# REVISITING THE PHONOLOGICAL PROPERTIES OF MORPHOLOGICAL CONSTITUENTS: THE CASE OF DIMINUTIVES*

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**Abstract**

This article explores the way in which the prosodic properties of words can be predicted from independent principles relating structures with phonology. In the literature, the general assumption is that the linear position of an affix determines whether it phonologically integrates with the base or not: prefixes do not integrate, and suffixes do, unless they are independent phonological words. Here we will argue in favour of an alternative account where, just as in syntactic phrases, the phonological properties follow from the internal constituency of words. We propose that, independently of their linear position with respect to the base, an affix is phonologically independent from it when they do not belong to the same Command Unit (CU). Phonological integration between base and affix takes place when both elements are inside the same CU. This proposal is argued for on the basis of the behaviour of diminutive affixes in Spanish, German and Czech. The results obtained from this analysis are applied to the domain of parasynthetic verbs in Spanish, in order to evaluate the plausibility of a particular proposal about their internal constituency.

## 1. MAPPING MORPHEMES INTO PHONOLOGICAL DOMAINS.

The central question that arises when the connection between phonology and morphosyntactic structures is explored is to determine the way in which the information of one component is accessed by the other. It is customary to decompose this question in the following specific problems:

a) Does morphosyntax have access to phonological information?
b) Does phonology have access to syntactic information?
c) If so, is it possible to predict the phonological domains on the basis of structural differences in the morphosyntactic derivation?
d) If so, what are the relevant aspects of the structure that are taken into account?
e) Are these aspects universal or parameterized?
f) Is the interaction between phonology and syntax direct or is it intermediated by an additional level?

In the answer to the first question, there is almost a total agreement that syntax does not have access to phonological information (Phonology-free syntax, Pullum & Zwicky 1988), and that apparent cases where syntactic operations are accompanied by phonological effects (like Heavy NP-shift as described by Chomsky & Lasnik 1977) are better accounted for as filters that impose post-syntactic requisites in the surface form of representations (but see Bresnan 1971 and Zec & Inkelas 1990 for a different perspective where syntax has some limited access to phonological information).

At the same time, as for the second question, there is also general agreement that phonology, being a set of representations and operations that manipulate the output of the syntactic structure, needs to have access to that structure.

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The third question has been answered by a variety of perspectives accepting that domains are built from some structural information, and therefore that phonology is sensitive to parts of the syntactic structure. The devil is in the details, and the different ways in which the fourth question has been answered are varied, although there is general consensus that only the surface form (thus, the form adopted by the syntactic tree at the point in which it is transferred to the phonology) is taken into account by the phonology, and previous steps (D-structure in pre-minimalist theories and the derivational history of the structure before spell out in Minimalism) are ignored by this component. A first group of analyses considers that the relevant relations taken into account by the phonology have to do with the linear adjacency of elements. This point of view can be traced back to SPE and the proposal of introducing boundary symbols at the edges of (almost) every node, as they are generated by the phrase marker rules. There are different points of disagreement, one of them being whether only phonologically spelled out objects are taken into account or traces of movement are also relevant. Take, for instance, the different analysis of *wanna*-contraction, and more in particular the family of analysis that claim that the contraction is blocked by a trace between the verb and the infinitival marker (Baker & Brame 1972, Selkirk 1972, Lightfoot 1976).

The other point of view does not rely so heavily in the linearity between the elements per se, and pays more attention to syntactic constituency. The rule of 'raddoppiamento sintattico', as accounted for by Nespor & Vogel (1982), crucially takes into account whether the linearly adjacent words are also immediate syntactic constituents, and thus makes phonology sensitive not only to the precedence relations between elements, but also to the shape and labels of the tree. Kaisse's (1983) analysis of auxiliary cliticization in English also exemplifies this approach, as she emphasizes the cases where there is an element linearly preceding the auxiliary but in the wrong syntactic configuration (as in pseudo-cleft structures; contrast *John's sick* with **What is bothering John's your insistence*) or belonging to the wrong hosting category (*The rug's a nice spot to hide this* vs. **Under the rug's a nice spot to hide this*). The details, again, vary in each analysis. Some theories take into account the relations between the different constituents (relation-based mapping). Nespor & Vogel (1986) concentrate on the head-complement relation and parameterize whether a language spells them out together in the same prosodic constituent or treats each element separately. In more recent times, Wagner (2005) has proposed that there is a crucial asymmetry between specifiers and complements, such as that a head forms a single prosodic constituent with its specifier, but remains independent from its complement. Other theories take into account the maximal projections, and mark their limits in the phonology by introducing boundary symbols to their right or to their left (end-based mapping, Selkirk & Shen 1990), while others take into account whether the syntactic node is branching or not (arboreal mapping, Zec & Inkelas 1990; see Arregi 2003 for a modern perspective on the same idea, assuming bare phrase structure). In this perspective, Uriagereka's (2002) theory of Multiple Spell Out establishes a crucial distinction between branching specifiers and any other kind of syntactic constituent (both branching complements and non branching specifiers), such as that, given general conditions on merge and the syntactic derivation, branching specifiers form independent phonological domains.

One advantage of this last perspective based on the branching or non branching of each node is that it is predicted to be universal, that is, is not parameterizable, unlike the other theories mentioned. As this theory is ultimately based on the theory of Phases (domains defined autonomously as far as the syntactic derivation goes, and

therefore transferred as units to the phonology and the semantics; cf. Chomsky 2001), it answers the fifth question by stating that the principles that determine the autonomy of a phonological domain are universal, while the other theories considered allow a certain level of parametric variation, and, for example, the end-based mapping marks the right edge of a syntactic constituent in a language like Chi Mw:ini and the left one in French (Selkirk 1986).

Finally, as for the sixth and final question, since Nespor & Vogel (1986) it has been customary to recognise a level that mediates between the syntactic structure and the phonology, p-structure; Kaisse (1983) and other theories previous to her did not use this intermediate level. Uriagereka's Multiple Spell Out theory stands out as one of the few theories that in the present proposes that the phonological domains are defined directly reading the properties of the syntactic derivation, without the need of proposing any intermediate level.

These questions about the connection between syntax and phonology have also been transferred to the study of the relation between morphology and syntax. Here, it is generally accepted that the relation is bidirectional, as word formation rules are sensitive to the phonological properties of the morphemes (for example, in choosing particular allomorphs), and the morphological properties of words are significant for defining the phonological structure of the word.

In this paper, we would like to expand on this last idea and address the third and the fourth question in the domain of words. In doing so, we will adopt the assumption that morphemes are organized into a binary-branching structure inside the word (as opposed to amorphous morphology, Anderson 1992), and that the relations between morphemes in the word are similar to those between syntactic constituents: heads, complements and specifiers. From this perspective, the crucial question that we would like to answer is what aspects of the structure are relevant for the mapping to phonology. The comparison will concentrate on whether the relevant criterion to perform the mapping is the linear relations or the structural constituency internal to the word. We will start, therefore, by shortly presenting these two approaches

*1.1. A linear definition.*

Prefix is the term that traditional morphology gives to any morpheme that can occupy the left edge of the word, while suffix is any morphological constituent that can appear in the right edge of the word. This linear definition does not differentiate between the different classes of prefixes and suffixes and does not have anything to say about the syntactic or semantic role that the morpheme plays inside the word. If the prosodic constituents were just sensitive to the linear relations between bases and their morphemes we would expect that all prefixes would behave phonologically in the same way, just because they are, by definition, to the left, and all suffixes would behave also in a coherent way, just by being to the right of the base. This is the general description of the prefix-suffix asymmetry which is given in some textbooks and general works on morphology, starting with Jakobson (1949), who reports that in Slavic the prefix does not resyllabify with the base, while suffixes do, so according to this statement prefix boundaries always correspond to syllable boundaries. The generalization can be stated as in (1).

(1) Prefixes are phonologically independent from their bases.
Suffixes phonologically integrate with their bases.

The mapping between the structure and the prosody of the word would, thus, be sensitive to relations such as those in (2), where '>' stands for 'linearly precedes':

(2) If $\alpha > \beta$, where $\alpha \in \{\text{Affix}\}$, then $[\alpha]_{\omega}[\beta]_{\omega}$
If $\beta > \alpha$, where $\alpha \in \{\text{Affix}\}$, then $[\beta\ \alpha]_{\omega}$

A traditional example of such asymmetry can be provided by Spanish. In Spanish, oral stops can form complex onsets with a sonorant, as in (3a), where the /b/ does not belong to the coda of the preceding syllable. However –the general description goes- when the /b/ is the last segment of a prefix such resyllabification is impossible (3b). Suffixes resyllabify (3c):

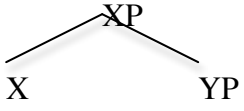
(3) a. *problema*, 'problem' /pro.´ble.ma/; */prob.´le.ma/
b. *sub-lunar*, 'under-moon' /sub.lu.´nar/; */su.blu.´nar/
c. *raton-era*, 'mouse-trap' /ra.to.´ne.ra/; */ra.ton.´e.ra/

Other authors, such as Booij (2000: 342), while accepting that prefixes are phonologically independent from their bases, depart from this very general picture and accept that suffixes, depending on their own specific properties, can be dependent or independent of the bases. If the suffix is coherent with the base, it forms a single phonological constituent with it, but if it is non coherent –and therefore it is phonologically independent- it must be able to constitute its own phonological word and have a minimal size of two syllables, like the prefix *-aktig* in Dutch. This account is also partially positional, as it still puts all prefixes in the same box.

