Silent lateral actors:
the role of unpronounced nuclei in morpho-phonological analyses

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1 Introduction

Government Phonology (henceforth GP; Kaye et al. 1985, 1990, Charette 1991 a.o.) builds on two theoretical proposals put forward around the 80s: Autosegmental Phonology (Goldsmith 1976) and the Structural Analogy Assumption (Anderson 1987). The desideratum made explicit by the latter is the development of a theoretical model of phonology that is ideally isomorphic to syntax, both on the computational and the structural side. As for the latter, structural similarities between syllable structure and X-bar phrase structure were not unheard of, as Onset, Nucleus, and Coda were proposed to mirror Specifier, Head, and Complement (Levin 1985, Fudge 1987). GP revised this hypothesis by getting rid of what in syntax would correspond to the phrasal node, namely the syllable, and conceiving phonological strings as sequences of onsets and rhymes, the latter obligatorily containing a nucleus (which is claimed to project the rhyme node) and optionally a coda consonant. As research within the GP framework progressed, the traditional syllable structure flattened even more, leaving no room for rhymes and codas (Lowenstamm 1996, Scheer 2004). In such a view, there is no arboreal structure in phonology, which is rather conceived of as flat, i.e. as a sequence of consonants and vowels that may host some melodic content or not.[1] On the computational side, striving for phonology-syntax isomorphism meant getting rid of the phonology-specific rule ordering (Bromberger and Halle 1989) and giving a much more central role to constraints defining representations' well-formedness.

In syntax, and specifically in Government and Binding (henceforth GB, Chomsky 1981, 1982, 1986), this development is represented e.g. by the formalisation of movement in terms of *Move* α (now /*I-Merge*), which is supposed to apply freely, the resulting structures being checked against well-formedness constraints such as Subjacency, the Empty Category Principle (ECP), etc. Similarly, in phonology, after the development of Autosegmental Phonology, basic operations accounting for the relation between melodic and prosodic

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[1]Despite this departure from the the Structural Analogy Assumption, the latter has not been abandoned altogether, and has indeed been recently extended far beyond the syllable-phrase structure parallelism (Backley and Nasukawa 2019).

representational units fall under the control of constraints such as the Well-Formedness Conditions, the Obligatory Contour Principle, the No Crossing Constraint, etc.

Among the constraints holding in GP, we find the already mentioned ECP and Proper Government. In this paper, I focus on these two theoretical devices, and, in particular, on some formal issues concerning the distribution and the governing strength of *apparently* empty nuclei. After discussing such issues (Section 2), I will introduce Turbidity Theory (henceforth TT; Goldrick 2001; Section 3), which provides the formal tools to solve the issue just mentioned. In a nutshell, this theory allows us to decompose the association of melody and prosodic node into two asymmetrical relations: *projection* and *pronunciation.* The former relates a specific prosodic node with its own (underlyingly specified) melodic content. In this case, a given melodic content is said to be projected by a prosodic position. The projection relation alone, though, does not guarantee that the melodic content gets phonetically interpreted. For that to happen, the melodic content needs to be linked back to the prosodic node via the pronunciation relation. Crucially, this system allows for (i) the refinement of the empty categories typology, enabling us to distinguish between empty nuclei (no *projected* melodic content) and unpronounced nuclei (no *pronounced* melodic content), and (ii) maintaining the standard GP assumption that the lateral strength of nuclei correlates with their melodic content, with only melodically filled nuclei being able to discharge lateral forces, e.g. (proper) government. In standard approaches, it is generally assumed that lateral strength correlates with a nucleus being phonetically interpreted, which means that unpronounced nuclei are not licit lateral actors. I argue that this might be too simplistic a view, and that the lateral strength of a nucleus correlates with the latter's phonological complexity, rather than depending exclusively on whether that nucleus corresponds to an acoustic event or not. In other words, unpronounced contentful nuclei might be licit lateral actors, whereas the only passive spectators are empty nuclei.

In what follows, I show how such a system allows for a straightforward account of disparate processes, such as the vowel-zero alternations in the Italian dialect spoken in Finale Emilia (Section 4.1.1) and in Hungarian (Section 4.1.2), glide formation in Classical Arabic (Section 4.1.3), and the intricate relation between stress (position) and length and word-final vowel-zero alternations in Colloquial Egyptian Arabic (Section 4.1.4).

2 Some formal issues of Proper Government

One of GP's most renowned trademarks are empty nuclei. Something similar was already around in the early 80s (Anderson 1982, Spencer 1986), but it is only with the advent of GP that such a device received a thorough formalisation. This parallels what happened in syntax, where, although the debate on empty elements can be traced back to the onset of generative grammar, empty categories become a standard feature of the generative theoretical toolkit with the development of GB (Hartmann et al. 2008). In GB, the distribution of these categories was regulated by Proper Government (henceforth PG), which licenses the empty categories/traces left back by movement only if governed/bound by an antecedent (Lasnik and Saito 1984, Rizzi 1990). PG basically allows for the recovery of the semantic content of the trace, and thus for the derivation of a well-formed syntactic representation. Inspired by the Structural Analogy Assumption, Kaye et al. (1990) introduce PG in phonology. As in syntax, PG is meant to account for the distribution of empty categories. In phonology, the latter usually correspond to nuclei that are part of the phonological representation, but receive no phonetic interpretation. These objects are known as empty nuclei (henceforth EN). Also in this case, what is at stake is the well-formedness of representations containing empty categories: EN need to be given the right to stay silent. In GP, this is granted via PG, which applies in a configuration where a phonetically realised nucleus properly governs a preceding EN. Clearly, this does not hold for final empty nuclei (henceforth FEN), as they are not followed by any audible vowel. FEN are thus argued to be licensed by means of a dedicated parameter. Besides FEN, there are two other special cases: EN that are enclosed within an Infraconsonantal Governing domain (i.e. coda-onset sequences and branching onsets) or that precede a s+C word-initial cluster (where they are *magically* licensed). As mentioned in Section 1, in strict CV (Lowenstamm 1996, Scheer 2004), phonological structures have been simplified by removing prosodic constituents such as rhymes and complex onsets, and flattening the structure down to a sequence of simple onsets and nuclei. Despite the fact that these adjustments increase the number of EN, strict CV improved in conceptual elegance and simplicity (e.g. because it concludes the lateralization process of the syllabic structure started by GP; Scheer and Cyran 2018), and it apparently loses no empirical coverage. [2]

However, as recently pointed out by Bafile (2020), strict CV does actually seem to show some shortcomings in accounting for cases in which segmentally similar consonant sequences are *apparently* repaired via epenthesis in some forms but not in others. Such forms can be found e.g. in the dialect of Finale Emilia (Italy), where [ˈsalɐs] 'willow' alternates with [ˈsalsi] 'willows', and [ˈdols] 'sweet$_{\text{M.SG}}$/cake' alternates with [ˈdolsi] 'sweet$_{\text{M.PL}}$/cakes'. In these forms, the /ls/ sequence surfaces as such if followed by the PL exponent /i/, but when it is followed by the zero M exponent, it can either surface as such ([ˈdols]), or it can be interrupted by a vowel ([ˈsalɐs]). The issue is obviously how to account for the different behaviour of an apparently identical phonological string, and what is the nature of the vowel interrupting the relevant sequence. Is it epenthetic, or is it recorded in the lexicon? Furthermore, from a strict CV perspective, another question arises concerning the parameter setting of FEN. Are Finale Emilia FEN able to properly govern a preceding EN, as suggested by [ˈdols], or not, as suggested by [ˈsalɐs]? This contrast is shown in Figure 1, where the relevant forms are given a strict CV representation (throughout the paper, PG is represented as a leftward arrow on top of the relevant representation).

In Figure 1b, V_3 properly governs V_2, which is thus allowed to stay silent. This suggests that the

[2] Also the typology of EN looks the same, as they can occur either if properly or parametrically governed, or if occurring within an Infrasegmental Government (TR) domain. Some attempts have been made to get rid of *magic* licensing. For instance, Carvalho (2017), Prince and Ferré (2020) and Scheer and Ségéral (2020) propose that the word-initial /s/ fills in/spreads to the EN occurring between /s/ and C. In a scenario like this "Magic Licensing becomes unnecessary [as] there is no empty nucleus to be [properly governed] since [the relevant EN] is occupied by /s/" (Carvalho 2017:600). Note that in these proposals /s/ is *doubly* associated both with a C and with the following V node. At the same time, it is interpreted by the phonetic module *only once* as a short sibilant. I maintain that this is another case in which standard autosegmental associations do not seem to be enough. An approach such as the one proposed in this paper (see below) would possibly provide for a better solution. For instance, one could argue that /s/ is *projected* by both the C node and the following V node, but is *pronounced* only in the C node. A similar analysis could be provided also for TR clusters, thereby refining the proposal of Carvalho (2017). I leave this for future work.

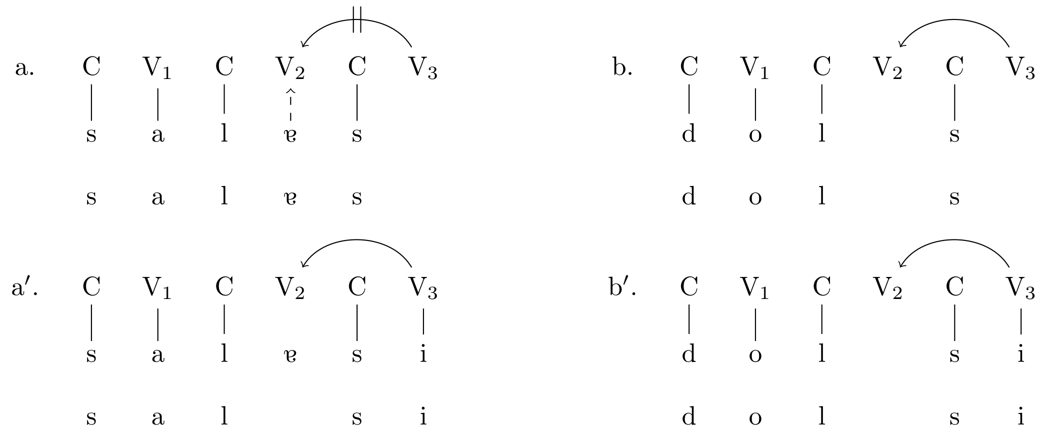

Figure 1: Gvt failure with floating melodic primes

parameter assigning lateral actorship to FEN is ON. However, in Figure 1a, V_3 does not seem to be able to properly govern V_2, as the latter surfaces as [ɐ]. In this case, it would hence look like the FEN parameter is OFF. In standard strict CV (Scheer 2004), this tension is explained away by assuming that the difference between the two forms boils down to a representational difference between the relevant EN: whereas V_2 in Figure 1b is *really* empty, the one in Figure 1a comes with a floating melodic prime. As N with floating primes are left unpronounced if followed by a proper governor, this solution would only hold if FEN is a proper governor just for EN, and not for N endowed with floating primes. In other words, FEN "can only govern nuclei that do not possess any floating melody in the lexicon" (Scheer 2004:644).

