Diminutives as heads or specifiers: the mapping between syntax and phonology[1]

Antonio Fábregas
Universitetet i Tromsø
antonio.fabregas@uit.no

Abstract

This article provides evidence for an analysis where the properties of lexical exponents are determined by the position they occupy in the structure and the configuration they establish with other items. It is argued that cross-linguistically and inter-linguistically, an item that can be introduced as a head or as a specifier displays syntactic, semantic and phonological properties that can be fully accounted for in the configuration. The study concentrates on the case of diminutives in Spanish, German and Czech. We show, through different tests, that diminutives can be introduced as heads, in which case they form a Command Unit with the noun or adjective with which they combine, and can therefore change the semantic and grammatical properties of that base and phonologically integrate with it. In other cases they are introduced as specifier, so that when phrasal movement of the base takes place they belong to different Command Units; in such cases they do not select for the base, they do not change its semantic or grammatical properties and they are not phonologically integrated with it. We argue that this account is superior to an analysis that uses any procedure where single lexical items are associated with sets of arbitrarily related properties.

Keywords: diminutives, specifiers, multiple spell out, phonology-syntax mapping

1. How to account for the properties of exponents

The goal of this paper is to explore –and argue for a solution to– a mismatch that exists in part of the literature between the way in which properties of phrases and properties of words are determined. The mismatch is the following: in the studies on affixes, there is an assumption that single lexical items carry with them specific prop-

1 I am grateful to Peter Svenonius, Martin Krämer, Carlos Piera, Carme Picallo, Pavel Caha, Ricardo Bermúdez-Otero, two anonymous reviewers of *Iberia* for comments and interesting suggestions to previous versions of this paper. All disclaimers apply. The research underlying this article falls within project FFI2011-23829, *Las relaciones de predicación*. In this article we use the following abbreviations: 3 (third person), adj (adjective), agr (agreement), CM (class marker), coll (collective suffix), dim (diminutive), fem (feminine), inf (infinitive), int (interfix), masc (masculine), n (noun), neut (neuter), sg (singular), ThV (theme vowel).

erties that determine the possible changes –or absence thereof– that they will trigger in the phonology, semantics and syntax of the objects with which they combine. This proposal is particularly clear in the approach initiated by Kiparsky (1982), generally known as Lexical Strata Theory. Single lexical items are associated to particular properties, and the lexical items can be grouped into classes, which gives rise to the strata. The following table summarises part of this classification in English (taken from Fábregas & Scalise 2012):

Stratum	**Morphological processes and affixes**
1	Irregular inflection (*oxen*) Derivation with: (suffixes) *-ion, -ity, -y, -al, -ic, -ate, -ous, -ive* (prefixes) *be-, en-, in-, pre-, con-*
2	Compounding (*wolfman*) Derivation with: (suffixes) *-ness, -less, -ful, -hood, -ly, -like* (prefixes*) un-, non-, semi-, anti-*
3	Regular inflection

Table 1. An approach based on single lexical items

As is well-known, adscription to a particular class, or stratum, determines whether the lexical item in question integrates with the base as a phonological and semantic unit. Affixes associated to Stratum I trigger non-general allomorphy processes in the base (such as spirantisation: *president* > *presidential*), and allosemy; those associated to Stratum II do not trigger non-productive and non-predictable changes. As we move to Stratum III, these affixes do not even change the grammatical category of the base. The higher the number of the stratum, the less influence the item has on the base, and there is a correlation between how much phonological integration there is and their semantic and grammatical behaviour.

Crucial to our purposes is that this approach captures the connections between phonology, semantics and syntax by adscribing single lexical items to one of the classes. Inflection, for instance, is not classified in the same class: the plural *-s* falls into stratum III and the plural *-en*, into Stratum I. This classification that makes specific reference to a single lexical item is reproduced in other phonological theories within OT (Prince & Smolensky 2004). Despite their many differences, both co-phonologies (Orgun 1996, Inkelas 1998, Anttila 2002) and indexed constraints (Ito & Mester 1995, Pater 2006) are devices that explain asymmetries in how items integrate by making explicit refer-

ence to individual lexical items.