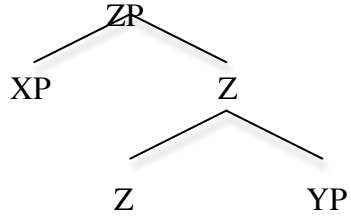
*1.2. A definition based on constituency: specifiers and multiple spell out.*

The alternative possibility would be that prosody is sensitive not to the linear precedence relations per se, but to the syntactic constituency of the different morphemes and the position that they occupy. In this case, we do not expect a one-to-one mapping between prefixes and prosodic independence or suffixes and prosodic dependence, simply because the surface order might have been triggered by the presence of movements and the same linear order might reflect different constituency properties. In this view, the syntactic and semantic properties of the affix play a crucial role in starting to diagnose the constituency that underlies the units. This kind of notion is helpful to diagnose the base position occupied by the affix, but several kinds of movement can modify this position, so that, in the surface, the same unit will end up as a prefix or a suffix –if we follow the traditional linear definition of these units-, without changing its properties, because another constituent moved to a higher position and they inverted their linear precedence relation. Starting with the base order in (4) and (5), thus, phrasal movement of the base over the affix would give as a result (6) and (7). If there is a further movement where the affix changes its order with respect to the base again, we would get (8).

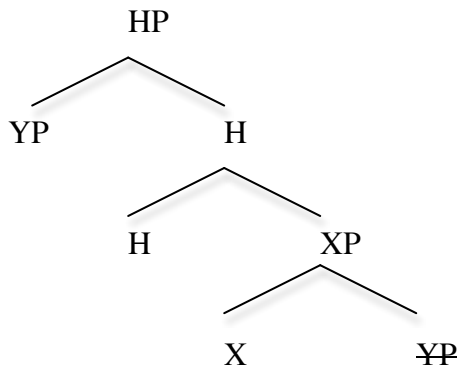
(4) The affix is a head



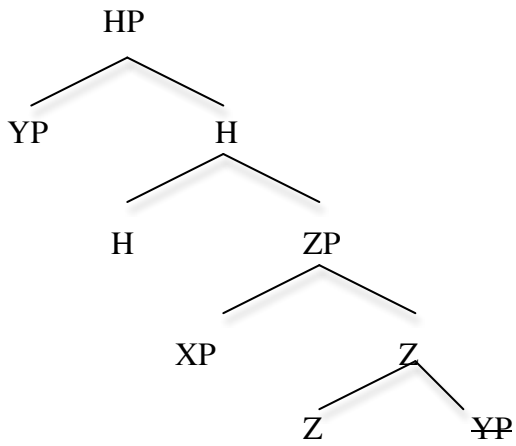

(5) The affix is not a head



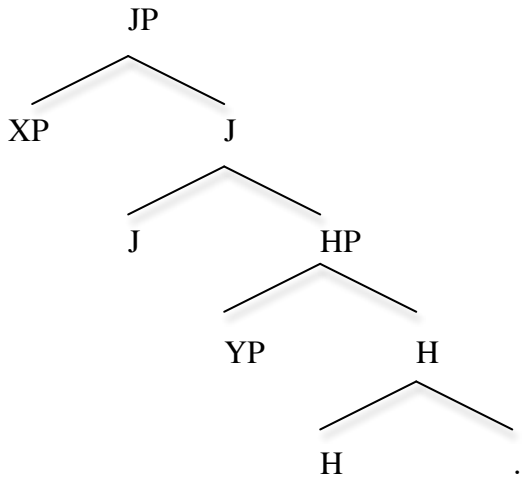
(6) YP-movement




(7) YP-movement




(8) Followed by XP-movement




Despite the fact that these configurations are very different, linearly (4), (5) and (8) would give a prefix and a base, while (6) and (7) produce a base followed by a suffix. Notice that the only configuration where the morpheme order could be altered without phrasal movement is (4); here the base and the affix hold a head-complement relation where it is possible to apply head movement (or a similar operation) to invert the relative order in the PF component without modifying the syntactic structure of the tree. In all the other cases, there is no head-complement relation between affix and base, and the only way of inverting their relative order is through phrasal movement.

This short overview shows that, once that we allow for movement, the relation between the linear position of an affix and their structural properties inside the word are not one-to-one and the semantics and the categorial properties need to be taken into consideration in order to determine the structure that underlies the relation between the base and the affix.

Which one of all the constituency-based distinctions that can be made on a structure (heads vs. phrases, specifiers vs. complements, etc.) is the one that plays a role here? Even though we would like to approach the problem from an empirical perspective, there is one constituent that seems to have stood out as an autonomous domain in the studies of syntax: complex specifiers. Among the well-known properties that show that specifiers behave autonomously with respect to their heads, we find the impossibility of subextraction (the Condition on Extraction Domains, illustrated in 9)

and the fact that they do not form constituents with their heads in the absence of the complement.

(9) a. ¿De qué director ha salido una nueva película?
Of which director has gone.out a new movie?
'Of which director has a new movie been premiered?'
b. *¿De qué director ha causado un gran escándalo una nueva película?
Of which director has caused a big scandal a new movie?
Intended: 'A new movie of which director has caused a big scandal?'

To explain all the freezing phenomena that show that specifiers are autonomous objects whose internal constituents interact in very limited ways with the rest of the structure, Uriagereka (1999, 2002) puts forth the proposal that specifiers are independent from the objects formed by the recursion of the head-complement relationship. This author proposes to introduce the notion of Command Unit (Uriagereka 2002: 46), which is a constituent obtained by the continuous application of merge to the same object. Specifiers constitute different CUs from the phrases they merge with, and that is why their internal constituents do not interact directly with the rest of the tree. (10) shows that a configuration in which a complex specifier is merged with a phrase cannot be reached by the continuous application of merge to the same object. The complex specifier is obtained by applying merge to object A (10a) and the phrase with which this specifier is merged results from the continuous application of merge to object H (10b); the combination of both results in a phrase with a specifier (10c). (10a) and (10b) are different CUs that are combined together in a further step.

(10) a. Merge A and B: {B,{B,{A}}} (the specifier)
b. Merge H and I: {H,{H,{I}}} (the spine of the tree)
c. Merge B and I: {H, {{B,{B,{A}}}, H,{H,{I}}}}}

In other words, a specifier is generated as a derivation parallel to the one that generates the spine of the tree. Before it can be merged with the spine, the complex specifier is sent to spell out, where its internal constituents are linearized (2002: 49), and as a result it constitutes an independent phase with respect to the PF and LF interfaces. This is known as Multiple Spell Out (MSO), which proposes that each different CU also constitutes a different unit with respect to spell out.
This approach predicts that any complex specifier, be it eventually linearized to the right or to the left of any head, will be phonologically independent of the base. This follows from the fact that the specifier is spelled out before it can be introduced as such, and thus it has been phonologically parsed as an autonomous object.
Uriagereka notices three phonological phenomena that show that, in syntax, complex specifiers show a certain degree of autonomy from their bases. The first one, taken from Cinque (1993) is that when focus stress is present in the right branch of a head, it can extend to higher constituents in the structure (wide focus, see also Zubizarreta 1998) (11a,b); in contrast, when the focus stress is present in the left branch of a head we obtain narrow focus, which cannot extend to higher constituents (11c,d).

(11) a. Michelangelo painted THE SIXTINE CHAPEL.
b. Michelangelo PAINTED THE SIXTINE CHAPEL.
c. MICHELANGELO painted the Sixtine Chapel.

d. *MICHELANGELO PAINTED the Sixtine Chapel.

Another property is that a pause between the left branch of a head and the constituent that this head forms with the complement is more natural than the same pause between the head and the complement:

(12) a. Michelangelo... painted the Sixtine Chapel.
b. ??Michelangelo painted... the Sixtine Chapel.

The same distinction can be made when we consider parenthetic constructions:

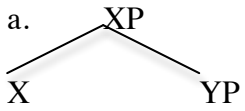
(13) a. Michelangelo, as everybody knows, painted the Sixtine Chapel.
b. ??Michelangelo painted, as everybody knows, the Sixtine Chapel.

Assume a version of the general theory that claims that complex specifiers are phonologically autonomous with respect to heads and complements is right.

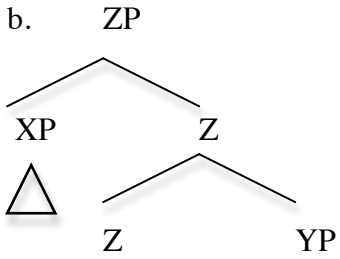
(14) If the affix and the base constitute different CUs they will be phonologically independent of each other, irrespective of their relative linear order.

Then we would have three relevant configurations, with only two different outputs, as two of them arrive at the same result. If the affix and the base stand in a head-complement relation and constitute a single CU, we expect the two objects to be parsed as a single phonological object (15a). On the other hand, if the affix, the base (15b, where XP can be the base or the affix) or both (15c) are complex specifiers, we expect that they will be phonologically autonomous of each other because they will be different CUs.

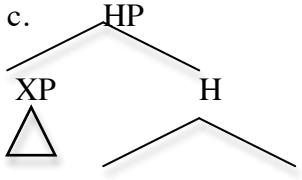
(15) a.

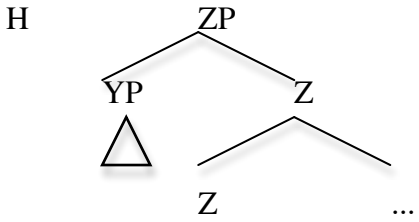



b.




c.






To summarize, this theory does not take the linearization per se of the affix as the way of determining its phonological parsing, but rather the structural relation between the base and the affix: if at least one of them is a complex specifier, one will be autonomous of the other.