Thus, it seems that, in order to account for cases such as the one just discussed, it is necessary to make FEN lateral actorship sensitive to the distinction between truly empty nuclei and nuclei with floating melodic primes (known as *yer*; Rubach 1986, Scheer 2011), or, as suggested by Bafile (2020), retreat from the bold EN-proliferating positions of strict CV towards safer standard GP shores, where the difference between [ˈsalɐs] and [dols] is due to the fact that only the former displays a EN in V_2, whereas the latter lacks the corresponding EN and /l/ and /s/ are underlyingly adjacent to each other. In her view, the problem is that "the formalism of strict CV theory and its conception of empty nuclei is not able to properly characterise the distinction between *true* empty nuclei and alternating empty nuclei" (Bafile 2020:103).[3]

In line with Bafile (2020), I argue for the need of a more adequately formalised difference between various types of silent nuclei. Differently from her, though, I do not argue that we necessarily need to recede from strict

[3] As pointed out by an anonymous reviewer, the alternative version of strict CV proposed by Cyran (2010) would provide a different explanation for the patterns in Figure 1. Also in this case, the relevant difference between the form in Figure 1a and the one in Figure 1b is that the former has a floating prime in V_2. In this case, though, the presence of the floating prime would prevent the leftward interonset government between /l/ and /s/ to apply. This would be due to the fact that the melodic primes of the two relevant C nodes are not adjacent. If there is no floating prime, as in Figure 1b, /l/ and /s/ can see each other, and interonset government can apply and 'lock' the intervening EN. In such a system, there would in fact be no need to make FEN actorship sensitive to the difference between EN and yers, nor to have a positive setting of the FEN actorship parameter. As a matter of fact, no internuclear government would be required at all, its effect deriving from the combination of interconsonantal governing relations, licensing, and a constraint on sequences of EN (e.g. Rowicka 1999's NoLapse). Note that the adoption of Cyran (2010)'s system would also allow us to avoid the formal issues related with yers (see iii) below), as the relevant licensing mechanism would operate at the melodic level, where the presence of a floating prime can be spotted.

CV. Rather, I propose a refinement of the representational technology that is compatible with both theories and improves on a few interrelated drawbacks, such as (i) the arbitrary and diacritic-like character of the parameter responsible for FEN's government strength, (ii) the incoherent relation between representational complexity and government strength, and (iii) the formally unclear status of yers.

Let us start from the last drawback. According to the autosegmental tenets, melodic primes live in their specific tier(s), which is different from the one hosting prosodic nodes such as C and V. If the melodic primes are floating, by definition, they are not associated with any prosodic node, and if the prosodic nodes are not associated with any melodic prime, then they are empty. The association of floating melodic primes and prosodic nodes happens as a result of phonological operations (e.g. linking and spreading), but before this happens, namely at the level of underlying representation, yers are formally indistinguishable from EN. This means that a (E)N should not be able to see whether under the preceding V node there is some floating prime or not. Thus, in Figure 1, the FEN should not be able to see whether under V_2 there is a floating prime, and as a consequence there would be no way to account for the difference between Figure 1a and Figure 1b.

There seems to be a further problem with the formal status of yers, which is not immediately related to the data discussed above, but is probably worth pointing out. In the literature, it is usually assumed without discussion that the floating melodic primes of yers cannot get associated to anything else than the V node under which they are represented. Intuitively (and diachronically) it makes perfect sense, but the formalism traditionally employed does not allow us to properly capture this intuition. Indeed, if one assumes a feature theory where the primes for consonants and vowels are the same (e.g. Element Theory, Backley 2011), nothing would in principle prevent a floating prime to get associated to one of the C nodes flanking V. This possibility is generally not entertained because it is implicitly assumed that, in the case of *yers*, a specific V node and some floating melodic prime belong to each other.[4] However, the standard autosegmental technology does not allow for a neat formalisation of this exclusive relationship: if there is no underlying association between a V and some prime, the latter cannot be defined as belonging to the former. As I will show later, the asymmetric relations of Turbidity Theory provide a solution to this formal problem (note that some phonological process could still apply that shifts the pronunciation of some primes from one prosodic node to another (Section 4.1.3).

Let us now consider the other two drawbacks affecting standard GP-based approaches, namely (i) the arbitrariness of the FEN lateral actorship parameter, and (ii) the incoherent relation between the representational complexity of N and its governing strength. In GP, government strength is traditionally assumed to be proportional to representational complexity, where complexity is a function of the number of elements making up the segment. This assumption is known as the Complexity Condition (Harris 1990):

> Let α and β be melodic expressions occupying positions A and B respectively. Then, if A governs

[4]Note that something similar is recognised by (Faust et al. 2018:7), who admit that "for [their] type of analysis, it is not the case that such segments are completely unassociated to any position: rather, they do "belong to" a designated position, but their realisation in it is grammatically controlled."

B, β is no more complex than α.[5]

Thus, governees cannot be more complex than governors. The correlation between representational complexity and governing (and licensing; Cyran 2003, 2010) strength holds throughout the entire phonological string, but breaks down in word-final position. In this case, rather than from complexity, FEN's governing strength is traditionally argued to follow from the setting of an ad hoc parameter (Scheer 2004, Scheer and Žiková 2010). Some languages have this parameter turned ON, so their FEN can properly govern. Others have it OFF, so their FEN cannot govern a preceding EN. I maintain that this might represent a problem, or at least a mark on the theoretical elegance of GP-based frameworks, as such a parameter looks like a betrayal of the autosegmental mantra inspiring GP-related frameworks, according to which, given the right representation, a process would follow. It thus sounds reasonable to reduce resorting to parameters as much as possible, also because there doesn't seem to be so much need for parameters in phonology to start with. In strict CV, FEN are the targets of two related parameters, one concerning whether or not a language allows them, and one concerning their lateral actorship (these two parameters can in fact be further reduced to one; Cyran 2010), whereas another parameter determines whether words have an empty initial CV or not (Scheer 2012). Apart from these, no other parameter has been proposed (see van Oostendorp 2015 for some discussion).

In this paper, I explore an alternative approach, where FEN parameters are translated into representational terms (in this sense, this is similar to proposals such as the Borer-Chomsky conjecture (Borer 1984, Chomsky 1995, Baker 2008). This would allow us to tie the lateral strength of FEN to their representational complexity, and the variation in FEN lateral strength across and within languages to representational variation, namely either to the lexicon (Section 5), and/or to the morphosyntactic environment a form occurs in (Cavirani and van Oostendorp 2019).

This brings us to a crucial aspect of the current proposal. I argue that (i) it is necessary to provide a formalism that allows us to distinguish between various kinds of silent nuclei, (ii) *yers* are formally inadequate objects, and (iii) we shall not give up on the direct relation between representational complexity and lateral strength, as this would allow us to downsize the resort to, and ideally abandon, the FEN lateral actorship parameter. The key to bringing all these pieces together is the formal distinction between *phonetic* and *phonological* emptiness, which enables us to account for cases in which silence conceals complex phonological representations. From this perspective, silent non-empty N are phonologically similar to full N, both in terms of melodic content and, as a consequence, of lateral strength. The difference is a matter of phonetic interpretation: full N are always pronounced, whereas silent non-empty N are allowed to stay silent in particular circumstances, namely when properly governed (or, if one were to adopt Cyran (2010)'s framework, if the language allows silent non-empty N to license the content of the preceding C). As I discuss below, this

[5]While stressing the role of representational complexity, the Complexity Condition does not make any reference to whether an expression is pronounced or not, nor a reference to pronounciation is made in Scheer (2004)'s assumption concerning the impossibility of FEN to properly govern yers. What matters is the phonological make up of the segments related by government, not whether they are phonetically interpreted or not.

difference in phonetic interpretability is encoded in their phonological makeup. Crucially, the similarity in terms of lateral strength of silent non-empty nuclei and full nuclei allows us to maintain the direct relationship between representational complexity and lateral strength. This obviously also holds for word-final nuclei, whose lateral strength do not need to be controlled by a parameter any longer. The formal tools we need to distinguish the two kinds of emptiness are provided by a specific take on the relation between melodic primes and prosodic nodes that falls under the name of Turbidity Theory. This theory is described in the following section.

3 Turbidity Theory

Turbidity Theory (Goldrick 2001, van Oostendorp 2008, de Castro-Arrazola et al. 2015, Torres-Tamarit 2015) was first proposed within the Optimality Theory framework (Prince and Smolensky 1993). Rather than building on Correspondence, it builds on Containment, which assumes that the input is always contained in the output. As a consequence, what in other frameworks is conceived of as deletion, in TT is conceptualized as phonetic underparsing. This means that the relevant phonological object is not deleted altogether. It is still part of the phonological string, but it does not make it to the phonetic module. Because of this, TT provides us with the tools to formally express the difference between truly empty and silent nuclei. These tools are the two different relations linking melodic primes and prosodic nodes to each other, which derive from splitting the symmetric autosegmental relation in two components: a projection relation expressing the lexical affiliation of a melodic prime to a given prosodic node, and a pronunciation relation expressing the phonetic interpretation of a melodic prime in a specific prosodic node. Graphically, these relations are represented as arrows: an arrow pointing from the prosodic node to the melodic prime stands for the projection relation, whereas an arrow pointing from the melodic prime to the prosodic node represents the pronunciation relation. This is illustrated in Figure 2, where phonological objects are represented that show no melodic content and no relation (V_1), only the projection relation (V_2), or both the projection and pronunciation relation (V_3). The first represents an EN, the last a full N, and the middle one represents a *yer*, namely a silent non-empty N (henceforth eN). As customary, floating primes are represented as primes lacking any prosodic association. When they get associated with a prosodic node, they are linked to the latter via a pronunciation relation. Note that since at the level of underlying representation they are not associated with any prosodic node, they have no projection relation (nor can one be added due to Consistency of Exponence; see below). Thus, melodic primes with the pronunciation relation only correspond to what is usually referred to as epenthetic vowels (in strict CV), namely vowels that are integrated in the phonological string as a result of phonological computation.[6] In Figure 2, as well as throughout the whole paper, I will represent melodic primes as elements (Backley 2011).

[6]This is partly reminiscent of a proposal put forward by Zikova (2008), who makes a distinction between floating primes that are "lexically specified for associating to any EN no matter whether the target of association is governed or not [and floating primes that] can only associate to ungoverned nuclei" (Scheer and Žiková 2010:482). This could be rephrased in TT terms by representing the former as a melodic prime endowed with a pronunciation relation.