The problems that emerge from this approach are well-known in the form of criticisms of aspects of the Lexical Strata Theory that can extend to the other aforementioned approaches: most relevantly, affixes that in some cases behave as Stratum I and in some others as Stratum II cast doubt on the descriptive power of associating single items to specific levels. The alternative to this approach is to make reference to the configuration of the structure where the elements combine, and not to the combined items directly. This has occasionally been tried in previous work on the structure of words, most relevantly in Giegerich (1999), where the nature of the cohesion between affixes is explained by the categorical status of the base –root vs. non-root. Stratal-OT (Bermúdez-Otero 2007) is also arguably close to this second family of approaches, to the extent that each level of evaluation is defined with reference to a particular level of complexity of the elements combined.

This approach where the mapping between semantics, syntax and phonology attends to configurational and structural properties independent of specific lexical items is actually the standard approach in syntax.[2] The different ways in which specific proposals have been presented within this configurational perspective are, as is well known, very different from each other. A first group of analyses considers that the relevant relations taken into account by the phonology are related to the linear adjacency of elements in the syntax, with the open question of whether only phonologically spelled out objects are taken into account or if traces of movement are also relevant (cf. the different analysis of *wanna*-contraction, and more in particular Baker & Brame 1972, Selkirk 1972, Lightfoot 1976). Other approaches do not rely so heavily on the linearity *per se*, and concentrate on the relations of syntactic constituency. The rule of Raddoppiamento Sintattico, as accounted for by Nespor & Vogel (1982), crucially takes into account whether linearly adjacent words are immediate syntactic constituents. 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*). 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 to 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

2 See Scheer (2008) for the suggestion that individual lexical items could be relevant in defining the domains for syntactic computation. To the best of our knowledge, such a proposal has never been fully developed in the literature, but a first attempt to fledging the ideas is to be found in Caha & Scheer (2007).

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).

We have, therefore, a mismatch between the (vast-majority of) approaches that capture form-meaning-grammar correlations inside words and those that try to answer the same questions inside phrases and sentences. This is clearly not a desirable outcome, even if one assumes that any version of the Generalised Lexicalist Hypothesis (Lapointe 1981) applies and phrases and words are built differently. The reason is that this kind of mismatch affects the way in which the properties necessary to determine the connection between grammar, form and meaning are codified –as single items or structures. As both words and phrases must be materialised and interpreted, it is desirable that semantics and phonology attend to the same kind of information in both cases.

Here we will approach this problem from an empirical perspective, considering the predictions that each kind of analysis makes and how they fare with respect to the data. One prediction of the lexical-item based approach is clear: one single lexical item will act systematically in one way with respect to the mapping, once possible homonymy has been accounted for. In contrast, the structure based approach makes the prediction that, when the structure underlying the form is different, the same lexical item will be mapped in different ways.

There is a second question related to the first one that interacts with the predictions. To the extent that single lexical items, when they are affixes, are prefixes or suffixes and this information can be part of what the lexicon specifies for each item, the suffixal or prefixal status of the items can play a role in the lexical-item based approach. In contrast (for reasons that we will clarify later on), the structure-based account expects that, unless further qualifications are made, this property will be irrelevant in determining the mapping, as the question of whether some element is linearised to the left or to the right of a base does not immediately tell us enough about the configuration of the structure. Let us look further into these reasons.

1.1. The interaction between linear position and mapping onto phonology

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. Its clearest formulation is in Jakobson (1971[1949]), who reports that in Slavic the prefix does not resyllabify with the base, in the way that suffixes do, so morphological boundaries between a base and a prefix 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). To the extent that single lexical items codify whether they linearise to the right or to the left of the base, the mapping attends to information contained in individual lexical entries.

(2) If α is a prefix of β, then $[a]_w[b]_w$
If α is a suffix of β, then $[\beta\ a]_w$

A standard 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, when the /b/ is the last segment of a prefix, such resyllabification is impossible (3b). Suffixes systematically resyllabify (3c):[3]

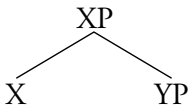
(3) a. *problema*, 'problem' /pɾo.blé.ma/; */pɾob.lé.ma/
b. *sub-lunar*, 'under-moon' /sub.lu.náɾ/; */su.blu.náɾ/
c. *raton-era*, 'mouse-trap' /ra.to.né.ɾa/; */ra.ton.é.ɾa/

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

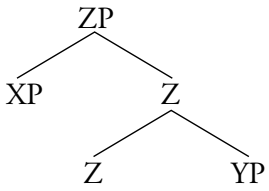
A structure-based approach does not expect the kind of mapping in (2), simply because, once we accept movement, even on the assumption that the hierarchical structure is read to linearise (Kayne 1994), the same linear order might reflect different constituency properties. If Y is the base and X is the affix, starting with the base order in (4) and (5), phrasal movement of the base over the affix would give as a result, respectively, (6) and (7). If there is a further movement where the affix changes its order with respect to the base again, we get (8).