*1.3. Different predictions of the two approaches.*

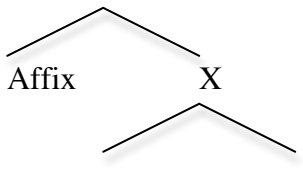
At this point we are confronted with two theories about the way in which the morphemes of a word are mapped into the phonology. The first one (§1.1.) proposes that the linear order is the one that determines it; the second one (§1.2.) proposes that it is the constituency internal to the word, and more in particular the presence of complex specifiers, what determines the mapping. To discriminate between these two theories we need to look for cases where the affix and the base constitute different CUs and the affix is linearized to the right of the base or cases where the affix and the base constitute the same CU and the affix is linearized to the left. In this paper we will argue that the diminutives in Spanish (and Czech) illustrate the first situation.

The paper is structured like this. We will first discuss diminutive affixes (§2), with particular attention to the Spanish form *-it-*. We will argue that its syntactic and semantic properties motivate that it is treated as the specifier of a Classifier phrase; this means that, to obtain the right morpheme order, the base will end up as an independent CU. We will show that this configuration is matched by the phonological behaviour of the base, which must be an independent prosodic unit. Then we will compare the Spanish diminutive to the German one, to show that the opposite set of syntactic properties comes accompanied by the opposite phonological behaviour. We will, finally, consider the Czech diminutive to show that the results found in Spanish are replicated in other languages. In section §3, we shortly explore the internal structure of parasynthetic verbs in Spanish and try to show that the results obtained from the analysis of diminutives can be used as a diagnostic for structural differences in this complex area of Spanish word formation. §4 outlines some consequences of our approach.

## 2. THE SYNTAX AND PHONOLOGY OF SPANISH DIMINUTIVES.

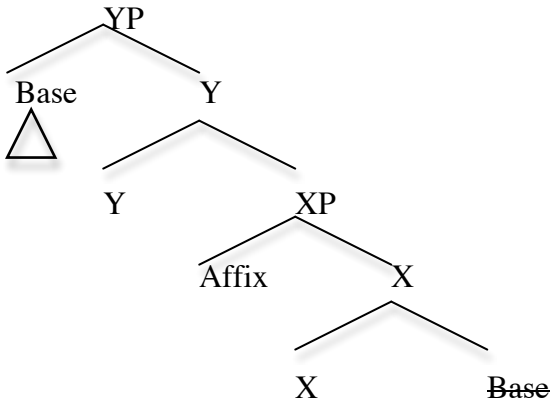
In this section we will argue that words containing the diminutive suffix -it- in Spanish illustrate the case in which the base and the affix constitute independent CUs and the affix ends up spelled out to the right of the base. The idea is that in their base position the affix and the base are in the configuration shown in (16), where Aff stands for the diminutive and B stands for the base:

(16)




In a further step, the base crosses over the affix, occupying a specifier position and therefore becoming its own CU.

(17)




At this point we obtain at least two CUs, the one for the base and the one that includes the affix. The theory that maps the linear position of affixes into prosodic units would predict that the base and the affix are the same prosodic unit; the theory that takes constituency into account predicts that the affix and the base are prosodically independent of each other. In §2.1. we will argue for the structure in (16) and (17) and in §2.2. we will show that indeed the two morphemes are phonologically independent of each other, in such a way that the base has to form a prosodic unit of its own (although not an independent phonological word). §2.3. considers other aspects of the analysis. §2.4. compares the situation to German, where a behaviour that shows that the diminutive is a head is accompanied by phonological phenomena that show that the base and the suffix phonologically integrate, and §2.5. compares it to Czech, where a Spanish-like syntactic behaviour is matched by a Spanish-like phonological behaviour. The results support the constituency mapping of morphemes into phonology, as opposed to the linear approach.

*2.1. The structure.*

In this section we will show that the diminutive morpheme *-it-* is syntactically a specifier which is spelled out as a suffix, in line with what has been claimed in previous work by Eguren (2001). We will follow the spirit of his analysis, even though the structure that we will propose considerably differs from his.

The first thing to take into account with this suffix is that it never alters the word class of the base. When it attaches to nouns (18a), it gives a noun as a result; when attached to adjectives (18b), it gives adjectives; when attached to adverbs (18c) it gives adverbs.

(18) a. casa, ‘house’ – cas-ita, ‘little house’
b. caro, ‘expensive’ – car-ito, ‘a bit expensive’
c. cerca, ‘close’ – cerqu-ita, ‘quite close’

The diminutive does not change the noun subclass either: the semantic properties of the base are always preserved in the diminutive, including the mass / count distinction (19), the animacy properties (20) or the class denoted by it. A *casita* is a small house; something *carito* is also something expensive, and being *cerquita* is also being close to something.

(19) a. mucha agua --> mucha agüita
much water --> much water-dim
b. muchos niños --> muchos niñitos
many children --> many children-dim

(20) a. gato --> gatito
cat --> cat-dim, 'small cat'
b. silla --> sillita
chair --> small chair

The second property that shows that this suffix is a specifier, as pointed out by Eguren (2001) is that it can be iterated, a property that would be impossible to explain if it was a head, as then it would give rise to a structure where there are two identical adjacent heads.

(21) a. chico 'small'
b. chiqu-ito 'smallish'
c. chiqu-it-ito 'very small'

Due to this, we will analyze it (as Eguren does) as a non head introduced as the specifier of another category. In determining which category is hosting this affix, we will concentrate on other properties of *-it-*: it always requires the presence of an overt desinence in the word to which it attaches. Even if the noun without the determiner does not carry a desinence, when the diminutive is present the affix becomes compulsory:

(22) a. cárcel --> *carcel-it, carcel-it-a
jail --> jail-dim, jail-dim-desinence
b. reloj --> *reloj-it, reloj-it-o
clock --> clock-dim, clock-dim-desinence

The desinence is also required in adverbs.

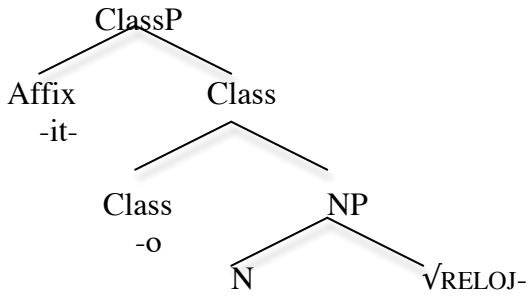
(23) aquí --> *aqui-c-it, aqui-c -it -o
here --> here-infix-dim, here-infix-dim-desinence

Notice that the phonology is not enough to explain this, as the epenthetic vowel *–e* could have been introduced to avoid that /t/ is the final segment in the word. This /e/ is sometimes the final segment in some nouns in Spanish. However, *-e* never appears with the diminutive suffix, and either *–o* or *–a* must be introduced (24).

(24) a. alcornoque --> *alcornoqu-it-e, alcornoqu-it-o
cork cork-dim-*e* , cork-dim-desinence

Another importan property to diagnose the structure of these words is that the position occupied by the diminutive is always to the left of the desinence. We assume the Spanish desinence to corresponde to the ClassifierP (Borer 2005), as Picallo (2006) and Alexiadou & Gengel (2008) have argued. The classifier contains the idiosyncratic information associated to the noun root and codifies some of its properties, among them the general class of objects that it denotes. We propose that to give account of the necessity of having a desinence with the diminutive suffix.

(25)




Crucially, the affix seems to require to check the information contained in the classifier of the noun; Eguren (2001) notices that the presence of the diminutive not only requires an overt desinence, but also that there are cases where the desinence has to reflect the gender information of the word, or, in other words, that the presence of the appreciative morpheme requires the classifier head to reflect the gender of the word (26a, 26b). A clear case of this is that with the word *mano*, which ends in the desinence *–o* despite the fact that it is feminine; with the diminutive, in European dialects of Spanish the desinence is regularized to *–a*, which is the desinence that is generally associated to feminine nouns (26c). This regularization is very limited, as it never affects masculine words ending in *–a*, and as many American dialects do not even regularize it with hand (as in Mexican Spanish, *man-it-o*), but the generalization that can be made is that whenever the noun does not contain a desinence, the diminutive requires the presence of a desinence that productively reflects the gender of the noun. The desinences *–a* and *–o* are regularly associated to a gender value. The ending *–e* is not associated to any gender value, and words ending in *–e* have changed gender class in the history of Spanish (as *puent-e*, 'bridge', which was feminine in pre-classic Spanish and masculine in Modern Spanish); the same happens with the zero marking (as for example *color-ø*, feminine until the XVII century and masculine after that period).

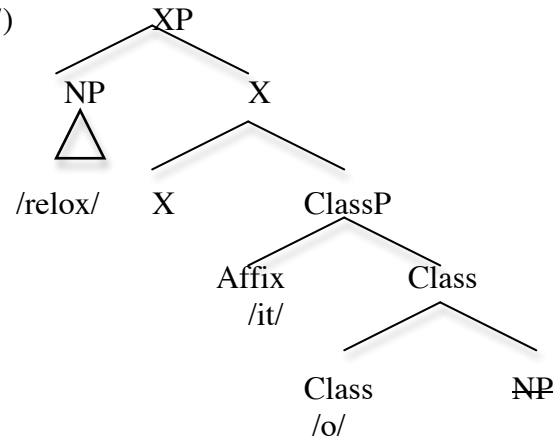
(26) a. actor --> actor-c-it-o
actor actor-inf-dim-des
b. actriz --> actric-it-a
actress actress-dim-des
c. man-o --> man-it-a
hand-des hand-dim-des

This is explained if the affix is a specifier of ClassP that requires to enter into an agreement relation with the head Class$^0$: unless the head contains explicitly valued gender information (which forces the insertion of *–a* or *–o*, the only desinences that correspond to gender marking in Spanish), agreement would be impossible. The fact that the diminutive is left adjacent to the desinence is also explained by this proposal. As agreement has already taken place, *-it-* is inactive and cannot move from the

position that it occupies in (25), and any syntactic movement that changes the position of ClassP would keep *-it-* in its specifier.[1]

However, (25) does not capture the order facts. The NP constisting of a nominalizer N plus the root linearizes to the left of the diminutive, which means that it moves to a higher position than ClassP. This movement cannot be any type of head movement, as it would be blocked by the Class$^0$, which is skipped by the noun. Had the noun head moved to the Class head, the order that we would expect is Root-Desinence-Diminutive (**reloj-o-it*). As the order is Root-Diminutive-Desinence (*reloj-it-o*), it is safe to conclude that whatever movement places the NP above the ClassP is phrasal in nature. This means that the NP will become, after movement, the specifier of a higher category, represented as XP in (27).