Floating prime	EN	eN	Full N
	V_1	V_2	V_3
		↓	↕
|A|		|A|	|A|
Ø	Ø	Ø	[a]

Figure 2: Turbidity Theory representations

In TT, projection relations are part of the lexical representation of a morpheme, and cannot be altered because of Containment and Consistency of Exponence (van Oostendorp 2008). In contrast, as a result of the pressure exerted by structural constraints holding on surface representations, the pronunciation relations can be modified. Analogously to what happens in syntax, the ECP and PG can be conceived of as structural constraints evaluating the well-formedness of surface phonological representations.[7] More precisely, assuming a direct relation between representational complexity and lateral strength (Harris 1990), PG behaves like a constraint favouring representations where a nucleus lacking the pronunciation relation is followed by one which is representationally no less complex. For this to work, TT relations must be included in the calculation of representational complexity, which would thus be a function of the number of elements, as well as of TT relations. Hence, in the representations in Figure 2, complexity *and* lateral strength decrease from right to left. V_3 is the most complex, and is endowed with a full lateral potential. V_2 is slightly less complex, but it contains phonological material, so it can still be a lateral actor. V_1 is phonologically empty, which makes it laterally powerless. As for the floating prime, it has no lateral strength per se, but it can contribute to enhance the one of the V node it gets associated to as a result of phonological computation by increasing the latter's complexity.

Phonetically, the melodic content of V_3 is faithfully interpreted, as dictated by its pronunciation relation. As for the other two nuclei, their phonetic interpretation depends on the context in which they occur. If followed by a proper governor, they can stay silent, otherwise they are interpreted according to their phonological content: EN (V_1) are assigned a default epenthetic melodic content, while eN (V_2) have their melodic prime(s) faithfully interpreted. As for floating primes, I follow the commonly held assumption that they are pronounced if associated to some prosodic node. In all these cases, the phonetic interpretation is formalised as a pronunciation relation.

This approach provides a solution to the issues mentioned in the previous section. The problem related to the formalisation of *yers* (qua V-floating prime pairings) vanishes, as there is no yer to start with. *Yers* are here conceived of as prosodic nodes projecting their own melodic prime. The latter is part and parcel of the phonological representation and can be detected by the following N, which can discharge on it its government power or not depending on the Complexity Condition. If government cannot be discharged, the melodic

[7]See Polgárdi (1999), Rowicka (1999), Harris and Gussmann (2002), Cavirani (2015) and Faust and Torres-Tamarit (2017) for attempts at translating GP mechanisms into constraint interaction, and Carvalho (2019) for a discussion of this possibility.

content of eN gets its pronunciation relations and becomes audible[8]. As for the parametrically determined government strength of FEN, this can now be directly related to representational complexity. This obviously implies a distinction between FEN and FeN. FEN are phonologically empty and cannot properly govern a preceding eN, as the latter is more complex than the former. On the other hand, FeN are endowed with some phonological content, and can properly govern a preceding eN/EN.[9]Despite the fact that this claim may sound outlandish with respect to strict CV assumptions, note that sequences of silent N are quite widespread (cfr. the many languages displaying CCC clusters). To account for those, many flavours of interconsonantal government relations have been introduced (Scheer 2004). The proposal put forward in this paper can be seen as an alternative way to account for these apparently ill-formed sequences, one in which the effect of interconsonantal governing relations rather depends on N's representational complexity.[10]

In what follows, I show how the explicit formalisation of different kinds of silent nuclei allowed by TT can shed light on a wide set of data, which can be given a straightforward and relatively simple analysis.

4 Empirical tests

In this section, I provide some evidence for the presence of and the role played by eN both word-internally and word-finally. I will start from the former, arguing that by assuming the presence of eN we can provide a straightforward, strict CV-compatible account of the Finale Emilian pattern introduced in Section 1 (Section 4.1.1) as well as of a similar pattern occurring in Hungarian (Section 4.1.2). Furthermore, I will show that eN can also be found in Classical Arabic, and that its presence was already suggested by medieval Arab grammarians, who hypothesize that an opacity issue in Classic Arabic phonology - glide formation - can be solved by assuming the presence of a silent N (Section 4.1.3). Finally, I will show that the distribution of stress and vowel length, as well as the spell-out of inflectional markers in Egyptian Colloquial Arabic, provide support for the distinction between FEN and FeN. (Section 4.1.4).[11]

[8]As suggested by Guido Vanden Wyngaerd (pc), the automatic process that adds a pronunciation relation can be thought of as a sort of last resort mechanism, similar to *do*-support in syntax

[9]Hulst and Ritter (2000) note that GP already has the tools to account for opacity. This is because phonological representations can feature melodic primes that are not necessarily associated with prosodic positions and are thus unpronounced. As will become clearer further down, the main difference between a 'traditional' GP-based approach and one in which TT melody-prosody association relations are resorted to boils down to the fact that only in the latter unpronounced melody can still be phonologically active, as it is still integrated in the phonological structure (via the projection relation). This makes it possible to distinguish between cases in which an empty position is completely inactive, and cases in which silence conceals some melody that is phonologically active.

[10]As already mentioned, an alternative could be thought of that aligns with Cyran's work. For instance, assuming that the complexity of a given N correlates with the amount of consonantal structure it licenses, the restriction on sequences of silent N can be related to the complexity of the preceding consonantal structure. Whether or not a silent N is allowed in a given position might thus be related to whether or not its representational complexity allows it to license its onset, rather than on it being properly governed by a following N. I leave the investigation of such a hypothesis for future research.

[11]Further evidence for this distinction is provided by Cavirani and van Oostendorp (2017) and Cavirani and van Oostendorp (2019), who discuss cases in which final devoicing (in Dutch dialects) and vowel epenthesis in word-final TR clusters (in Italian dialects) are blocked. Some other piece of evidence could come from French, where e.g. *petit* 'small' surfaces with or without the final /t/ depending on whether it agrees with a F (*petite bête* 'little beast$_{\text{F.SG}}$' [pəˈtitbɛt]) or M noun (*petit canard* 'little duck$_{\text{M.SG}}$' [pətikanaʀ]). In this case, one could argue that adjectives agreeing with M.SG nouns end with a FEN, whereas F.SG adjectives have their word-final V slot filled in e.g. with a(n unpronounced) schwa, which licenses the preceding /t/. The latter (as well as schwa) would thus be associated with its C slot via a projection relation only, its pronunciation being licensed by the following eN.

4.1 Case studies

4.1.1 Finale Ligure vowel-zero alternation

As discussed above, the melodic content of eN is integrated in the phonological representation and can be detected by the following N. If the latter is no less complex than the preceding eN, the latter can be properly governed and stay silent. On the other hand, if government cannot be discharged, the melodic content of eN receives the pronunciation relation and is phonetically interpreted. Let us see how this system applies to the case discussed by Bafile (2020), which is given a TT representation in Figure 3.

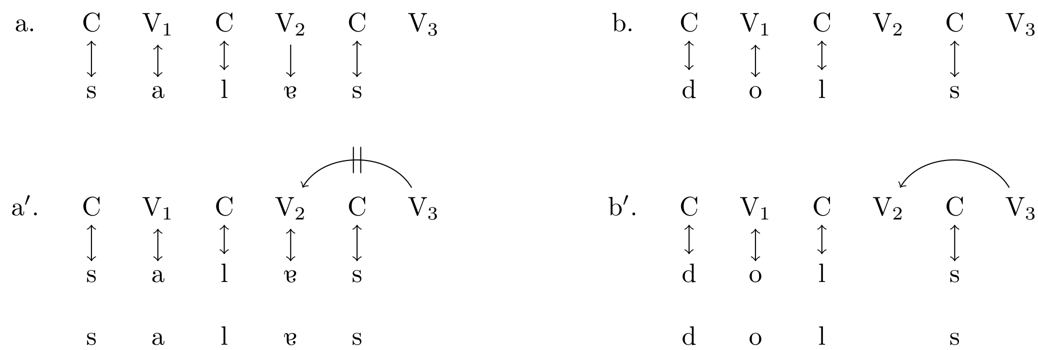

Figure 3: Complexity condition: FEN properly governs EN, but not eN

In Figure 3, V_3 is a FEN, and all the other segments (but V_2) are full segments. In TT terms, the latter have both the projection and the pronunciation relation (up-down arrow), indicating that their melodic content is always pronounced. As for V_2, in Figure 3b it is an EN, whereas in Figure 3a V_2 it is an eN, as it projects /ɐ/.

The derivation of the output forms in Figure 3 should be quite straightforward. The FEN in V_3 is less complex than the eN in V_2. Because of the Complexity Condition, V_3 cannot properly govern V_2. As a consequence, a pronunciation relation - illustrated by an upward arrow superimposed on the downward arrow - is assigned from /ɐ/ to V_2. Remember that, as long as a melodic prime is floating, it is not integrated in the phonological string. As such, it cannot be detected by a following N. Thus, were /ɐ/ a floating prime (as in Figure 1a) the FEN in V_3 would discharge its government power on V_2. This is what happens in Figure 3b, where both V_2 and V_3 are EN. They display the same degree of complexity, so V_3 can properly govern V_2.

As reported in Section 2, Bafile (2020) suggests that in order to be able to account for patterns such as these, we need to switch back to standard GP and reintroduce prosodic levels such as rhymes and codas. This would allow us to distinguish between CC sequences that can be interrupted via epenthesis and those that cannot, despite them looking melodically identical. The absence of a vowel-zero alternation would boil down to the absence of an intervening EN, suggesting a coda-onset sequence. On the other hand, the presence of a vowel-zero alternation points to the presence of an intervening nucleus. In this case, the two consonants would be two different onsets. As shown, adopting TT, we can account for this pattern while keeping the strict CV assumptions concerning the prosodic structure. As for the other issue mentioned by Bafile (2020), i.e. the assumption of Scheer (2004) concerning the possibility for a FEN to "only govern nuclei that do not possess any floating melody in the lexicon", it is useful to tease apart two sides of it. On the one hand, this assumption relates to the Complexity Condition, as it basically says that a FEN cannot properly govern a preceding yer because the latter is more complex that the former. From this point of view, this assumption cannot be taken as favouring standard GP over standard strict CV, nor the latter over the proposed TT-based development, as in these approaches complexity plays a comparable role. On the other hand, the assumption of Scheer (2004) implies that floating melodic primes can be detected by a following N. As discussed above, until floating primes are not associated to any prosodic node, they are not integrated in the phonological string, and as such they cannot be referred to to distinguish a yer from a EN. This problem disappears as soon as yers are formalized as eN, as the melodic content of the latter is integrated in the phonological string by means of the projection relation. Thus, TT allows us not to go back to standard GP while avoiding the issue related to yers.

4.1.2 Hungarian vowel-zero alternation

Hungarian stems can be divided into three different groups depending on the vowel-zero alternation they show upon suffixation (Blaho 2008). The stems belonging to the first group display a final CC cluster both in the unsuffixed form and when followed by a vowel-initial suffix (Table 1a). The ones belonging to the second group show a stem-final CVC sequence when unsuffixed, and a CC cluster when followed by a vowel-initial suffix (Table 1b), and the ones belonging to the third group display a CVC sequence in both cases (Table 1c).

		szörny	*szörny+ek*
a.	CC∼CC	[sørɲ]	[sørɲɛk]
		'monster'	'monster-PL'
		torony	*torony+ok*
b.	CVC∼CC	[toroɲ]	[torɲok]
		'tower'	'tower-PL'
		szurony	*szurony+ok*
c.	CVC∼CVC	[suroɲ]	[suroɲok]
		'bayonet'	'bayonet-PL'

Table 1: Vowel-zero alternations in Hungarian (Blaho 2008:269)

As noted by Blaho (2008), these alternations cannot be accounted for in terms of epenthesis or deletion. Were the appearance of a vowel due to epenthesis (e.g. triggered by a ban on stem-final CC clusters), as might be the case for [toroɲ] ∼ [torɲok] (Table 1b), we would expect epenthesis to apply to *szörny* too, yielding *[søroɲ] (Table 1a). Conversely, were it the case that the vowel we see in [toroɲ] disappears in [torɲok] due to a deletion process (applying e.g. when the last C is followed by another vowel), we would expect deletion to apply to *szurony+ok* too, yielding *[surɲok] (Table 1c).