3 Other authors, such as Booij (2000:342), while accepting that prefixes are phonologically independent of 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 suffix *-aktig* in Dutch. The account still places all prefixes in the same class.

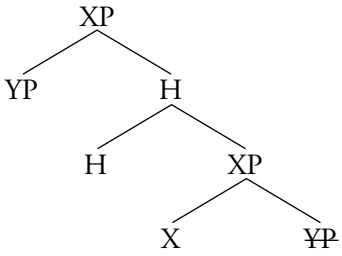
(4) The affix is a head



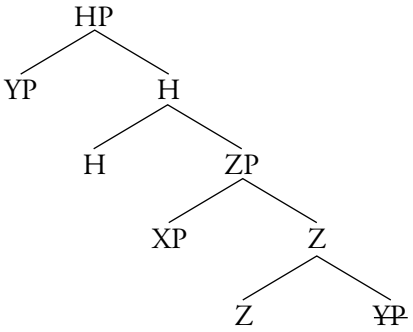
(5) The affix is not a head



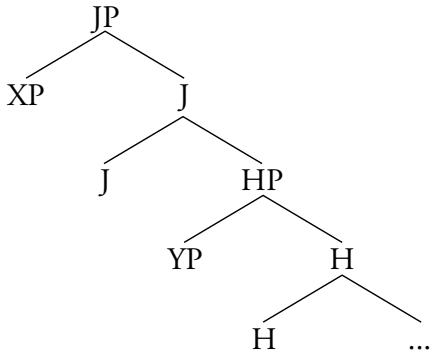
(6) YP-movement



(7) YP-movement



(8) Followed by YP-movement



Despite the fact that these configurations are very different, in (4), (5) and (8) the affix will materialise as a prefix, while (6) and (7) produce a base followed by a suffix. The reason is that phrasal movement can alter the linear order of elements. Inversely, given standard assumptions about the mapping between syntax and phonology, phrasal movement is not the only device to alter the linear order of elements. On the assumption that head movement exists at least as a morphophonological operation (Embick & Noyer 2001), continuous sequences of heads in a specific configuration can reverse their order without phrasal movement. Head movement is assumed to be restricted to the following principle:

(9) Head movement of X to Y is only possible when XP is selected as the complement of Y and cannot skip any intermediate head Z.

Given this principle, the only configuration where the morpheme order could be altered with head movement is (4); here the base and the affix hold a head-complement relation and there are no intervening heads. 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.

Within this approach, the natural question is 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 in the mapping onto phonology and semantics. 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 10) and the fact that they do not form constituents with their heads in the absence of the complement.

(10) 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 phenomena that show that specifiers are autonomous objects whose internal constituents interact in very limited ways with the rest of the structure, Uriagereka (2002) puts forth the proposal that specifiers are independent from the objects formed by the recursion of the head-complement relationship. The approach is rooted on Chomsky's Theory of Phases (see specially Chomsky 2001, 2004), where it is argued that the traditional notion of syntactic domain can be derived from a theory where there are chunks of structure which, having satisfied all their formal properties, are transferred to the interfaces and thus abandon the computational space (see Gallego 2010, 2012 for a review of different aspects of this theory).

The crucial notion in Uriagereka's take on phases is the concept of Command Unit (CU, 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. (11) 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 (11a) and the phrase with which this specifier is merged results from the continuous application of merge to object H (11b); the combination of both results in a phrase with a specifier (11c). (11a) and (11b) are different CUs that are combined together in a further step.

(11) 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, irrespective of whether it is eventually linearized to the right or to the left of a given constituent, will be phonologically independent on 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 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) (12a, 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 (12c, d).