(27)




The identification of XP is orthogonal to our analysis, as the crucial thing is that in this configuration the base is a complex specifier which forms a different CU than the affix. For explicitness' sake, we propose that XP equals nP, the outer layer of the nP shell, where the index of identity associated to the set denoted by the NP is placed (Baker 2002). Movement of NP to that position is necessary so that the index in nP identifies the set of objects denoted by the NP (28):

(28) $[_{nP}\ [NP]\ \ n^0\ [_{ClassP}\ [it]\ Class^0\ [NP]]]$

[1] Consider an alternative technical implementation of the same generalization that the diminutive requires a marker that fully specifies the gender of the word. After movement of the NP to a higher position, the noun is adjacent to Class$^0$ only if there is no intermediate specifier, like the diminutive, that stands between them. If the selection of the particular vocabulary item that will be inserted to mark the class marker in the noun is determined at spell out, taking into account adjacency, the presence of the diminutive item between the moved NP and the Classifier head (as in *reloj* > *it* > *o*) is enough at that point to prevent the licensing of an idiosyncratic allomorph, such as a zero element, as in *actor-ø*, or the *–o* in a feminine noun like *mano*. The problem for all these approaches, including the one adopted in the paper, is the fact that the –a which marks masculine nouns (*problem-a* 'problem'; *planet-a* 'planet'; *artist-a* 'artist') remains unchanged after addition of the diminutive. This might suggest that *–a* is not an idiosyncratic marker when it signals masculine, but a masculine marker on its own right and that Spanish has two different morphemes *–a*, one for feminine and one for masculine. In contrast with *–o* as a marker of feminine nouns (which is displayed by less than 10 words in Spanish), the number of masculine words ending in *–a* is much higher, which might account for the asymmetry between the two markers. This topic, however, will have to be left for future research.

After movement of NP to nP, what was before a single CU becomes two CUs, as now the NP is a complex specifier (Uriagereka 2002: 63). At the point in which movement (internal merge) takes place, we have two CUs, as shown in (29):

(29) a. CU1: {N, {N, {√}}}
b. CU2: {n, {n, {Class, {Class, {N}}}}}
c. Merge CU1 and CU2:
{n, {{N, {N, {√}}}, {n, {n, {Class, {Class, {N}}}}}}

The prediction of the constituency based approach is that the base will form a phonological domain independent from the spine of the tree. What about the diminutive affix? Notice that, being a non complex specifier, Uriagereka's proposal makes it belong to the same CU as the projection in which it is merged, as the whole can be constructed without resorting to two parallel derivations:

(30) a. Merge NP and ClassP: {Class, {Class, {N}}}
b. Merge -it- and Class P: {Class, {-it-, {Class, {Class, {N}}}}}

Thus the prediction of this approach is that the diminutive and the class marker will belong to the same CU. It is expected, then, that the base will be a phonological domain and the set formed by the diminutive and the desinence will be a different phonological domain. On the other hand, the linear approach would expect the base, the desinence and the diminutive to belong to the same phonological domain, as the diminutive is a suffix which does not consist of more than one syllable and it cannot form a word by itself. Which one of the two theories makes the right prediction?

*2.2. The phonological behaviour.*
The diminutive morpheme can be introduced in a noun, adjective or adverbs between the base and the desinence without triggering any further phonological changes.

(31) a. casa -> cas-it-a
b. perro -> perr-it-o

However, with several words the presence of the affix comes with insertion of the segments /θ/, /eθ/ or /θeθ/ (written *–c-, -ec-* and *–cec-,* and pronounced in most of the Hispanic world as [s], [es] and [ses]).

(32) a. camión 'truck'--> camion-c-ito
b. sol 'sun' --> sol-ec-ito
c. pie 'foot' --> pie-cec-ito

When exploring the contexts where each one of these segments is introduced, the generalizations that emerge are stated in phonological terms. The first family of generalizations have to do with the length of the base and its final segments:

2.2.1. Phonological generalizations

a) The segment *-c-* can only be introduced whenever the base is polysyllabic, the last syllable carries primary or secondary stress and ends in a coronal consonant /n/, /l/ or /r/:

(33) a. hipérbaton /ipérbatòn/--> hiperbaton-c-ito
b. hotel /otél/ --> hotel-c-ito
c. amor /amór/ 'love' --> amor-c-ito

Also bisyllabic nouns ending in a stressed vowel take this segment:

(34) a. café 'coffee' --> cafe-c-ito
b. maná 'manah' --> mana-c-ito

b) The segment *-ec-* can be introduced whenever the noun is monosyllabic and ends in a consonant:

(35) a. plan 'plan' --> plan-ec-ito
b. dios 'god' --> dios-ec-ito
c. mar 'sea' --> mar-ec-ito
d. pez 'fish' --> pec-ec-ito

Also to this group belong some nouns which take the vowel *–e* as the final vowel when they appear without a desinence. Note that in all these nouns, the consonant preceding the *–e* is not a possible coda in Spanish (/ʧ/, /b/...), which suggests that the *–e* was, to begin with, an epenthetic vowel and the nouns were underlyingly monosyllabic.

(36) a. noch(e) 'night' --> noch-ec-ita
b. coch(e) 'car' --> coch-ec-ito
c. llav(e) 'key' --> llav-ec-ita

If the word is monosyllabic but it ends in a /i/, then *-ec-* is again the segment used.

(37) ley /léi/ 'law' --> ley-ec-ita [le.ye.θí.ta]

In this case the /i/ turns into [j] and is syllabified as the onset of a syllable headed by the /e/ in the added segment.

c) The segment *-cec-* is introduced whenever the noun is monosyllabic and ends in a stressed vowel.

(38) a. té 'tea' --> te-cec-ito
b. pie 'foot' ---> pie-cec-ito

The second parameter which determines when the segments are introduced is also phonological in nature. A well-known property of Spanish is that some bases alternate between containing a diphthong or a single vowel depending on the position of the stress; thus, if stress falls on the vowel, it turns into a diphthong and if it does not, it stays a vowel.

(39) contar 'to tell', /kon.tár/
a. /kuén.to/, 'I tell'
b. /kuén.tas/, 'You tell'

c. /kuén.ta/, ‘He tells’
d. /kon.tá.mos/, ‘We tell’
e. /kon.táis/, ‘You tell’
f. /kuén.tan/, ‘They tell’

(40) a. cuento ‘tale’ /kuén.to/
b. contador ‘tale teller’ /kon.ta.dóɾ/

Whenever such type of words contains the diphthong, the diminutive requires the insertion of one of the mentioned segments:

(41) a. cuento --> cuent-ec-ito
b. tierra ‘earth’ --> tierr-ec-ita
c. nuevo ‘new’ --> nuev-ec-ito

2.2.2. Phonological effects

Now that we have seen that the contexts where the segments need to be introduced is phonological in nature, let us see if also the presence of the segments has some phonological effect. We will show that their insertion has the effect of letting the output meet several markedness constraints. The vocalic segments increase the length of the base to let it form an independent foot, while the consonant segments prevent the base from resyllabifying with the diminutive and prevent the formation of base-final diphthongs.

In bases which are already bisyllabic (or more), the insertion of the consonant segment *-c-* prevents the word to resyllabify with the affix.

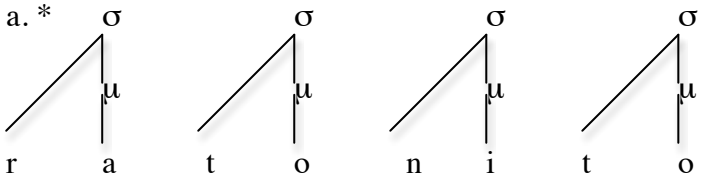
(42) rà.ton.cí.to

This has two effects. The first is that it preserves the alignment between the prosodic constituents (the syllable) and the morphological constituents (the different morphemes), as in the absence of this additional consonant each one of the boundaries would be in different positions:

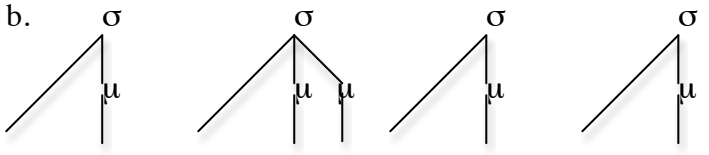
(43) a. *[(ra)$_\sigma$ (to)$_\sigma$ (n]i)$_\sigma$ (to)$_\sigma$
b. [(ra)$_\sigma$ (ton)$_\sigma$] (θi)$_\sigma$ (to)$_\sigma$

This is a manifestation of a constraint stating that the right edge of the prosodic unit has to be aligned with the right edge of the base (ALIGN FOOT, R / MORPHEME, R). Moreover, the ban on resyllabification keeps the association of the final /n/ in the base to a mora (44a, 44b), as in the underived form (44c).

(44) a. *

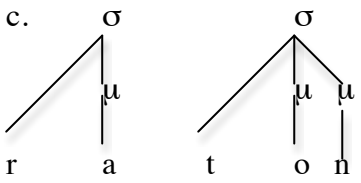



b.



r a t o n θ i t o

c.




This can be interpreted as a MAXIMIZE MORA(SONORANT), that is, a constraint that favour that the association between sonorant consonants and moras is preserved. The identity in the moraic structure between (44c) and the base in (44b) is total. Thus, there are two advantages of having the infix, both of them suggesting that the base has to be phonologically independent from the suffix.