As proposed by Blaho (2008), the different behaviour of the three groups of stems derives from differences at the level of underlying representations. The forms in the first group end with a CC cluster, the ones of the third group with a CVC sequence, and those of the second group end with a CC cluster, but also contain a ‘floating vocalic segment’. Adopting strict CV and TT, the three groups are also teased apart because of a difference in the underlying representations, but, as it might be expected, there is not such a thing as a ‘floating vocalic segment’ (as in strict CV only primes can float). This is shown in Figure 4.

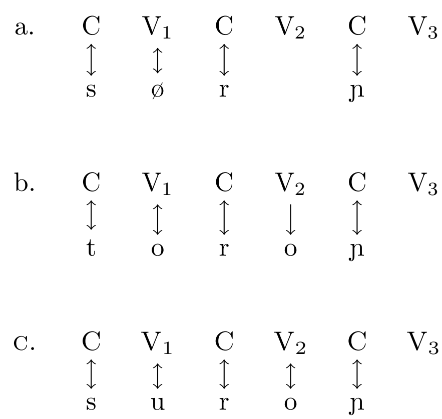

Figure 4: Hungarian stems’ underlying representations

The crucial difference between the representations in Figure 4 is in V_2. In Figure 4a, V_2 is a EN, in Figure 4c it is a full N, and in Figure 4b it is a eN, namely a V node projecting its melodic prime. When these forms are fed to the phonological component, the lateral relations holding among the segments determine how they should be interpreted by the phonetic component, namely, in our case, which V nodes should be pronounced and which should not. This is shown in Figure 5, where the bare stems of the three groups are represented on the left-hand side, and the corresponding suffixed forms on the right-hand side.

As shown, the forms of the first group display an EN in V_2. As the latter is no more complex than the FEN in V_3, V_2 can be properly governed, resulting in [sørɲ] (Figure 5a′). When this stem is followed by the PL marker, V_2 can be properly governed by the more complex V_3, yielding [sørɲɛk] (Figure 5a″). In the forms of the third group, V_2 is a full nucleus. As such, it is unaffected by the governing strength of the following FEN, and these forms show no vowel-zero alternation. As shown in Figure 5c′ and Figure 5c″, the /o/ in V_2 is always pronounced: [suroɲ] ∼ [suroɲok] (in strict CV it is usually assumed that silent N attract PG; as the V_2 in Figure 5c′ and Figure 5c″ are not silent, no PG relation is represented). Let us now focus on the forms of the second group, namely those showing the vowel-zero alternation. In these forms, V_2 is an eN (Figure 4b). When this eN is followed by a less complex V, as in Figure 5b′, proper government cannot apply, so V_2 gets pronounced, yielding [toroɲ]. However, if V_3 is no less complex then V_2, as in Figure 5b″), then proper government does apply, and the melodic content of V_2 is not phonetically interpreted: [torɲok].

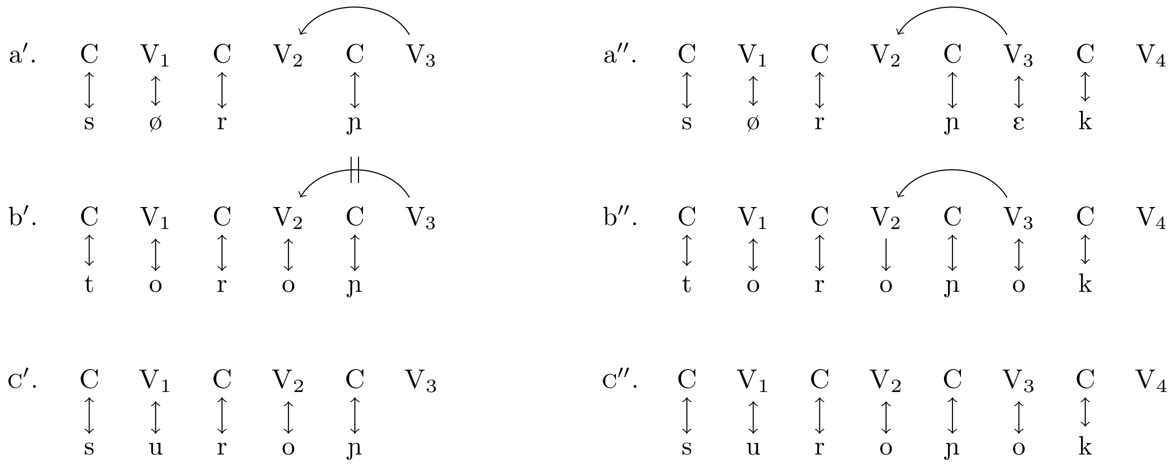

Figure 5: Complexity condition: FEN properly governs EN, but not eN

As shown, in this analysis, the surface forms are derived from the corresponding underlying forms by simply assuming different representations and fairly standard and independently motivated assumptions concerning the prosodic tier (phonological strings as CV sequences), the mapping of melodic content to the latter (TT), and the interaction between nuclei (PG *plus* Complexity Condition). At the same time, the issues related to yers are avoided.

4.1.3 Glide mutation in Classical Arabic

In their description of the morphophonological component of the medieval Arabic grammatical tradition, Bohas and Lowenstamm (2021) note that "the results of the Arab grammarians anticipate insights of modern linguistic theories of universal scope".[12] One such a case is reminiscent of the distinction between full N, eN and EN. This can be found in their discussion of the morphophonological component, the so-called *taṣrīf*, which Arab grammarians describe as consisting of two subcomponents: *taṣrīf I* and *taṣrīf II*. The former deals with derivational morphosyntax, whereas the latter focuses on phonology proper, and aims at tracing a phonetic form back to its underlying representation. This representation is conceived of as the phonological object resulting from the morphological derivation, i.e. as the output of *taṣrīf I*.

An instance of this retrieval procedure is the recovery of the underlying representation of forms that surface as biconsonantal due to a process of medial or final glide mutation (*qalb*). To explain such apparently exceptional cases, Arab grammarians refer to the presence of an unpronounced nucleus. Let us start by introducing the relevant patterns and the analysis given by the Arab grammarians.

Two forms displaying the crucial patterns are the biconsonantal *ramā* 'he threw' and *qāla* 'he said'. An excerpt from the perfective conjugation of the former is given in Table 2 together with the corresponding forms of the regular triconsonantal *kataba* 'he read' (as customary in Semitic studies, I will refer to the base

[12]The data and many of the arguments discussed in this section come from Bohas and Lowenstamm (2021), who provide several examples of the foresightedness of Arab grammarians and sketch an interesting parallelism with recent minimalistic development.

from which the other forms are derived as identical to the 3M.SG form, unless I find it more appropriate to indicate the triconsonantal root).

1SG	[ramaytu]	[katabtu]
2M.SG	[ramayta]	[katabta]
3M.SG	[ramaː]	[kataba]

Table 2: Excerpt from the perfective conjugation of *ramā* and *kataba*

In the 1SG and 2M.SG forms of *ramā*, the agreement suffixes /tu/ and /ta/ are preceded by /y/. These forms pattern with the corresponding forms of *kataba*, where the agreement suffixes are preceded by /b/. The latter also appears in the 3M.SG form [kataba], so, appealing to analogy, Arab grammarians conclude that the underlying representation of 3M.SG [ramaː] is /ramaya/. Hence, as [kataba] derives from $\sqrt{\text{KTB}}$, so [ramaː] derives from $\sqrt{\text{RMY}}$. The absence of /y/ from the 3M.SG surface form is due to a mutation process that transforms a prevocalic glide into a post-vocalic *alif*, which marks the length of the preceding vowel. Bohas and Lowenstamm (2021) formalise this process as in (1), where G stands for *glide* and V for any vowel.

(1) /aGV/ → [aː]

This process can be seen at work also in *qāla* 'he said'. An excerpt from the perfective conjugation, together with the corresponding imperfective forms, is given in Table 3 .

	PERFECTIVE	IMPERFECTIVE
1SG	[qultu]	[ʔaquwlu]
2M.SG	[qulta]	[taquwlu]
3M.SG	[qaːla]	[yaquwlu]

Table 3: Excerpt from the perfective and imperfective conjugation of *qāla*

The 3M.SG form displays a long [aː], which we expect derives from a /aGV/ sequence due to the process in (1). In other words, we predict the presence of a glide between /q/ and /l/. As suggested by the imperfective conjugation, the right glide is /w/. The root of *qāla* is thus $\sqrt{\text{QWL}}$. What still needs to be established is what the vowel following the glide actually is, i.e. whether the perfective [qaːla] is underlyingly /qawala/, /qawula/ or /qawila/ (given the rule in (1), the identity of the second vowel is unrecoverable). As observed by the Arab grammarians, /qawula/ must be excluded on semantic/syntactic grounds, as perfective forms in /u/ are invariably intransitive, which is clearly not the case of *qāla*. At this point, to decide among the two remaining options, we need to look at the imperfective conjugation. Perfective forms in /i/ correlate with imperfective forms that have an /a/ between the last two radical consonants. If [qaːla] were underlyingly /qawila/, we would expect 3M.SG imperfective *[yaqwalu]. This is not what we find, as the imperfective of $\sqrt{\text{QWL}}$ - [yaquwlu] - shows no [a] between the two last radical consonants. This suggests that the underlying representation of [qaːla] must be /qawala/.

The imperfective of $\sqrt{\text{QWL}}$ introduces a crucial piece of our argumentation. Regular imperfective forms have a /ya$C_1C_2VC_3$u/ template, where no vowel appears between the first two radical consonants, and a variable vowel occurs between the middle and the last radical consonants. As shown in Table 3, though, the imperfective of $\sqrt{\text{QWL}}$ has a /ya$C_1VC_2C_3$u/ shape, where a vowel follows the first radical consonant, and the other two radical consonants are adjacent. Arab grammarians maintain that this is due to a transfer process (*naql*) targeting forms that display a medial glide, by which the vowel that occurs between C_2 and C_3 'moves' to the left-hand side of C_2. As a consequence, the underlying /yaqwulu/ is realised as [yaquwlu] (again, were [qaːla] underlyingly /qawila/, the transfer process would yield 3M.SG imperfective *[yaqawlu], and, ultimately, *[yaqaːlu]; see below).