(12) a. Michelangelo painted THE SISTINE CHAPEL.
b. Michelangelo PAINTED THE SISTINE CHAPEL.
c. MICHELANGELO painted the Sistine Chapel.
d. *MICHELANGELO PAINTED the Sistine Chapel.

Another phonological 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:

(13) a. Michelangelo... painted the Sistine Chapel.
b. ??Michelangelo painted... the Sistine Chapel.

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

(14) a. Michelangelo, as everybody knows, painted the Sistine Chapel.
b. ??Michelangelo painted, as everybody knows, the Sistine Chapel.

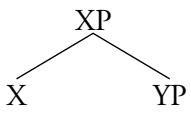
Here we will argue for an application of this general theory to the study of how

constituents are mapped onto phonology and semantics inside words. We will argue in favour of a correspondence between the phonological properties of the exponent and the syntactic and semantic role of the features that it expresses. When the morpheme does not behave as a head that selects its base, it forms its own phonological domain, independent of the base; when the morpheme is a head selecting a base, it integrates in the same phonological domain as the base. The correlation is intermediated, as we will suggest, by the notion of CU, and is, therefore, derived from the syntactic configuration.

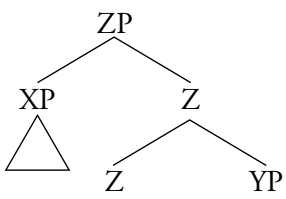
(15) If the affix and the base constitute different CUs they will be phonologically —and semantically— independent of each other, irrespective of their relative linear order.

If this principle is right, when we consider heads and specifiers and introduce phrasal movement, we will have three relevant configurations. 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 (16a). On the other hand, if the affix, the base (16b, where XP can be the base or the affix) or both (16c) are complex specifiers, we expect that they will be phonologically independent of each other because they will be different CUs.

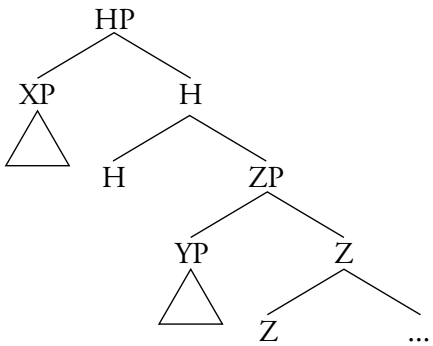
(16) a.



b.



c.



Let us quickly summarise the main points of this introduction. We have argued

that there are two main theories about how structures are mapped to phonology and syntax: one that relies on information codified inside individual lexical items, and another one that uses configurational properties of the structure to determine the mapping. The former is frequently used in morphology and phonology, while the latter is, to the best of our knowledge, the only one considered in syntax. These two theories also pay different levels of attention to the linear ordering of elements in this mapping. If the position with respect to a base is part of the lexically-encoded information of an affix, the first approach generally profits from this distinction in its analysis. This option is rejected by the syntactic approach, which only takes linearisation into account to the extent that it reflects a structural configuration.

The rest of the article is structured as follows. In the next section, we will present the properties of diminutive suffixes in three Indoeuropean languages belonging to different languages groups –Spanish (Romance), German (Germanci) and Czech (Slavic). We will see that there is a correlation between the type of grammatical behaviour and the type of mapping onto phonology and semantics that they display. In section 3, we will show that the aforementioned grammatical properties are expected if Spanish and Czech introduce the diminutive in the general case as a complex specifier of a nominal projection, while in contrast German introduces it as a head selecting the noun. Section 4 shows how these different configurations are mapped differently onto the phonology and the semantics, providing thus evidence coherent with the assumptions made in the structure-based account. Section 5 shows evidence taken from Spanish diminutives that casts doubt on the lexical item based account.

2. The behaviour of diminutives in three languages

In this section we introduce the empirical core of our study. We will explore the syntactic, semantic and phonological effects produced by diminutives in a Romance language, a Germanic language and a Slavic language.

2.1. Spanish

The productive diminutive suffix in Central Peninsular Spanish is the suffix *-it*, which is always followed by an unstressed vowel, which when attached to nouns corresponds to a noun marker that sometimes, but not always, is dependent on the grammatical gender of the base.