Notice, however, that the position of the stress is different in the word *ratón* (/ra.tón/) and the base contained inside the diminutivized word *ratoncito* (base /rà.ton/, with secondary stress on the leftmost syllable). We will see that, in those cases where the stress has to be kept in a specific syllable despite potential stress clashes due to an independent constraint, more material has to be introduced (cf. 46 below).

In other cases, the infix adds one or more /e/ vowels. By doing that a minimal size of the base in the absence of resyllabification with the affix is obtained: the base now consists of two syllables and thus can form an independent foot.

(45) a. From *Dios* --> (dio.se.)$_{\pi}$ (θi.to)$_{\pi}$
b. From *ley* --> (le.je.)$_{\pi}$ (θi.ta)$_{\pi}$
d. From *noch(e)* --> (no.ʧe.)$_{\pi}$ (θi.ta)$_{\pi}$
e. From *pie* --> (pie.θe.)$_{\pi}$ (θi.to)$_{\pi}$

This can correspond to a constraint that states that feet have to be binary, BINARYFOOT. Insertion of the vowel (and eventual consonants) guarantees this. The question that comes to mind now is why the base could not profit from the initial vowel of the affix, /i/, to get the second nucleus that is required to have a binary foot. The phenomenon suggests, again, that the base and the affix must belong to different prosodic domains, different feet and no foot can be constructed which contains (part of) the base and (part of) the affix.

The bases to which *–cec-* and *–ec-* are added are those where the word, being monosyllabic, requires an extra vowel to form a perfect foot. The extra *-c-* is present when the base ends in a vowel and, therefore, would have had problems resyllabifying with the segment *-ec-*. Those where *-c-* is inserted are those that were already bysillabic or more, but which, ending in a consonant, would have been forced to resyllabify if followed by the initial vowel of the diminutive.

In the case of the bases that contain diphthongs that require stress, the presence of the segment guarantees that the diphthongized vowel will receive rhythmic stress:

(46) a.
```
                *
(*              *)
(bue.  ne.)  (ci.   to)
```

b.
```
        *
```

(* *) STRESS CLASH!!
(bue.) (ni. to)

In this case, as opposed to what we saw in *ratón ~ ràtoncíto*, the stress has to be kept exactly in the same syllable as in the non derived form. The reason is that these words have the special property that the alternation between a diphthong /ue/ or /ie/ is dependent on the presence of stress in the syllable that contains them. Failure to keep this association would imply changes in the form of the base. These changes are not generally rejected (as we will show shortly; §2.3.2), but here they are disallowed. This suggests again that the base has to be prosodically independent from the affix.

*2.3. Evaluating the data.*

2.3.1. Prosodic independence.

There are some considerations to be done. The central one is that segments are introduced here to preserve markedness conditions that are not normally preserved when words combine with suffixes. For example, consider the following derived words from the same bases that take the segments with this diminutive morpheme:

(47) a. pan 'bread' + en...a = /em.pa.náɾ/ ('to put bread on something')
b. pez 'fish' + era = /pe.θé.ɾa/ ('aquarium')
c. ratón + era = /ra.to.né.ɾa/ ('mouse trap')
d. nuevo + ísimo = /no.bí.si.mo/ ('very new')

In the examples in (47) we can see that other suffixation processes do not require the insertion of segments, and that the very markedness infractions that were unacceptable in the case of diminutives are here illustrated: the base resyllabifies with the suffix altering the alignment (all the cases) and the association to a mora (47a, 47c; notice that the base in 47c is the same we considered with the diminutive). The base does not form a bisyllabic foot by itself (see specially 47b) and there can be stress clash between the first syllable of the suffix and the first of the base, triggering the disappearance of the diphthong (47d).

The conclusion is that in the case of the diminutive suffix, the base must be prosodically independent from the set formed by the suffix and the desinence. In normal cases of suffixation where the affix is a head that changes the base's grammatical category, the semantics or both these constraints do not require to be met.

This phonological behaviour is expected if the fact that the base belongs, after phrasal movement, to a different CU from the one formed by the diminutive and the desinence is relevant to determine that each one of these sets needs to be phonologically independent from the other.

2.3.2. Derived environment effects and morphological complexity.

The second consideration to be done is that here, as in many other morphological processes, the bases have to meet some markedness requirement that the original forms, in a morphologically underived context, did not need to meet. Consider, for example, that nothing is wrong in Spanish with having some monosyllabic words, like *té, pie* or *ley*, but as soon as these forms are the bases of derivation of a diminutive affix, they must become bisyllabic. These effects are well known in the literature and have been labelled Derived Environment effect or the Revised Alternation Condition

(Kiparsky 1982): sometimes several phonological processes, that give rise to less marked structures, take place in morphologically complex words, but not in the underived objects. In OT these effects are accounted in a variety of ways which ranges from proposing cophonologies which treat different sets of forms with different constraint rankings (Ito & Mester 1995), indexed constraints which operate on classes of morphemes (Pater 2006) or constraint conjunction which coordinates a constrain on morphological complexity with a markedness constraint, such as only when both constraints are violated an infraction is triggered (Prince & Smolensky 1993). We will not get into the details of how to derive these effects here. What we would like to emphasize is that there is a strong correlation between the phonological changes discussed here and whether the word is perceived as morphologically derived.

In the case of diminutive morphemes, there is a number of apparently derived forms which are listed in the lexicon, as their meaning is non compositional. It is worth noting that in these cases the phonological effects that we have been discussing do not take place. Remember (46), where we argued that in order to keep the diphthong in the form *bueno* the stress clash was avoided by introducing extra vocalic segments. The resulting word, *buenecito*, has a compositional meaning which contains the meaning of the adjective *bueno*. That is, this adjective can be used in all the contexts where *bueno* can be used. Constrast this with the word in (48), historically related to *bueno* and a diminutive affix:

(48) bon-ito
good-diminutive

Here no segments are introduced between the two morphemes, there is stress clash and as a result of it the diphthong becomes a vowel when its syllable looses the stress it carried. The crucial property of (48) is that this form is not felt as derived by speakers of modern Spanish, and thus the derived environment effect does not arise.

2.3.3. The suffix is not a phonological word.

Let us consider the alternative from the perspective of the theories where the linearization of the segment accounts for its phonological properties. Remember that some of these theories (Booij 2000, Plag 2003) allow suffixes to be phonologically independent when they correspond to minimal words in the language. The segment *–ito / -ita* is bisyllabic and, therefore, could be a potential minimal phonological word in Spanish. However, as noticed in these theories, when this situation arises, the suffix should behave like a non bound form with respect to its phonological properties, most crucially allowing coordination as a separate segment, as each one is an independent phonological word listed in the lexicon as such (49; the sign ω stands for phonological word). (50a) would be the way of expressing in Spanish the sequence 'small boys and small girls'. The coordination cannot be done below the word level, however (50b; the pronounciation /e/ of the conjunction is due to its being immediately preceding an /i/).

(49) a. Americanophilia and Americanophobia
b. $[\text{Americano}]_{\omega}[\text{philia}]_{\omega}$ and $[\text{-phobia}]_{\omega}$

(50) a. niñitos y niñitas
small boys and small girls
b. *niñitos e -itas

small boys and small.feminine

We conclude, thus, that it cannot be claimed that the diminutive behaves in Spanish as an independent phonological word. Its inability to phonologically integrate with the base is not an effect of its properties as a unit, but is a result of the syntactic configuration in which it appears; as a unit, it is not phonologically autonomous.
The behaviour of the base in these morphological context, thus, is not triggered by any word minimal size, as the two objects, the base and the diminutive, must integrate in a single prosodic word. Instead, these effects are due to a requisite that forces the base to form a prosodic foot with unmarked properties. We will see that in Czech (§2.5) the phonological effects are also at the prosodic level of foot and not at the word level, as the two elements still need to integrate into a prosodic word. The inescapable conclusion of these data is that we cannot equal a command unit with a prosodic word.

2.3.4. The nature of the infix.
Another question that needs to be addressed is the nature of the segment that is added in order to preserve the phonological unmarkedness of the base. Three possibilities come to mind: it is an epenthetic segment, it is part of an allomorph of the base or it is part of an allomorph of the diminutive. The first possibility would predict that the segments inserted are the unmarked epenthetic segments in the language; this possibility could be plausible in the case of the vowel /e/, as this is the vowel inserted in contexts where a nucleus is needed in a syllable and the lexical entry does not provide one (say, in loanwords, as in *sport* -> [es.pór]), but the situation is not so clear with the segment /θ/, despite the fact that in most dialects it would be pronounced [s], which is a more likely candidate for an unmarked consonant in Spanish, as it is coronal. However, some lexical variability (see infra) suggests that this solution is not the right one.
Internal to our proposal, we would expect the segment to be part of the allomorph of the base (not the diminutive), if only because they are triggered by properties of the base and the base belongs to a different spell out unit as the diminutive. We would not expect the diminutive to have information about what is going on in the spell out of the complex specifier. Indeed, there are reasons to think that the segments are part of the allomorph of the base, and not of the diminutive. The reason for this is that the segment introduced to keep the base from resyllabifying with the diminutive is sometimes lexically motivated. The most frequent form is /θ/, but a word like *café* 'coffee' allows /l/: *café --> café-l-ito*. Notice that the diminutive is the same one, which prevents us from claiming that this /l/ is allowed by the diminutive. The conclusion is that the segments are increments associated to specific allomorphs of the base, not the diminutive, as we expected internally to our theory.
Resyllabification at the word level could reinterpret some of these segments (crucially the last consonant) as the onset of the constituent formed by the diminutive and the gender marker, but crucially the resyllabification guarantees that at the word level the base will have unmarked prosodic properties.