Let us now see what happens when transfer interacts with the mutation process given in (1), as this is when eN enters the scene and plays a crucial role. Such interaction can be observed in the imperfective [yaxaːfu], which builds on the perfective [xaːfa] 'he feared'. Because of mutation, the perfective can be argued to underlyingly show a glide in medial position. According to the Arab grammarians, the underlying form of [xaːfa] is indeed /xawifa/. As already mentioned, perfective forms with a medial /i/ correlate with a /yaC_1C_2aC_3u/ imperfective template. Thus, we expect /yaxwafu/, which should turn into [yaxawfu] through transfer (as in /yaqwulu/ → [yaquwlu]), but this is not what we observe. Instead, what we find is that /yaxwafu/ surfaces as [yaxaːfu]. The question is why we have [aː].

According to the mutation rule, [aː] is expected to surface when a glide is preceded by /a/ and followed by another vowel. In such a case, the glide-vowel sequence would get deleted and the preceding /a/ would get lengthened (as in the perfective /xawifa/ → [xaːfa]). In the imperfective of $\sqrt{\text{XWF}}$, though, the context triggering mutation occurs neither in the underlying form prior to transfer - /yaxwafu/ - nor in the form after transfer - *yaxawfu* -, as in neither cases the glide is simultaneously flanked by /a/ on both sides. To explain such a conundrum, Arab grammarians claim that the Beduins "transferred the *a* of the *w* in /yaxwafu/ onto the preceding segment, i.e. the *x* [thus /yaxwafu/ → /yaxawfu/, EC]; then, the *w* [was] changed into *alif* because [it was] followed by a vowel [in its underlying form and is] now preceded by *a*" (Ibn Ǧinnī, in Bohas and Lowenstamm 2021).

In Bohas and Lowenstamm (2021)'s words, thus, "the vowel has been removed from its canonical position, yet its former presence somehow continues to count, in ghostlike fashion, as the righthand side environment of the [mutation] rule [...] Because the Arab grammarians explicitly talk about vowel movement, the modern theoretical construct that most closely corresponds to Ibn Ǧinnī's idea seems to be trace theory". Accordingly, Bohas and Lowenstamm (2021) propose the following rule (where '"' represents the *alif*, which, as mentioned above, indicates that the preceding vowel is long):

(2) G → "/a _ {V, t_{a}}

The transfer rule in (1) would thus turn /yaxwafu/ into /yaxaw$t_a$fu/, providing the environment for the mutation rule in (2) to apply, yielding [yaxaːfu].

In absence of a phonological trace theory, the effect of the rule in (2) can be obtained by casting t_{a} in TT terms. What Bohas and Lowenstamm (2021) dub a "ghostlike" vowel, can thus be translated into eN. As discussed above, eN lack the pronunciation relation, hence they are silent, but due to their projection relation, they are still phonologically active. This is shown in Figure 6, which represents the derivation of the imperfective of $\sqrt{\text{XWF}}$ (the bottom line in each form represents the phonetic interpretation).

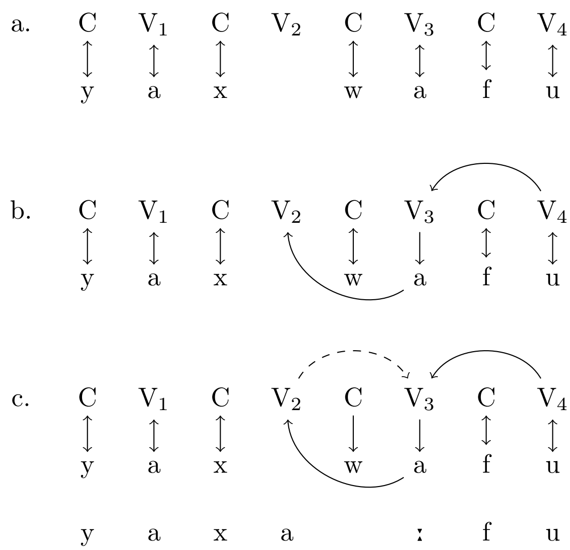

Figure 6: TT implementation of transfer (a-to-b) and mutation (b-to-c)

In Figure 6a we have the ‘regular’ imperfective form /yaxwafu/, i.e. the form spelling out the structure built by the morphosyntactic component (*taṣrīf I*). This form is the input to the phonological component (*taṣrīf I*), where the transfer rule applies, yielding /yaxawfu/ (Figure 6b). The latter displays our “ghostlike” vowel, i.e. the eN in V_3. The projection relation this eN had in the underlying representation (Figure 6a) is maintained (as per Consistency of Exponence). As such, its melodic content is still part of the phonological string. However, this melodic content is not phonetically interpreted, which is formalised as the absence of the pronunciation relation linking /a/ to V_3.

Remember though that the Arab grammarians talk about a *transfer* of “the *a* of the *w* in /yaxwafu/ onto the preceding [...] *x*”. The movement of /a/ is here understood as movement of the its *pronunciation* only. In other words, the melodic content of V_3 does get phonetically interpreted, albeit in V_2. This is represented by the pronunciation relation associating /a/ to V_2. In this view, transfer is interpreted as a process that shifts the pronunciation of the melodic content from a nucleus to the preceding one, without removing it from its underlying position.[13] Note that as a result of transfer, V_2 is no longer silent, whereas V_3 becomes silent. Hence, for this representation to be well-formed, it is V_3 that needs to be properly governed, not V_2. As shown, V_3 can be properly governed by V_4. Crucially, the presence of /a/ on both sides of the glide creates the environment for mutation to apply, yielding [yaxaːfu]. This is represented in Figure 6c. As shown, the ‘deletion’ of the glide is interpreted as the removal of its pronunciation relation. This might result from the

[13]The trigger of transfer (and of mutation), namely the process that makes V_3 become a ‘ghost vowel’/eN is apparently some sort of well-formedness constraint that Arab grammarians dub ‘heaviness’. As the discussion of this would lead us too far and would not add anything significant to this paper’s proposal, I refer the interested reader to Bohas and Lowenstamm (2021) for details.

reduced licensing strength of the following eN, which formalizes the observation by Ibn Yaʔīš (in Bohas and Lowenstamm 2021) that "mutation only affects *w* and *y* after these two segments have been weakened by the erasure of the following vowel". As for the lengthening of /a/, this is formalized as the spreading of the melodic content pronounced in V_2 to V_3 (represented by the dashed arrow from V_2 to V_3). This is because in cases in which the melodic content of the V node following the glide is different from /a/, the mutation process still produces a long [aː] (/xawifa/ → [xaːfa]). This suggests that it is the melodic prime pronounced in V_2 that undergoes spreading in Figure 6c, rather than the content of V_3 being *re*interpreted.[14]

In a more traditional analysis, namely one that keeps a symmetric autosegmental relation between melodic primes and prosodic nodes, transfer would be conceived of as the delinking of the melodic content of V_3 and its relinking to V_2. This analysis should also either maintain that mutation refers to a previous stage of the derivation (prior to V_3's content delinking), or modify the structural description of the rule in such a way that it applies between two Ns, no matter whether they are empty or contentful. The former possibility is quite questionable, as referring to previous stages of a derivation would contravene the alleged markovian character of generative grammar (Baltin 2005). As for the latter, a rule that makes reference to just N without distinguishing between empty and non-empty N would overgenerate. This was noticed (albeit discussed in different terms) by Ibn Yaʔīš (in Bohas and Lowenstamm 2021), who warns that "the rule should [not] apply to *sawṭ* and *šayx* because in the base (of those words) *w* and *y* are not followed by vowels: they never were and can therefore not be weakened by the erasure of a vowel to their right". Note that if strict CV is assumed, the /aG/ sequences just mentioned would be followed by an N node. If one did not distinguish between cases in which N is truly empty, such as the cases mentioned by Ibn Yaʔīš, and cases in which we are dealing with eN, as in Figure 6b, we would wrongly predict e.g. /sawt'un/ 'whips' → *[saːt'un]. Thus, whereas a traditional analysis would either need to refer to previous stages of the derivation, or overgenerate, the TT-based analysis proposed above does not overgenerate, nor refer to a previous stage of the derivation, for the latter is stored in the representation itself (from this point of view, TT, as well as the containment approach to input-output mapping it builds on, actually represents a sort of memory device, not dissimilar from syntactic copies).

So far, I discussed a few examples in which string-internal eN are phonologically active, in the sense that their melodic content, despite not being pronounced, (i) provides part of the environment triggering glide mutation, and (ii) allows for the development of a neat account of vowel-zero alternations in Hungarian (Section 4.1.2) and in the Finale Emilia dialect (Section 4.1.1). In the following section, I will discuss instances of FeN in Colloquial Egyptian Arabic, showing how they can be detected by stress assignment and vowel length distribution algorithm, as well as discharge proper government.

[14] One might wonder whether in this case the government of V_3 by V_4 needs to be maintained. As counter-intuitive as it might be, this is assumed to be the case in structures in which vowels lengthen (under stress). In such cases, lengthening only occurs if lengthened N are followed by a full N. This seems to suggest that the 'second half' of the lengthened vowel must be supported, i.e. governed, which is why long vowels can only be found before full N (Larsen 1998).

4.1.4 Inflectional markers in Colloquial Egyptian Arabic

The data discussed in this section come from Fathi (2013), who suggests that "not all final phonetically silent nuclei in CEA necessarily stem from phonologically contentless ones" (Fathi 2013:36), and that those which are endowed with some minimal melodic content are phonologically active. In other words, she is recognizing the need to distinguish between the two objects that TT allows us to adequately formalize: eN and EN. Before reviewing her hypothesis and proposing a TT formalization, let us introduce the relevant patterns.

In Colloquial Egyptian Arabic (CEA), there is a restriction on the distribution of long vowels: as shown in Table 4, they can only be found in penultimate and final position.

a.	[mesekˈnaː] 'we caught him/it$_{M}$'	CVCVCCVV
b.	[mesekˈnaːha] 'we caught her/it$_{F}$'	CVCVCCVVCV
c.	[meseknaˈhaːli] 'we caught her/it$_{F}$ for me'	CVCVCCVCVVCV

Table 4: Long vowels distribution in CEA (Fathi 2013:11)

However, as shown in Table 5, vowel length is contrastive only in word-final position, as no minimal pair can be found in which two forms show a vowel length contrast in a position other than the final one.

a.	[meˈsektu] /mesek-tu/ caught-2PL.SBJ 'you caught'	[mesekˈtuː] /mesek-tu-u/ caught-2PL.SBJ-3M.SG.OBJ 'you caught it'
b.	[ˈkorsi] /korsi/ chair.SG 'chair'	[korˈsiː] /korsi-i/ chair.SG-3M.SG.POSS 'his chair'

Table 5: Short *vs* long vowels in CEA (Fathi 2013:17)

Despite the appearance, Fathi (2013) demonstrates that the word-finality of long vowels in forms such as those in Table 4a and in the right-hand column of Table 5, as well as the vowel length contrastivity shown in Table 5, are actually illusory. This illusion is brought about by the concatenation of specific suffixes, which results in the lengthening of the base-final vowel. As shown by the examples in the right-hand column of Table 5, the forms showing a long vowel involve a 3M.SG suffix, which seems to surface as *u*, *i* or *a* (Table 4a) depending on the quality of the preceding vowel. This would suggest that the phonological exponent of 3M.SG is an empty morpheme that gets filled in via spreading of the melodic content of the preceding N. Assuming strict CV, it would be tempting to represent the 3M.SG marker as an empty CV, with V absorbing the melodic content of the preceding nucleus. The inspection of further data, though, reveals a more complex picture.