(17)	a. cas-a house-CM	>	cas-it-a house-DIM-CM	feminine
	b. papel paper	>	papel-it-o paper-DIM-CM	masculine
	c. problem-a problem-CM	>	problem-it-a problem-DIM-CM	masculine

There is considerable geographical and stylistic variation with respect to the exponent that this diminutive materialises as in Spanish. Central Peninsular Spanish tends to use *-it-*, but *-ill-* is also used in this variety and the Southern Peninsular Spanish variety; *-ic-* is used in Aragonese Spanish and the southern eastern area (like Jaén), while *-in-* in Northern varieties such as the one spoken in Asturias. Other suffixes have been attested (see Lázaro Mora 1999 for an overview).

2.1.1. Syntactic and semantic properties

The first thing to note with this suffix is that it can combine with words belonging to at least three major classes: nouns (18a), adjectives (18b) and adverbs (18c). In all these cases, it never alters the grammatical category 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. cas-a, 'house' > cas-it-a, 'little house'
b. car-o, 'expensive' > car-it-o, 'a bit expensive'
c. cerc-a, 'close' > cerqu-it-a, 'more or less close'

In some varieties, it even extends to some verbal forms and other grammatical categories (cf. Toscano Mateus 1953 for the case of the Spanish spoken in Quechua-influenced areas of Ecuador).

The diminutive does not change the relevant semantic properties of the base either: the semantic properties of the base are always preserved in the diminutive, including the mass / count distinction. In (19a), we show that a mass noun –showing typical mass behaviour, as it can combine with the quantifier *mucho* in singular– stays a mass noun, and in (19b) we show that count nouns still are count after the diminutive attaches to them. The same can be shown with respect to the animacy properties in (20). The meaning of the base is compositionally preserved: a *casita* is a small house. The same applies to the adjectives: something *carito* is also something expensive, and as the base is gradable, so is the complex form (*muy carito* 'very expensive-dim'). In adverbs, it is the same: *cerquita* is also being close to something, and the form belongs to the same class of adverbs than the base form, not losing any of its combinatorial properties and gradability (*muy cerquita* 'very close-dim').

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

(20) a. gat-o > gat-it-o
cat-CM > cat-DIM-CM

b. sill-a > sill-it-a
chair-CM > chair-DIM-CM

The gender of the noun is also preserved by the diminutive. As has been pointed out before (Eguren 2001), this suffix can be iterated.

(21) a. chico 'small'
b. chiqu-it-o
c. chiqu-it-it-o

As mentioned, the diminutive always requires the presence of an unstressed vowel to its right. Even if the noun (22a) or the adjective (22b) does not end in a class marker, when the diminutive is present this affix becomes compulsory:

(22) a. cárcel > * carcel-it, carcel-it-a
jail > jail-DIM, jail-DIM-CM
b. frágil > * fragil-it, fragil-it-o
fragile > fragile-DIM, fragile-DIM-CM

The same applies to adverbs that do not end in a segment similar to a noun marker.

(23) aquí > *aquic-it, aquic-it-o
here > here-DIM, here-DIM-CM

Given this systematicity, we suggest that the 'noun' marker is introduced by the diminutive affix itself, not as a phonologically triggered change, but as a condition on its morphological environment that must be satisfied by segments with particular phonological properties. A phonological condition –such as a ban on word-final /t/– is not enough to explain this pattern, as the epenthetic vowel *-e* could have been introduced to avoid that /t/ is the final segment in the word. Indeed, -e is sometimes the final segment of nouns in Spanish; however, it never appears with the diminutive suffix, and either *-o* or *-a* must be introduced instead(24).

(24) alcornoque > *alcornoqu-it-e, alcornoqu-it-o
cork cork-DIM-*e*, cork-DIM-CM

2.1.2. Phonological properties

Let us move now to the phonological properties of the Spanish diminutive. There is, of course, a huge amount of literature on this issue, and it will be impossible to do justice to it in these few pages (see, among many others, Jaeggli 1978, Harris 1983, Crowhurst 1992, Prieto 1992, Lloret 1996, Colina 2003, Bermúdez-Otero 2007, Cabré & Ohannesian 2009, Bradley & Smith 2011, Norrmann-Vigil 2012). The diminutive morpheme can be introduced in a noun, adjective or adverb between the base and the desinence without triggering any further phonological changes.