*2.4. Diminutives in German.*
Let us see how our analysis makes the right predictions also in German. In German, diminutive suffixes can change the gender of the noun; they systematically turn the noun, irrespective of their gender information, into a neuter noun (51). No exceptions

to this are reported, to the best of my knowledge, in grammar books or by native speakers (Martin Krämer, p.c.).

(51) der Ball --> das Bäll-chen

Moreover, the diminutive in German can only produce nouns (52). When combined with an adjective like *guten*, and unlike the examples in Spanish, the only possible result would be a noun; the word in (52) could be marginally interpreted as 'a little comodity', but never as a way of put degree modification to the adjective form.

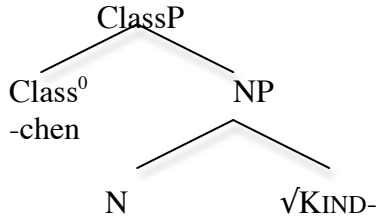
(52) ?das Gütchen

The affix cannot be iterated either (53).

(53) *Kind-chen-chen

All these contrast with the behaviour of the diminutive in Spanish. These are properties of a head that belongs to the nominal domain and changes the information contained in the base, replacing it with a different set of features (neuter gender, minimally). If *–chen* is a classifier head that contains information about gender, then it follows that it can only be combined with objects that are nouns or that have been turned into nouns, as the classifier compulsorily selects nouns. See Wiltschko (2006) for a similar, though not identical, proposal.

(54)




It is possible that this structure helps understand another property of the diminutive in German vs. the Spanish one. The diminutive in Spanish has a high productivity, and almost any noun can combine with it. The possible exception are some abstract nouns refering to qualities (55), but in these cases the incompatibility seems to be triggered by (word knowledge) and, anyway, they are still marginally acceptable.

(55) ?libertad-c-ita
freedom-Infix-diminutive

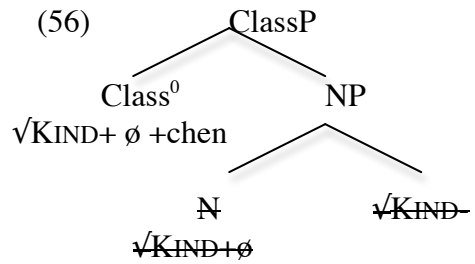
In German, however, speakers report that the diminutive has trouble combining with a bigger set of nouns, among them *Buch* ('book'), *Boden* ('floor') or *Not* ('hardship'). Forms like ?*Büchchen, *Bödchen* or **Nötchen* are marked at best, and no clear phonological reason can be seen that prevents this combination. If we compare the two different structures in Spanish and German, a potential explanation of this tendency might be at hand. In Spanish, the diminutive combines with the gender information, which any noun will have, but does not select the noun itself. In German, on the other hand, the diminutive is the classifier, and select the noun. In the same way that in a given language it is not the case that a particular gender information is compatible with any noun, we do not expect the German diminutive, which spells out

the same head, to be compatible with every noun. This might be a problem of selection: *-chen* cannot select just any noun, and imposes some idiosyncratic restrictions to the set it can select.

As Wiltschko points out, the structure in (54) should also predict that the diminutive changes some additional semantic information of the noun; this is the case in German and other languages, like Yiddish, Dutch and Ewe, where diminutives turn mass nouns into count nouns (German *Brot* 'bread' --> *Brötchen* 'bread roll'; Yiddish *der zamd* 'the sand' --> *dos zemdl* 'grain of sand'; Ewe *sukli* 'sugar --> *sukli-vi* 'piece of sugar'). Her conclusion is that in all these languages the diminutive must be a head selecting the noun. In contrast with what Wiltschko notices for German and these languages, Spanish diminutives can attach to mass nouns without necessarily turning them into count.

Given the configuration in (54), the diminutive in German belongs to the same CU as the base. Notice that the configuraton in (54) corresponds to our example in (4), where there is a head-complement relation between the base and the affix and it is, therefore, possible to form a morphological word with the two words without phrasal movement. If head movement –or an equivalent mechanism, such as Morphological Merger (Embick & Noyer 2001) or Mirror Theory (Brody 2000), the linear ordering of the two heads is reverted without destroying the syntactic configuration. For explictiness we will represent the operation as head movement, which we assume to take part at PF by copying the phonological signature of the complement into the selecting head (56).

(56)




Our prediction would be that the base and the affix form in German a phonological domain, and therefore that the affix might trigger some direct changes in the base which are not explained by the need of the base of being autonomous as a phonological object. This prediction is fulfilled in the well-known phenomenon of Umlaut: the presence of the suffix, containing a front vowel, changes the vowel quality of the base to palatal (57; I am grateful to Martin Krämer for these examples). In order to get the assimilation in vowel quality, the two morphemes must be integrated in the same phonological unit.

(57) a. Hut 'hat' --> Hüt-chen 'hat-diminutive'
b. Stuhl 'chair' --> Stühl-chen
c. Gnom 'gnome' --> Gnöm-chen
d. Rad 'wheel' --> Räd-chen
e. Nonne 'nun' --> Nönnchen

The theory that establishes an association between the CU units inside the word and the mapping of morphemes into prosodic units has its prediction borne out also in German, where diminutives behave as heads and, consequently they form one phonological domain with the base.

*2.5. Diminutives in Czech.*

Czech diminutives have (almost) the same properties as Spanish diminutives: they allow for iteration (58); they can be combined with a variety of grammatical categories, keeping the category of the base intact (59; notice that Czech also allows for diminutives in verbs, something which is controversial in Spanish) and they systematically preserve the gender information of the base, and even its marking (60).

(58) a. strom-eč-ek
tree –dim-dim 'little tree'
b. ruč-ič-k-a
hand-dim-dim-feminine 'small hand'

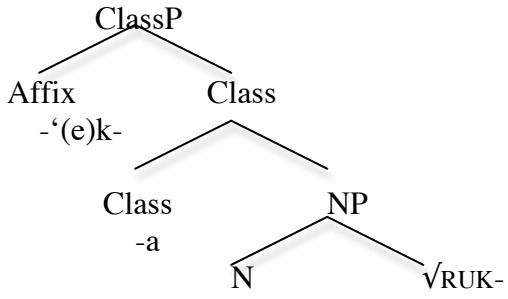
(59) a. mal-y 'small'
small-agreement
a'. mal-ič-k-y
small-dim-dim-agreement
b. sp-a-t 'to sleep'
sleep-ThV-infinitive
b'. sp-in-k-a-t
sleep-dim-dim-ThV-infinitive

(60) a. ruk-a 'hand' --> ruč-k-a
hand-feminine hand-dim-fem
b. strom-ø 'tree' --> strom-ek-ø
tree-masculine tree.diminutive-masculine

We will not discuss the complex pattern of allomorphs that Czech diminutives display when iterated.

The set of data that we have presented shows that Czech diminutives, much as Spanish diminutives, behave as specifiers of a head and not as heads themselves. Assuming, given their position, that the head they modify is the Classifier that introduces gender information, their structure would be similar to the Spanish one, as in (61).

(61)




The morpheme order cannot be obtained via head movement, and therefore phrasal movement of the NP has to take place to a position above the classifier, which creates two independent CUs, as in Spanish. Therefore, we expect some phonological independence between the base and the affix.

One significant difference between Spanish and Czech is that in the latter long and short vowels are differentiated. While in Spanish each vowel is associated to just one mora, Czech allows bimoraic vowels. Now, consider the data in (62), taken from Scheer (2003: 100-101).

(62) a. mly:n ‘mill’ --> mly:n-ek ‘little mill’
b. vlak ‘train’ --> vla:č-ek ‘little train’
c. muž ‘man’ --> muž-i:k ‘little man’
d. ky:bl ‘bucket’ --> kybl-i:k ‘little bucket’

The generalization proposed by Scheer is that a base with a short vowel needs to lengthen it when the short form of the diminutive is used (62b), but stays if the long form of the diminutive is used (62c). A base with a long vowel stays long if the short form is used (62a), but needs to shorten if the long form is used (62d). The result, Scheer argues, must be exactly three mora in the derived word: one in the base and two in the diminutive or two in the base and one in the diminutive, no more and no less.

The requisite that the size of a word is three mora is, to begin with, typologically odd. There is a clear tendency to have bimoraic constituents across languages (see, for example, Rosenthall 1999: 361, where a ban on trimoraic constituents is proposed; Morén 2001: 124, where feet cannot be trimoraic). It would be better to define this alternation on the basis of maximally bimoraic structures, which is what we will attempt to do.

Also from the perspective of the data, the alternation proposed by Scheer has counterexamples. Consider (63), where the vowel of the base remains short despite the fact that the diminutive also appears in the short version.

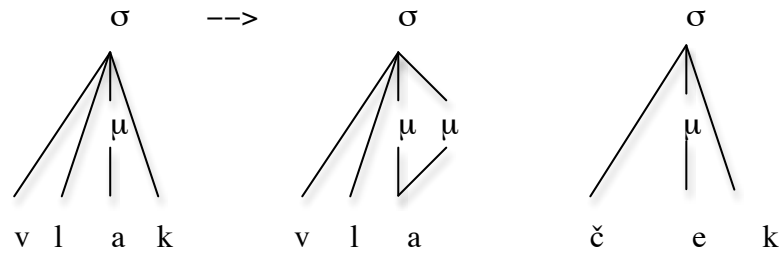
(63) strom ‘tree’ --> strom-ek ‘little tree’

We will argue that these cases require that (some) consonants are moraic in Czech and those that are sonorant can be ambisyllabic, adding a mora to the coda as well as becoming the onset of the following syllable. Once that we add this proviso into the analysis, we will see that the data can be understood as the base needing to be bimoraic in all the cases, with independence of the length of the word in a non derived environment. Just like in Spanish, where a word that could be monosyllabic needs to get extra material to become bisyllabic in a derived environment, Czech monosyllables that lengthen the vowel are forced to do so in the derived word because in that context they need to meet a binarity requirement in the absence of the suffix. The requirement is different in Czech and Spanish, simply because in Czech the length of the vowel is distinctive. However, in both cases the base needs to meet a requirement of binarity in the absence of the suffix. In Czech this has the result that the base must be bimoraic. No additional consonants are introduced in Czech to prevent resyllabification because in these language sonorant segments are allowed to be ambisyllabic, suggesting that the Align constraint has to be ranked low in this language.