To start with, depending on "personal stylistic factors or contextual factors like slow speech or rhetorical emphasis" (Fathi 2013:18), the forms in the right-hand column of Table 5 can be optionally followed by *h*.[15] Thus, [mesekˈtuː] alternates with [mesekˈtuːh] and [korˈsiː] with [korˈsiːh], suggesting that the long vowels are underlyingly followed by some *h*-initial marker.

Furthermore, if forms such as those in Table 5a are followed by another suffix, as in Table 6, the aforementioned *h* is followed by *u*, and stress and length shift to the right (compare the form below with Table 5a's [mesekˈtuː]).

[mesektuˈhuːli]
/mesek-tu-hu-l-i/
caught-2pl.sbj-3m.sg.obj-for-1sg.dat
'you caught him/it for me'

Table 6: Surfacing of 3m.sg.obj (Fathi 2013:20)

These two pieces of data clearly show that the phonological exponent of 3m.sg cannot be conceived of as an empty CV sequence whose V is filled in by means of the spreading of the preceding V's melodic content. Instead, it is a CV with an eN, as provisionally represented in Figure 7.

$$\begin{array}{cc} C_1 & V_1 \\ \downarrow & \downarrow \\ \mathrm{h} & \mathrm{u} \end{array}$$

Figure 7: TT underlying representation of 3m.sg.obj marker (provisional)

In Figure 7, the melodic content is associated with the corresponding prosodic node via a projection relation only. As discussed above, this formalizes the fact that the affiliation of a melodic prime to its prosodic node is established in the Lexicon, whereas its pronunciation is a matter of phonological computation, which adds the pronunciation relation depending on the environment this form occurs in. To understand how this works in the cases under discussion, we first need to discuss CEA stress and its relation to length.

CEA places stress in penultimate position, more precisely on the penultimate melodic prime associated with a V node (Fathi 2013). This is clearly the case in forms such as those in the left-hand column of Table 5, but the generalization does not seem to hold for the forms in the right-hand column. In this case, though, the disguised presence of the 3m.sg.obj marker saves the generalisation: the stress is assigned to the last melodic prime of the stem, which is underlyingly followed by the V node projecting the melodic prime of the 3m.sg.obj marker and therefore occurs in penultimate position. The question now is what the relation between stress and length is, as the data presented above clearly suggest that there is one.

Given that the V node of the 3m.sg.obj marker projects a /u/ prime (Figure 7), the presence of a phonetically long /iː/ in [korˈsiː] (Table 5b) (and of a long [aː] in a form such as [maˈʔaː] 'with.prep-3m.sg.gen')

[15]This suggests an interesting hypothesis, according to which the pronunciation of the melodic content of a given prosodic node, and thus the lateral strengths regulating it, may be conditioned by grammar-external factors (Cyran 2017).

suggests that the content of the base-final V node spreads to a V node that is not the one of 3M.SG.OBJ.[16] So where does this extra V node come from? As argued by Fathi (2013), the one under discussion is actually not a case of spreading, nor of (C)V insertion: the extra V node is already there, and is associated with the relevant melodic prime at the level of UR. This is because, in CEA, all corner vowels are phonologically long, hence associated with two V nodes. Whether or not they phonetically surface as such, namely whether or not the rightmost V node is 'used', depends on stress, which is argued to license branchingness.[17] In TT terms, this can be formalised as the relevant V nodes underlyingly projecting the same melodic prime (which is thus phonologically long), while the melodic prime is associated via pronunciation relation only with the leftmost V node (hence it is phonetically short). Once this form is fed to the phonological component, if the stress falls somewhere else, then nothing happens, and the vowel surfaces as short. On the other hand, if stress falls on this vowel, then a pronunciation relation is added from the melodic prime to the rightmost V node, and the vowel surfaces as long. This is represented in Figure 8, where the UR are given of /korˈsiː/ and /maˈʔaː/.

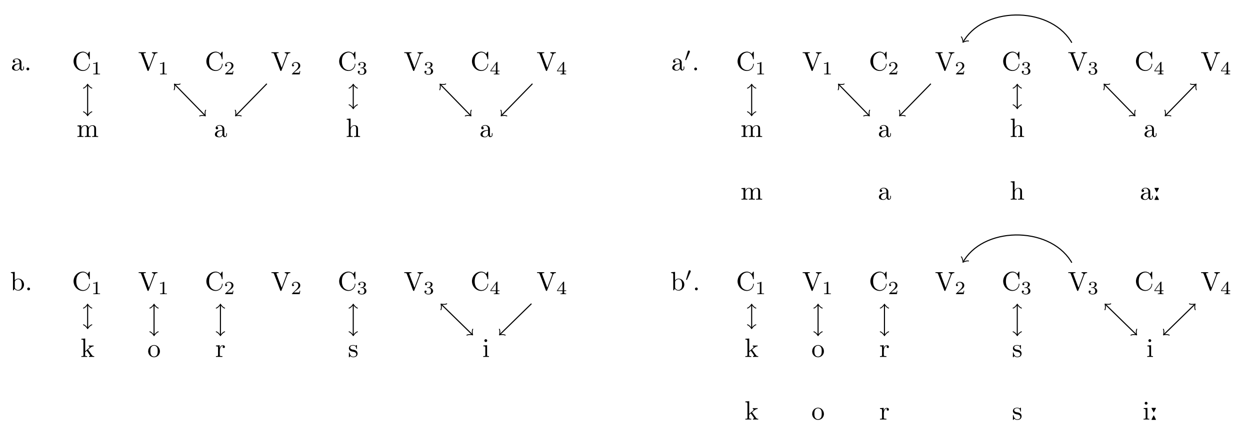

Figure 8: TT representation of /korˈsiː/ and /maˈʔaː/

On the left-hand side, we have the underlying representations, whereas on the right-hand side we see how these forms surface when the stress falls on the stem-final melodic prime (remember that, as discussed above, these primes are actually in penultimate position, as these forms are followed by the 3M.SG.OBJ marker; I didn't include this marker to keep the representation easier to parse). As we can see, when these forms are

[16]Even though the possibility for a melodic prime to be pronounced in a non-empty prosodic node is not excluded by TT, nor by other approaches (as shown by many analyses of metaphony), the hypothesis that we are here dealing with a different V node is supported by forms such as [mesekˈtuːh], [korˈsiːh] and [maˈʔaːh], which display both lengthening and /h/. Were lengthening due to the base-final V node's content either spreading to the 3M.SG.OBJ's V node, or replacing the latter's content, the content of 3M.SG.OBJ's C node - /h/ - would need to move after 3M.SG.OBJ's V node, a hypothesis that is not easy to defend, e.g. because an extra, unmotivated C node should be added to the string.

[17]Fathi (2013) claims that stress increases the duration of the stressed vowel, which is also assigned a high pitch. In order to account for the fact that corner vowels are doubly associated also when unstressed, and that phonological length does not necessarily translate into phonetic duration, she claims that when a corner vowel "is identified as the stress bearing unit, pitch floods over its corresponding templatic chunk (that is two V slots), thus perceived 'longer' than usual" (Fathi 2013:198). In the present approach, the mismatch between phonological length and phonetic duration in corner vowels is formalised in TT terms. This allows us not to refer to pitch, thereby aligning with more traditional accounts (see Fathi 2013:196 for discussion and references), while keeping the double association representation of corner vowels. Be as it may, the proposal put forward in this paper is not incompatible with Fathi's approach.

fed to the phonological module and the stress algorithm places the stress on the stem final melodic prime, a pronunciation relation is added that associates the melodic prime to V_4. As a consequence, this prime is pronounced as long. Note also that for V_2 to be silent, it needs to be properly governed. As shown, V_3 is a full N, and can thus properly govern V_2 (in Figure 8a′ this means that the leftmost /aː/ is pronounced as short). This happens also when these forms do not bear stress. In such cases, V_2 would still be properly governed by V_3. However, there would be no stress licensing the addition of the pronunciation relation from the last melodic prime to V_4, thus no vowel lengthening.

As the 3M.SG.OBJ marker also has a corner vowel, which we argued to be phonologically long, the representation of it in Figure 7 should be updated as in Figure 9. Differently from the objects represented in Figure 8, the 3M.SG.OBJ marker can stay silent (see Table 5), which suggests that the melodic content of this marker is associated with the prosodic nodes via projection relations only.

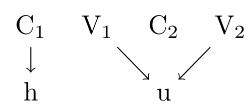

Figure 9: TT representation of /huː$_{\text{3M.SG}}$/

The addition of the pronunciation relations, as well as the enforcement of the lateral relation, depends once again on the phonological environment in which this marker occurs. This is shown below, where the perfective form of $\sqrt{\text{MSK}}$ 'catch' is followed by the 2PL.SBJ marker /tuː/ (Figure 10a), the latter is followed by the 3M.SG.OBJ marker /huː/ (Figure 10b), which is then followed by the preposition /l/ 'for' and the 1SG.DAT marker /iː/ (Figure 10c).

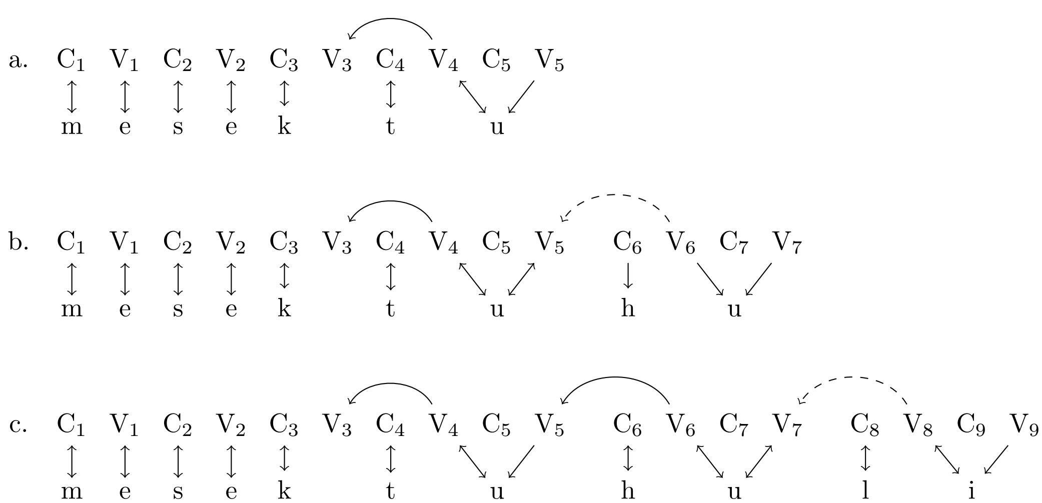

Figure 10: Stress, vowel length and 3M.SG

The form in Figure 10a represents what happens when the UR /mesek-tuː/ 'you caught' is fed to the phonological component. Since it is phonologically long, the word-final /uː/ is associated with both V_4 and

V_5 by a projection relation. The pronunciation relation only associates /uː/ to V_4, though, as in this context /uː/ is not in penultimate position and does not get stressed. As such, the /uː/-to-V_5 pronunciation relation is not licensed (remember that what counts for the calculation of the placement of stress are melodic primes associated with a V node; Fathi 2013). As a consequence, /uː/ surfaces as short. The stress falls on the /e/ in V_2, which is phonologically short and therefore cannot surface as phonetically long.[18] This results in /mesek-tuː/ being pronounced as [meˈsektu].

