of contexts (D-N and Cl-V) in all varieties. Thus as pointed out by Bafile (1997), the realization of final vowels has obvious relevance from a morphological point of view, namely that of “saving from weakening and preserving a minimum of segmental content ([A], [I] o [U]) in vowels corresponding to the endings of certain morpholexical items”. At the same time, in *Stigliano* the preservation of final /a/ covers contexts where /u/ propagation is not observed. Vice versa, in

⁴ Bafile (1997) connects the realization of final vowels in phonosyntactic contexts in Neapolitan to a general treatment of unstressed nuclei. Bafile observes that in pre-tonic nuclei, back vowels have a raised outcome [u]; front vowels are realized as [ə] or variably as [i]; in post-tonic position the neutralized outcome [ə] is normally attested. [a] is found both pre- and post-tonically. She argues that the context in which a final unstressed nucleus is not weakened to [ə] corresponds to the phonological phrase; in this context the final unstressed vowel is in a pre-tonic position with respect to the stressed nucleus which heads the prosodic constituent. In other words, a prosodic structure is created analogous to the word-internal structure where pre-tonic nuclei do not neutralize to [ə] but are at least partially preserved.

Saracena and *Cerchiara* obligatory /u/ propagation is found where /a/ preservation is absent. In short, different phonosyntactic processes (here /u/ propagation and final /a/ realization) are sensitive to different features and morphosyntactic relations, within the same basic set.

The comparison between the tables in (44) and (49) raises some fundamental questions as to the nature of parametrization. If we associated the parametric values in (44) and (49) with the morphemes (including) /a/ and /u/ in the lexicon, this implies using the lexicon improperly as a repository for computations instructions/constraints – essentially the same problem that we raised for D'Alessandro & Scheer's (2013) proposal in section 1.2. Incidentally the likelihood that parametrization of phases and the PIC is involved in the phonosyntactic phenomena of /a/ preservation and /u/ spreading seems to us further diminished by the need to associate it with the single morphemes (including) /a/ and /u/.

We believe that the core insight expressed by the lexical parametrization hypothesis is best reformulated in relation to the crucial role that the lexicon plays in the operation(s) of externalization. We may construe externalization essentially as an instruction to pair some sensory-motor content to some syntactico-semantic content, along the lines of (50). Most of externalization is carried out by the lexicon, which we may think of as a procedure to cut up the conceptual universe into linguistic units. Parameters naturally arise in the course of lexicalization, corresponding to whether certain conceptual properties are or are not lexicalized, and in which way. However if we take the suggestion of Chomky (2001) that linear ordering is also a property of externalization, precedence would also be determined by externalization (dominance relations remaining unchanged). This leads to a less restrictive conjecture about parameters, tying them to externalization, as in (51), of which lexicalization forms crucial part.

(50) Externalize

Pair phonological information x with syntactico-semantic information y

(51) Parametrization

Parameters arise in externalization

We suggest that the phenomena schematized in (44) and (49) should be seen in the perspective suggested by (50)–(51), as externalizations of morphosyntax by phonology, and as such subject to linguistic variation. We attribute to propagation the status of other harmony processes, whereby a property perceptually vulnerable and in any event relevant for the purposes of recognizability gets extended over a phonological domain, with the result therefore amplified and maximized (Kaun 1995, 2004; Walker 2005; Nevins 2010). Kaun (1995) observes that harmonies increase the exposition of the hearer to morphophonological elements

characterized by vulnerable phonological properties (Kaun 1995; Walker 2005): “harmony serves to extend the duration of phonetic information which is phonologically important (i.e. distinctive), but which is transmitted by means of relatively subtle acoustic cues” (Kaun 1995, vii). In other words, harmony processes have the effect of extending over a temporal sequence a vulnerable quality, not easily identifiable, increasing the exposure of the hearer to this phonological quality, preserving and increasing its perceptibility.

Some of the conclusions of Kaun agree with the restrictions observed in section 2.1. Kaun (2004) observes that rounding is a subtle property from the articulatory and acoustic point of view, at least in the sense that it is sensitive to other properties, so that it is maximally recognizable when associated to back/high vowels. For instance round harmonies tend to avoid front vowels and low vowels, explaining in particular the fact that in the varieties studied here rounding does not normally apply to front vowels. The phenomena that we are concerned with are to be seen as phonological constructs that externalize syntactic informations, namely those concerning inflectional/agreement properties. Parametrization therefore concerns the logical relations being externalized.

4 Conclusion

From a phonological point of view, we have studied a harmonic process triggered by the element [U], which according to Kaun (1995, 2004) has a special status in harmonic processes because of its perceptual weakness. Indeed harmony processes have the effect of extending some phonological properties on several positions within a prosodic domain. In present terms a [U] element must be present on the stressed nucleus head of the prosodic domain in order to licence [U] on a pre-tonic nucleus.

This leads us to the major stream of our discussion, involving the syntactic conditions on /u/ propagation. As a consequence of these conditions, the net effect of /u/ propagation is that of multiplying acoustic cues leading to the recognition of certain morphosyntactic categories, specifically nominal class/gender and more generally the phi-feature complex. This is consistent with the conception of the SM interpretation component as externalization of the syntax within the general framework of the minimalist program (Chomsky 1995) and more specifically of the biolinguistic program (Berwick & Chomsky 2011). Beyond this common core, fine variation is observed across different varieties (and within the same variety) according to which features must or can be involved and to a scale of syntactico-semantic relations of growing generality.

Defining the relevant relations has required us to delve in some depth into syntactic analysis – with a view however to defining the issue that gives the title to this work, i.e. what is externalized exactly at the SM interface. Here we have argued that SM does not simply see syntactic nodes and structural relations among them (as in Rizzi & Savoia 1993). The structural notion of feature checking (e.g. Elordieta 1999, 2008) comes much closer to capturing the relevant environments. In particular given appropriately abstract syntactic structures, and an appropriately abstract notion of feature checking, all of the environments of obligatory and optional application could be conceivably accounted for in terms of feature checking.

As the last point of the present work, however, we aimed to push the logically strongest thesis, namely that externalization sees not only morphosyntactic information but has full access to the interpretive properties read by the Conceptual-Intentional (CI) interface. Specifically, following Manzini & Savoia (2005, 2007, 2011), phi-feature inflections are construed as elementary argument. Agreement does not delete uninterpretable features (feature checking) but rather matches sequences of locally identical features creating a single discontinuous referent. In this perspective, parameters on /u/ propagations are defined by whether the trigger directly saturates the target or rather the trigger and the target agree in the sense just defined, or some other relation holds between them (e.g. operator, lexical restrictor). The same conditions are active on the phonosyntactic process of /a/ preservation in final position. There is no evidence for specialized buffer components mediating the relation between syntactic structure and SM interpretation. If our stronger thesis is on the right track, such buffer structures are excluded, since intervening between the SM interface and the syntactico-semantic (CI) one, their effect would be to prevent full access of Spell-out (externalization) to CI.

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