This means that the distribution between the long and the short forms of the diminutive is not explained by phonological criteria in our analysis; notice, however, that in Scheer’s proposal the length of the vowel in the underived form is also unable to predict which one of the two allomorphs would be introduced. In both cases the choice between the allomorphs has to be left for further research.

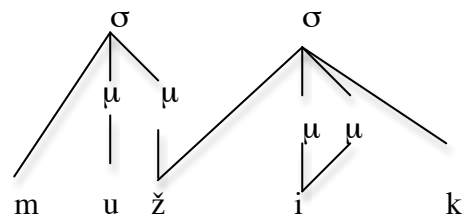
The changes in the vowel are an effect of its interaction with other moraic elements in the base. Consider first the case of lengthening of a short vowel. (62b) must lengthen, because after the consonant is resyllabified with the affix two moras have to be filled.

(64)




The next question is how we obtain a short vowel that does not lengthen. This is possible if the final consonant was, to begin with, moraic in the base (62c), and is ambisyllabic once the resyllabification takes place. See Morén (2001) for the proposal that sonorants can be ambisyllabic in coerced weight contexts.

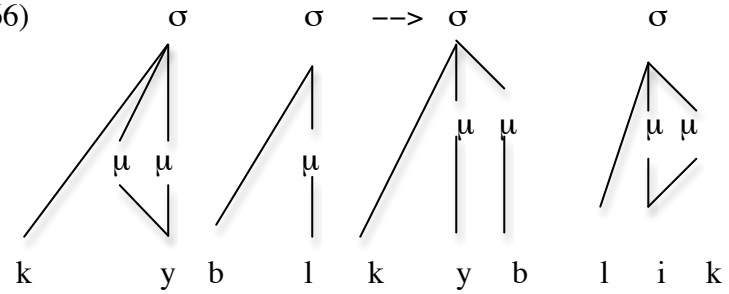
(65)




On the assumption that the final consonant is moraic on the base and can remain moraic when it is ambisyllabic, the size of the base is already two moras.

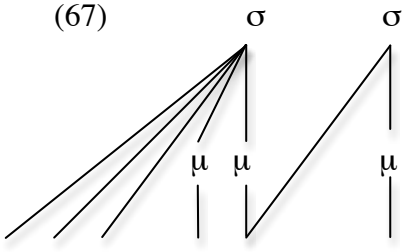
Consider now the case of the long vowel that shortens. This can be obtained if in the word of (62d) the final sonorant is moraic and is the head of a syllable of which /b/ is the onset. When, in the derived form, the /l/ is followed by a vowel, it becomes an onset, and then the /b/ has to be reanalyzed as the coda of the preceding syllable, where it gets mora by position (WEIGHT BY POSITION, Moren 2001: 122). Once the consonant adds an extra mora, the vowel needs to shorten to meet the bimoraicity requisite.

(66)




In a word where a short vowel remains short, like *strom-ek*, we have an ambisyllabic sonorant:

(67)



In a word like (62a) we need to assume that here the /n/ is not ambisyllabic and gets reanalyzed as the onset of the following syllable without contributing another mora to the first syllable. This can be obtained if, in the lexical entry of the base, the /m/ in *strom* is linked to a mora, but the /n/ in *mlyn* or the /l/ in *ky:bl* are not. In order to meet a MAX-LINK MORA (SONORANT) constraint and a general preference for syllables with onsets, these nasals have to be ambisyllabic. Those not associated to moras in the lexical entry, however, can be reinterpreted as non moraic. To the extent that lexical representations are arbitrary, this solution is a stipulation, but we are not introducing any further level of arbitrariness beyond the one required by lexical representations.
Notice that throughout the discussion I have assumed that the palatalization of the final consonant of the base triggered by the diminutive is a phenomenon that happens at the level of the prosodic word (or later).
We have tried to show that the pattern in Czech can be reanalyzed as a requisite on a bimoraic base in the absence of the diminutive affix. If the analysis can be maintained, we find a parallelism with the situation in Spanish, as the base in Czech also needs to meet some phonological requisites in the absence of the diminutive.

## 3. A NOTE ON PARASYNTHETIC VERBS.

We will use the tools that we have developed in the previous sections to try to get some understanding of the internal structure of parasynthetic verbs in Spanish. We will not provide a full-fledged analysis of parasynthesis, which is a highly complex phenomena in Spanish, and, as such, all we say in this part of the paper will be speculative and has the sole purpose of showing how to diagnose a part of the whole structure of a parasynthetic construction via phonological mechanisms. In short, we will not use parasynthetic verbs to argue in favour of the analysis, but rather we will use our approach to see if we can gain some understanding of parasynthetic verbs.

### *3.1. A semantic contrast between two prefixes en-.*

It is possible to identify two different meanings associated to the prefix *en-* inside derived parasynthetic verbs. The first prefix appears in change of state verbs derived from adjectives or nouns (68); the second prefix appears in locative verbs derived only from nouns (69).

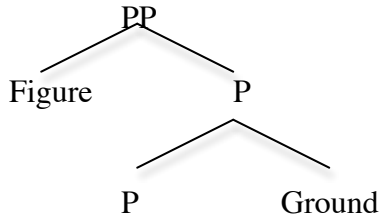
(68) a. en-amor-ar, ‘to fall in love’
in-love-ThV
b. en-orgull-ec-er, ‘to become proud’
in-pride-verb.-ThV

(69) a. en-harin-ar, ‘to put flour’
in-flour-ThV
b. en-aren-ar, ‘to put sand’
in-sand-ThV

As can be seen, in both classes of verbs the prefix occupies the same linear position, but we will argue that, given their semantic contribution, the structure that they form with the base is different in each case.
Let us start with the locative verbs. Our discussion will concentrate on locatum verbs, for reasons that will become clear as we proceed. In this class of verbs the meaning of

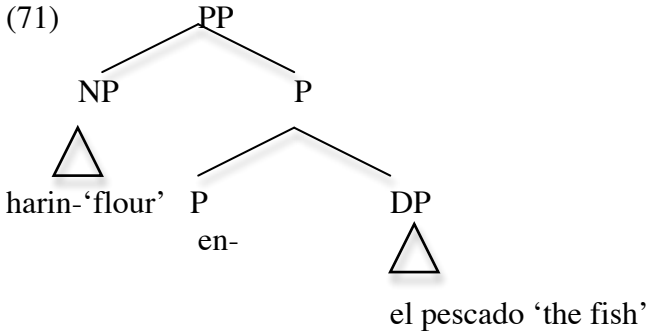
the verb is locative and it is very difficult to miss the generalization that in Spanish the prefix *en-* is identical to the place preposition *en* 'on / in'. The unmarked assumption is that the prefix is actually responsible for the locative semantics here. Moreover, if we examine the semantics of a locative verb, we see that the general distinction between figure and ground (Talmy 1985) is also identifiable. The direct object of the verb is one of them, and the base on top of which the verb is constructed is the other one.

(70)




The locatum verbs (like English *to saddle*; Hale & Keyser 2002) are those in which the base of the verb denotes the figure and the direct object denotes the ground. *To saddle the horse* is understood as 'to put a saddle (figure) on a horse (ground)'. This can be translated to a structure if in a locatum verb the base starts as the specifier of the prefix, with whose projection it establishes a thematic relation. Thus, *enharinar* 'to put flour' presumably contains as part of its internal structure the tree in (71), where the base is the specifier and the constituent that will become the direct object is the complement.

(71)




Given this initial configuration, necessary due to get the locative relation between the base and the direct object, , the only way of obtaining the order in which the affix precedes the base is through remnant movement of the PP above the position occupied by the figure. First, the NP will have to move to another position (72), where it will be a complex specifier and thus its own CU.

(72) $[_{XP}$ [harin-] $X^0$ ... $[_{PP}$ ~~[harin]~~ $P^0$ en $[_{DP}$ el pescado]]]

Consider now the role that the prefix *en-* plays in the change of state verbs, where there is no direct locative meaning associated to the prefix. In this case the prefix does not introduce any argument structure; in the absence of locative meaning, the base is neither the figure nor the ground of the preposition. The question is to determine, then, what is the function of the prefix in this kind of nouns, given the fact that there does not seem to be any locative notion there. We will shortly argue that in this case the prefix must be a head that selects the adjectival or nominal base to change its

semantic properties in such a way that it can be compatible with the semantics required of verbs. Let us see the evidence for this.
Change of state verbs allow for a stative reading in which the scale normally associated with the temporal domain is mapped into the spatial dimension. (73) shows such case: (73a) is the result of different degrees of width being mapped into temporal intervals inside the evening, and (73b) is obtained when the scale defined as different degrees of width is mapped to different points in the space between the ceiling and the floor. In the second case there is no temporal progression associated to the scale, or, in other words, there is no change of state properly. The link between a space and a scale is the relevant construct here.

(73) a. The crack has been widening for the whole evening.
b. The crack widens from the ceiling to the floor.