If we add the 3M.SG.OBJ marker /huː/, as in Figure 10b, the /uː/ of the 2PL.SBJ marker occurs in penultimate position (i.e. it is the penultimate melodic prime associated with a V node), and gets stressed. The stress, in turn, licenses the pronunciation relation linking /uː/ to V_5, so /uː/ surfaces as phonetically long. Thus, /mesek-tuː-huː/ is pronounced as [meˈsektuː] (note that, as discussed above, the 3M.SG.OBJ itself is not pronounced; only its /h/ can be pronounced, albeit in specific conditions, see fn 12).

If in the course of the derivation another marker displaying a non-empty V node is added to /mesek-tuː-huː/, the /uː/ of the 3M.SG.OBJ marker finds itself in penultimate position and gets stressed. Stress licenses the insertion of a pronunciation relation from /uː/ to its right-hand side V, so 3M.SG.OBJ marker /huː/ surfaces as [huː]. This is shown in Figure 10c, where /l/ 'for' and the 1SG.DAT marker /iː/ are added to /mesek-tuː-huː/. At the level of UR, besides the double projection relation characterising corner vowels, /iː/ has a pronunciation relation with V_8 (formalising the fact that it is always pronounced). There is no pronunciation relation from /iː/ to V_9 at the level of UR, nor is one introduced by phonological computation, as the stress falls somewhere else. As a consequence, /iː/ surfaces as a short [i], so /mesek-tuː-huː-l-iː/ is pronounced as [mesektuˈhuːli]

A couple of points made in this analysis deserve some further comment. In Figure 10c, the stress falls on the 3M.SG.OBJ marker's /uː/ associated with V_6 and V_7. As the /uː/ of the 2.PL.OBJ marker is unstressed, the /uː/-to-V_5 pronunciation relation is not licensed, and /uː/ surfaces as short. The PG discharged by V_6 on V_5 ensures that this structure is well-formed. The configuration in Figure 10b is quite different. In this structure, V_5 does not need to be properly governed, as the /uː/-to-V_5 pronunciation relation is licensed by stress. Note that there seems to be a convergence between the licensing of length by stress, as proposed here following Fathi (2013), and the licensing of length assumed in the standard GP approach to stress, where stress introduces an empty CV and the content spreads from the preceding V node to the newly inserted V node only if the latter is governed by a following non-empty nucleus (Larsen 1998; see also fn. 14). In both cases, there seems to be a relation between the availability of length and the nature of the following nucleus. Accordingly, in the representation in Figure 10b, the licensing of V_5's pronunciation relation provided by stress could be 'backed up' by the following eN (I represented this additional licensing as a leftward dashed arrow). This would not be possible if V_6 were an EN, nor, crucially, if eN's lateral strength were more similar to that of EN than to that of full N.

[18]Note that the UR representation of /$tu_{2PL.SBJ}$/ differs from that of /$hu_{3M.SG}$/ (Figure 9) inasmuch as the former displays a pronunciation relation from *t* to the left-hand C (C_4), and from *u* to the left-hand V (V_4), formalising the fact that, differently from /$hu_{3M.SG}$/, the melodic content of 2PL.SBJ is always pronounced (with the exception of the second half of the long *u*, whose pronunciation depends on stress).

The proposed analysis also suggests that /l/ 'for' should be conceived of as a floating prime docking on the leftward C node of the 1SG.DAT marker /iː/ (i.e. C_8 in Figure 10c). If /l/ came with its own C node followed by an empty V node, and /iː/ had two empty C nodes and two V nodes, then the leftmost V node of /iː/ would properly govern /l/'s empty V node, thereby preventing the latter to properly govern 3M.SG.OBJ's rightmost V node (/iː/-to-V_7), which would thus be wrongly predicted to surface as short.

Thus, besides allowing for a neat formalisation of the relationship between stress and length, it is important to highlight that the inclusion of laterally active eN in the theoretical toolkit also allows for the formulation of an exceptionless generalisation concerning stress and length distribution. As shown, by assuming the presence of a word-final eN such as the 3M.SG.OBJ marker in forms that apparently show a word-final stressed long vowel, the generalisation stating that stress and length only occur in penultimate position can be maintained. If the V node of the 3M.SG.OBJ marker were an EN, on other words, if it were devoid of any melodic content, the stress assignment algorithm would not count it, and stress would be incorrectly assigned to the non-empty V node on the left of the one in which stress actually occurs, deriving e.g. *[meˈsektu] rather than [mesekˈtuː] from /mesek-tuː-huː/ 'you caught it', *[kaˈtabna] rather than [katabˈnaː] from /katab-naː-huː/ 'we wrote it', etc.

Another CEA pattern supporting the plausibility of eN involves the contrast between the 3F.SG.SBJ and 1SG.SBJ markers. This contrast shows that "not all final phonetically silent nuclei in CEA necessarily stem from phonologically contentless ones" (Fathi 2013:36). In order to see this, let us look at a chunk of the perfective paradigm of $\sqrt{\text{LBS}}$ 'put (clothes) on' given in Table 7 (Fathi 2013:34).

1PL	lebesna
1SG	lebest
3F.SG	lebset

Table 7: Excerpt of the perfective paradigm of $\sqrt{\text{LBS}}$

As we can see, the presence of [e] between the last two radical consonants depends on the context, as it can be found only if followed by a consonant cluster, i.e. [sn] in 1PL and [st] in 1SG. In strict CV terms, this means that the V node occurring between the radical /b/ and /s/ gets phonetically interpreted only if followed by an EN (occurring between the C nodes of the relevant cluster), for the latter cannot properly govern the former. If instead the V node occurring between /b/ and /s/ is followed by a full N, as in 3F.SG, it can stay silent. Let us start by looking at the 1PL form.

As we saw, CEA corner vowels are phonologically long. This means that we can represent the 1PL marker as in Figure 11, where /n/ and /a/ are linked to the C_1 and V_1, respectively, via both a projection and a pronunciation relation, and /a/ and V_2 are associated only via a projection relation (as discussed above, the pronunciation relation responsible for the phonetic length of the vowel needs to be licensed by stress).

The representation resulting from the concatenation of this marker with the relevant stem is given in Figure 12. The first V slot of the 1PL marker (V_4) is a full N, hence it can properly govern the root-final EN in V_3. The latter, by virtue of being properly governed, cannot properly govern the preceding EN (V_2),

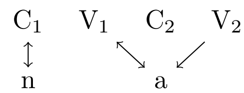

Figure 11: TT representation of 1PL marker /naː/

which surfaces as [e] (the lack of the projection relation between V_2 and [e] indicates that the melodic content surfacing in V_{3R} is epenthetic). Thus, /lebØsØ-naː/ is pronounced as [leˈbesna].

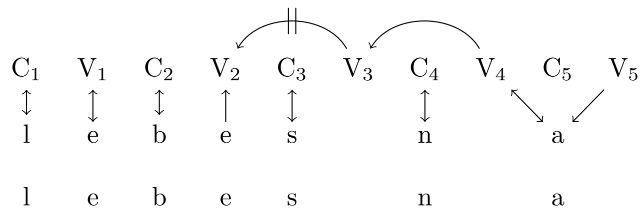

Figure 12: TT representation of /lebØsØ-naː/ [leˈbesna] 'we put clothes on'

Things get more complicated with the 1SG and 3F.SG markers. The issue is related to the identity of the final V node of the 1SG and 3F.SG markers and of the [e] appearing after the root-final /s/. As we saw, the root ends with an EN (V_3). If this is properly governed, it can stay silent (Figure 12), otherwise it needs to get phonetically interpreted. This is what happens in the 3F.SG form ([leˈbset]), where the 3F.SG marker's [t] is arguably followed by a EN (V_4) that, as such, cannot properly govern the preceding EN. The latter, by virtue of being pronounced, can properly govern the EN in V_2, which can thus stay silent. This is shown in Figure 13, where the stem /lebØsØ/ is concatenated with the 3F.SG marker.

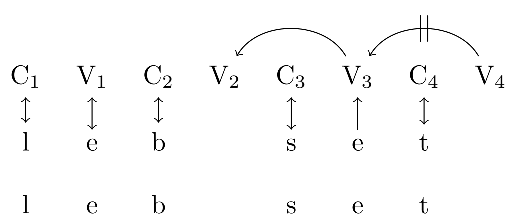

Figure 13: TT representation of /lebØsØ-tØ/ [ˈlebset] 'she put clothes on'

Interestingly, the root-final /e/ does not surface in 1SG forms, despite the fact that the latter's /t/ is followed by no audible vowel. This can be taken as an indication that the silent V nodes following [t] in 1SG and 3F.SG are two different objects: whereas the latter is truly empty and therefore cannot govern a preceding EN (Figure 13), the final V node of the 1SG marker does contain some melody, and behaves like a "dormant governor" (Fathi 2013:36). This is shown in Figure 14, where the stem /lebØsØ/ is concatenated with the 1SG marker.[19]

[19] In Classical Arabic, this position was filled with /u/, but CEA speakers are not likely to have any way to infer it from the data they are exposed to. The 1SG marker is thus represented as bearing /e/, namely the less marked CEA melodic prime alternating with Ø. As for the 3F.SG marker, it was an EN also in Classical Arabic.

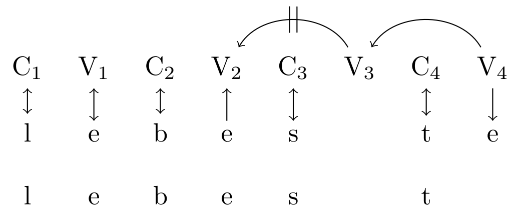

Figure 14: TT representation of /lebØsØ-t(e)/ [le'best] 'I put clothes on'

As shown in Figure 14, the eN in V_4 properly governs the EN in V_3, which can thus stay silent and cannot properly govern the EN in V_2. Consequently, the latter is assigned a default prime and surfaces as [e].

As shown above, an approach that formalises the difference between 1sg and 3f.sg in representational terms, the former displaying final eN as opposed to the latter's EN, correctly accounts for the observed patterns, whereas a traditional approach resorting to a parametric FEN lateral strength (and a 'bigger' 3f.sg marker, see below) fails in providing a unified account of the relevant forms.[20]

A positive setting of such parameter would allow FEN to govern a preceding EN, and sequences of two silent nuclei such as that displayed by the 1sg [lebesØtØ] would be well-formed, as expected. In this case, though, also the 3f.sg /lebesØ-tØ/ would be well-formed, and should surface as **lebest* (thus identical 1sg), rather than *lebset*). Conversely, were the parameter set negatively, namely were FEN not allowed to properly govern a preceding EN, the CEA 3f.sg form would be correctly derived (/lebesØ-tØ/ > [lebset]), but the 1sg form would not, as it would be wrongly predicted to surface as *[lebset].

This is pointed out by Fathi (2013) too, who indeed proposes a solution that builds on typology of final silent N that overlaps with the one proposed by Fathi (2013), which distinguishes between (i) "governors that enjoy explicit phonetic and phonological content" (i.e. full N), (ii) an N that "can be characterized as both phonologically and phonetically contentless" (i.e. an EN), and, crucially, (iii) an N that "was evacuated from [its] concrete phonetic vocalic content [and] involves a latent, yet structurally active nucleus" (i.e. a eN). In this work, I try to move a step forward in the same direction by providing a straightforward formalization of Fathi's intuition.

Before concluding, it is worth briefly considering an alternative analysis, one in which both the 1sg and the 3f.sg markers display a FEN, and the rightmost [e] of the 3f.sg form (['lebset]) is a full N belonging to the inflectional marker. This alternative representation of the 3f.sg is given in Figure 15 (adopting strict CV, /e/ is preceded by an empty C node).

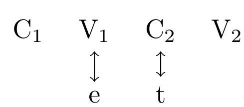

Figure 15: CEA 3f.sg marker as /ØetØ/

[20]See Faust (2019) for a further proposal that exploits the representational properties of the 3m.sg exponent in Palestinian Arabic.

Were the 3F.SG marker represented as such, the V node hosting /e/ would be immune to FEN's government, and a parametric approach to FEN lateral strength could be maintained, as even if the latter were allowed to properly govern a preceding EN (as demanded by the 1SG form */lebØsØ-tØ/ [le'best]), government would not affect the preceding full N in V_4. As shown in Figure 16, though, this hypothesis would wrongly predict the 3F.SG form to surface as *[le'beset].

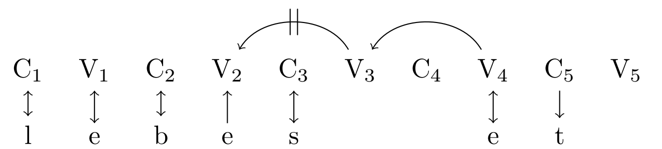

Figure 16: /lebØsØ-ØetØ$_{3F.SG}$/ *[le'beset]

By virtue of being a full N, V_4 can properly govern the root-final EN in V_3, which is thus not phonetically interpreted. However, since it is properly governed, V_3 cannot properly govern the EN in V_2, which should surface as *e*. Thus, /lebØsØ-ØetØ$_{3F.SG}$/ is predicted to surface as *[le'beset], rather than as the attested ['lebset].

Another alternative analysis needs to be considered, namely one in which the 3F.SG marker is represented as a CV sequence with /t/ associated with C and preceded by a floating /e/, as in Figure 17.

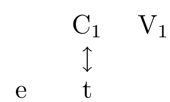

Figure 17: CEA 3F.SG's *e* as floater

Due to its floating status, in order to surface, /e/ needs to be associated to an available V node. This might be provided by the root-final EN. However, if FEN were parametrically endowed with governing potential in order to account for 1SG [le'best], the root-final EN would be properly governed, and therefore unavailable for the 3F.SG floating /e/, which would hence stay afloat. This would yield 1SG *['lebest], rather than the attested ['lebset]. On the other hand, if the FEN parameter is OFF *and* 1SG has a FeN, 1SG would correctly surface as ['lebset]. This is the proposal put forward by Fathi (2013), which differs from ours with respect to the formal nature of the [e] surfacing in base-final position: underlying in Fathi (2013), epenthetic in this paper (these views are not incompatible, and could be merged into one if independent evidence is found supporting the formal nature of [e]).[21]

[21] Still another couple of alternatives can be thought of. The first builds on a proposal made by Zikova (2008), according to which a floating prime can be "lexically specified for associating to any EN no matter whether [the latter] is governed or not" (Scheer and Žiková 2010:482). As already mentioned in fn. 6, this could be formalised as a floating prime bearing a pronunciation relation. Alternatively, we could resort to a principle that removes a VC sequence if completely empty (Gussmann and Kaye 1993). In Figure 16, after the removal of V_3C_4, the full V_4 would follow C_3, and could properly govern V_2, generating the attested ['lebset]. Despite being a plausible solution, the removal principle on which it is based still lacks independent motivation.

5 Conclusion

In this paper, I argued that by upgrading the standard autosegmental representational assumptions of Government Phonology-based approaches with the Turbidity Theory technology, a set of empirically and conceptually puzzling issues can be given a straightforward solution.

In particular, I argued that thanks to the possibility of formally distinguishing between truly empty prosodic positions and positions that have some unpronounced melodic content, it is possible to account for a variety of phenomena that would otherwise be labeled as exceptional, and would require complicating (i) the rules formalizing phonological processes such as glide mutation in Classical Arabic, (ii) the correlation and distribution of stress and vowel length in Colloquial Egyptian Arabic, and (iii) the account of the behaviour of word-final consonant clusters in the Finale Emilia dialect, Hungarian, and Colloquial Egyptian Arabic.

The analysis of these empirical cases shows that a system that combines the strict CV representational system with the TT association relations is thus observationally, descriptively and possibly explanatorily more adequate than the parametric approach. Furthermore, the proposed TT-based approach fares better with abiding by the strict modularity tenets (Fodor 1983, 2000). Both approaches postulate objects that are not directly observable, namely parameters and invisible pieces of melody, but whereas the latter are formulated by means of a phonology-specific vocabulary - melodic primes, prosodic nodes and association relations formalising their reciprocal correspondence -, the former are arbitrary statements apparently unrelated to the representational properties of the phonological object over which they are argued to hold.[22] In other words, as introduced in Section 2, parameters introduce a deviation from the autosegmental mantra assumed by GP according to which the computation follows from and is constrained by representations, thereby betraying their diacritic nature. On the other hand, TT allows for keeping a direct relation between computation and representation, and more specifically between lateral actorship and representational complexity. This suggests that the parameter defining the lateral actorship of N can be possibly dispensed with, its effect deriving from the phonological makeup of N, thus, ultimately, to the Lexicon.[23] Here the Borer-Chomsky Conjecture comes to mind, where "all parameters of variation are attributable to differences in the features of particular items (e.g. the functional heads) in the Lexicon" (Baker 2008). In phonology, the functional head would be the (word-final) V node, and the feature distinguishing between active and non-active silent nuclei would be a phonological feature, which does not necessarily need to be phonetically interpreted.

In a similar vein, the parameter forcing a language not to have word-final FEN can also be given a lexical interpretation. This could for instance be the case for Italian, a language that in the GP literature has been traditionally mentioned as an example of a variety in which final N must be obligatorily full. A closer inspection of the data shows that this is not entirely correct. In Italian, it is typically inflected forms (D, N, Adj, V; but also Adv) that end in full vowels, whereas other, uninflected forms do obligatorily end in C

[22] In this sense, they are as remote from representations as OT constraints are, for they are nothing but a tool to take binary decisions over whatever matter is being discussed.

[23] The same might in principle hold for the whole set of parameters with which GP-based models can be upgraded (see Ulfsbjorninn 2017 for a principled account and an exhaustive list of GP parameters). Further research is needed to explore such a possibility.

(e.g. Prep such as *con* 'with', *per* 'for'). There can also be inflected forms obligatorily show no final full N (both belonging to the native Lexicon, e.g. Det such as *il* 'the$_{\text{M.SG}}$', *un* 'a$_{\text{M.SG}}$', or borrowed, e.g. *sport*), or where the final N can be optionally deleted by a phonological process (which is all but expected had forms to obligatorily end with a full N; e.g. II and III class 3SG.PRS, such as *tiene/tien* 'hold$_{\text{3SG}}$' *viene/vien* 'come$_{\text{3SG}}$', *tenere/tener* 'hold$_{\text{INF}}$' *venire/venir* 'come$_{\text{INF}}$'), or where deletion depends on the syntactic context (e.g. Adj such as *buon* 'good$_{\text{M.SG}}$', *bel* 'beautiful$_{\text{M.SG}}$', which typically undergo -*o*$_{\text{M.SG}}$ deletion in prenominal position).[24] Rather than supporting the existence in the Italian grammar of a parameter against FEN holding across the board over the entire Lexicon, cases such as these suggest that the (lack of) phonetic interpretation of FEN mostly depends on morphosyntactic factors, such as e.g. the need to spell out phi-features. In Italian, the latter are indeed spelled out by V(-final) markers, being either (beginning with) a floating melodic prime docking onto the root/stem-final empty V node (Passino 2009, Lampitelli 2010, 2017), or some piece of melody with its own CV nodes concatenating with the root/stem. Thus, in Italian, the content of a final N depends on the morphosyntactic derivation introducing a lexical item endowed with some melodic prime that associates to the final EN. If we accept the hypothesis that such phonological content do not necessarily have to be pronounced, then laterally active FEN can be replaced by FeN. Namely, FEN parameters can be dismissed.[25]

However, something similar to a language-specific cut-off point still seems to be needed in order to decide where, along the stressed N > unstressed N/schwa > eN > EN complexity scale, N stop being lateral actors. This suggests that it is probably too early to throw away parameters altogether (provided that it is a good idea at all; see e.g. the discussion in *Linguistic Analysis* 41(3/4)), albeit it seems reasonable to try to derive them from 'third' factors and their interaction with UG (Biberauer et al. 2014). In this view, the decision of the cut-off point just mentioned could be interpreted as a decision resulting from the interaction between learning biases (e.g. analogy and Biberauer et al. 2014's input generalization), experience (i.e. the primary linguistic data a learner is exposed to) and UG principles (e.g. N's lateral forces and TT relations). In such a hypothetical scenario, a learner acquiring a language displaying word-final TR clusters could extend the UG-defined lateral forces she sees cooccurring with full N to FEN via analogical reasoning, and, given that the linguistic data show that word-medially there is a correlation between complexity and lateral strength (Complexity Condition), she could postulate the presence of phonological material hiding under FEN's silence. Besides the FEN parameters, such an approach could be explored to account for the CV template, the Complexity Condition and the complexity scale in an neo-emergentist way. Further research is needed to explore such a hypothesis.

[24]Letting aside borrowings, note that word-final N can be left unpronounced if the resulting final C is a possible coda. This suggests that an unpronounced N has a weak licensing strength, or, conversely, that segments that are possible codas do not require a strong licensor (Cyran 2003, 2010). See Cardinaletti and Giusti (2015, 2018) for discussion of some of the Italian examples showing optional phi-features realisation.

[25]An obvious way to get rid of parameters is to replace them with violable constraints. For instance, in an OT environment, the (lack of) pronunciation of FeN can be taken care of by a constraint ranking where a constraint favouring CV sequences, e.g. NoCoda, dominates a constraint penalising unparsed melodic content, e.g. Parse or Pronounce. Due to space limitation, it is not possible to discuss this point further. The interested reader is referred to Harris and Gussmann (2002), and to van Oostendorp (2015) for discussion concerning the relation between constraints and parameters.

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