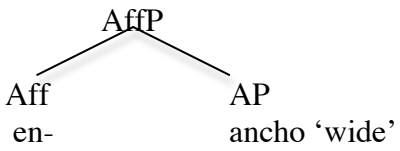
This same semantic operation is generally possible with change of state verbs in Spanish, but crucially only if they do not contain a prefix in front of the adjectival base. There are two ways of translating *widen* to Spanish: the one without a prefix, *extender*, can be used to translate (73b), while the one with a prefix, *enanchar*, cannot.[2] In other words, the presence of the prefix *en-* forces the scale associated to the base of the verb to be mapped into the temporal domain, forcing a change of state reading.

(74) a. La grieta se extiende desde el techo hasta el suelo.
The crack SE widens from the ceiling to the floor.
b. #La grieta se ensancha desde el techo hasta el suelo.

This property follows if the role that the prefix is playing in the structure is precisely to serve as an anchor that takes the properties denoted by the base (be it a noun or an adjective) and maps them to the temporal domain; once the prefix is present, the scale must remain mapped to the temporal domain, and the stative reading becomes impossible. This role suggests that in the change of state verb, the prefix is a functional head that acts as a function that selects a set of properties and maps it into a temporal sequence. If this characterization is correct, as the contrast in (74) suggests, then the prefix must be here a head that takes the base as its complement (75). Thus, they are both in the same CU to start with.

[2] In modern Spanish, *enanchar*, considered a colloquial form, competes with *ensanchar*, with a segment *-s-* between the prefix and the base that has been characterized as a phonological infix (cf., among others, Serrano Dolader 1999: 4705). However, there are reasons to believe that this infix is not phonological. The first one is that in the cases where the infix is clearly phonological the form without the infix is ungrammatical and is never used (*piececito* 'small foot', with the infix /θeθ/, never competes with **pieíto*). In this case, the verb *enanchar* is preferably used with animate subjects (as in the translation of *The child has become wider*, *El niño ha enanchado*) while the form *ensanchar* is unmarked. Secondly, if this *-s-* was a phonological infix then it would be the only case in Spanish where it is necessary to introduce an additional segment between the prefix and the base to prevent resyllabification. In all the cases where resyllabification does not occur between a prefix and a base, no segment is necessary, as in *sub-atómico* 'sub-atomic', pronounced [sùβ.a.tó.mi.ko]. For these two reasons we consider that the additional segment that appears between the prefix and the base in *ensanchar* is not triggered by phonological reasons, and we propose that its presence, being associated to a semantic difference, is due to a lexical distinction between two different lexicalizations of the same root or, in other words, allomorphy.

(75)




If the constituent in (75) never gets broken in the following steps of the derivation, then at the point of spell out the prefix and the base will be part of the same CU and therefore will form a phonological unit. Given the fact that the prefix acts as a function that modifies the denotation of its complement, and that the base would not be apt to provide the semantics required by a change of state without the prefix, any movement that takes the AP from the c-command domain of the prefix would create a semantic object unfit to be part of a verbal change of state. Thus, any movement of the AP will necessarily have to be contained inside the AffP. The conclusion is that at every point the affix and the base belong to the same CU.
Now we have a way of testing if the partial representations that we have offered for these two classes of parasynthetic verbs is plausible: their phonological behaviour.

*3.2. A phonological difference.*
Consider the contrast between the quasi-minimal pair (as they are almost identical in their segments and, crucially, identical in their syllable structure and the position of the main stress) *enamorar* (‘to fall in love’, change of state) vs. *enharinar* (‘to put flour’, locatum verb).
From the comparison between the two spectrograms, which correspond to the emphatic pronounciation of the two verbs, several differences can be identified. Most significantly, the intensity and length of the /e/ of the prefix is considerably higher in the case of the locatum verb, as well as the length of the nasal /n/, which is pronounced as a geminate. The same prefix has a duration of 0.50 seconds in the locatum verb and 0.17 seconds in the change of state. The first vowel of the base, /a/ in both cases, is longer in the change of state verb than in the locatum verb.

Image 1. Spectrogram *enamorar* (change of state *en-*) with duration

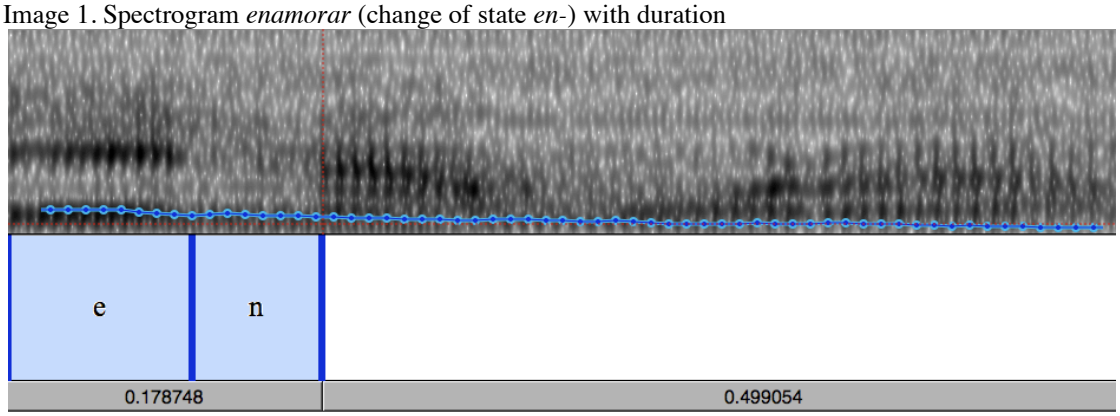
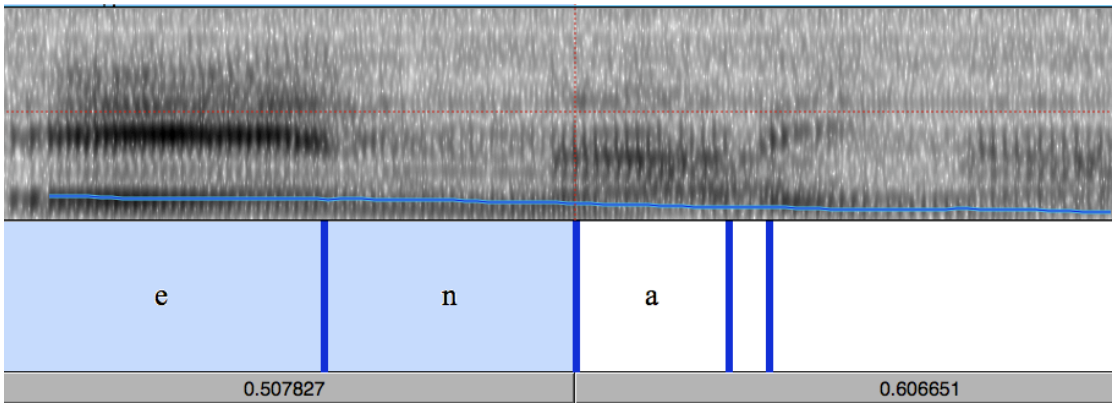



Image 2. Spectrogram *enharinar* (locatum *en-*) with duration




These phonetic differences follow if the prefix *en-* carries secondary stress in the locatum verb (76a), but not in the change of state (76b), as stress in Spanish is generally accompanied by an increase in the vowel length. The fact that the prefix carries secondary stress in the locatum prevents the first vowel of the base from getting rhythmic stress, due to stress clash (77), but secondary stress is possible in the first vowel of the base when the verb is a change of state.

(76) a. /èn.a.ri.nár/
b. /en.à.mo.rár/
(77) */èn.à.ri.nár/

The increased length in the /n/ of the prefix can also be explained if the gemination is triggered by the need of providing the first syllable of the base with a consonant segment as an onset. Another characteristic sign that the /n/ is treated in these verbs as a final segment is the fact that in the dialects that pronounce final nasals as [ŋ], such as the Galician or Asturian regional varieties of Spanish, a locatum verb such as *enhebrar* (from *hebra*, 'thread', 'to put the thread in the needle') is pronounced as *e*[ŋ]*ebrar* (Pensado 1999: 4452).

## 4. Conclusions.

We have argued through the Spanish, German and Czech diminutives that the linear position occupied by an affix with respect to the base is irrelevant in determining the phonological interaction between the two elements and that, at best, it might happen that in a given language affixes that project as phrasal specifiers end up linearly preceding their base more often than not. Consequently, the cases presented here argue in favour of the proposal that it is the syntactic constituency, and more in particular Uriagereka's Multiple Spell Out, what determines the phonological properties of an element. This theory has the advantage of being universal –which makes it very easy to falsify it, as the counterexamples can be argued in any language-, of following from independent principles proposed in the constituency of domains, and of not requiring the presence of mediating levels between the structure and the phonology (as p-structure).

The main consequence of our proposal is that the same analysis can give account of the semantic, formal and phonological properties of the internal constituents of a word. With the same underlying structure, which is generated by syntactic merge, and the same notion of Multiple Spell Out, we can account for the role that affixes have in their semantic contribution to the word, for their phonological constituency, and for the formal relations that they establish with each other. The analysis shows, therefore,

that the same set of principles that single out complex specifiers in the syntax also single out the same objects inside the word structure, which supports an approach to word formation where syntax is the component that puts morphemes together into complex structures. Given this set of facts, the logically possible alternative that morphology and syntax are generated by different sets of operations which, however, happen to single out the same kind of constituents is considerably unattractive.

Secondly, our analysis shows that the linear position is not enough to determine the properties that a unit brings with it. This consequence might sound trivial in the field of syntax, but it is not so in the field of morphology, where affixes are defined by their position relative to the base. We have shown that the linear position of an affix is irrelevant both for the semantics and the phonology of the word, and that in the same way as it is not possible to group all the suffixes of a language by a set of shared properties (apart from the trivial one that they are linearized to the right of the base), generalizations are also unavailable when we consider their phonological properties. Prefix and suffix are names that describe the linear position of a dependent unit, but they do not represent concepts that bear any role in the grammar of a language.

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