(25) perr-o > perr-it-o
dog-CM dog-DIM-CM

However, in other cases, a special allomorph of the base must be used when combined with the diminutive. Generally, this allomorph involves the base taking the increments /θ/, /eθ/ or /qeθ/ (written *c, ec* and *cec,* and pronounced in most of the Hispanic world as [s], [es] and [ses]).

(26) a. camión 'truck'> camionc-it-o
b. sol 'sun' > solec-it-o
c. pie 'foot' > piecec-it-o

It is necessary to motivate our decision to treat these increments as part of an allomorph of the base, as opposed to: (a) part of an allomorph of the diminutive or (b) a phonological infix distinct from both the base and the diminutive. Against both these analyses we have facts like those presented in (27) and (28). Even if [s] is the most common increment in these cases; other sounds are used with particular lexical bases.

(27) a. café > cafet-it-o
coffee coffee-DIM-CM

b. José > Josel-it-o
(proper name) Jose-DIM-CM

The fact that different lexical bases might require different increments shows that the extra elements are sensitive to the morphological properties of the entries, and are not just the insertion of some default sounds to fill empty positions in a phonological representation. Thus the increment is part of the morphological representation. The fact that the base when combined with other suffixes uses the same increment shows that the increment is a part of the base, rather than of the suffix. (28) shows one case of this(compare the base with 27a).

(28) café > cafet-al
coffee coffee-coll 'coffee plantation'

Another argument in favour of treating these elements as part of an allomorph of the base has to do with the fact that there is a great deal of variation with respect to how (and whether) one base takes the increment or not when combined with the diminutive. This is expected if the increment is part of an allomorph, because then the variation reduces to a well-known property of lexical learning e.g., whether the speaker has stored an allomorph for that particular lexical base or not. Monosyllabic forms like *pie* and *sol* tend to appear as their 'longer' allomorph when combined with the diminutive, but when bisyllabic forms are involved, the variation is very noticeable (see specially Colina 2003). Consider, for instance, the forms *buen-it-o* 'good-ish' and

buenec-it-o, both diminutive forms of the adjective *bueno* 'good'. A search on CREA[4] makes clear that the first form can be found (7 times) in Argentina, Paraguay, Chile and Mexico. The form *buenecito* is found 8 times, in Spain, Colombia and Uruguay. The variation is not always so clearly geographical; different speakers of the same variety might prefer different forms. From *cuerpo* 'body', both *cuerp-it-o* and *cuerpec-it-o* are attested in Argentina in the same corpus. Sometimes, one speaker allows both forms, which suggests that other factors are in play –perhaps along the lines of what Parrott (2006) has proposed to integrate sociolinguistic factors and the choice of allomorphs. Peninsular Spanish speakers interviewed for this article allowed both *coch-it-o* and *cochec-it-o*, from *coche* 'car', but agreed that the first form is more likely to be used in contexts with considerable social proximity between speaker and addressee e.g., when talking to children. In our analysis, we will leave aside these cases of sociolinguistically motivated variation.

The question of whether a particular allomorph includes one increment or another can be answered by making reference to the phonology of the base form, as each one of the different increments appears in bases that share certain phonological properties.

a) The segment *-c-* appears as part of the allomorph when the form of the base without the diminutive is polysyllabic and the last syllable carries primary or secondary stress and ends in a coronal consonant /n/, /l/ or /r/:

(29) a. hipérbaton /ipérbatòn/ 'hyperbaton' > hiperbatonc-it-o
b. hotel /otél/ 'hotel' > hotelc-it-o
c. amor /amór/ 'love' > amorc-it-o

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

(30) maná 'manah' > manac-it-o

b) The segment *-ec-* is the one that has the most complex distribution of the group, but it is still describable in phonological terms. It appears whenever the base is monosyllabic and ends in a consonant:

(31) a. plan 'plan' > planec-it-o
b. dios 'god' > diosec-it-o
c. mar 'sea' > marec-it-o
d. pez 'fish' > pecec-it-o

Some nouns that have the vowel *-e* as their final vowel can be assimilated to this group. Note that in all these nouns, the consonant preceding the *-e* is not a possible coda in Spanish (/ʧ/, /b/...). These verbs can be integrated into the class if this *-e* is

4 CREA is the on-line corpus of Contemporary Spanish made available by the Spanish Royal Academy of Language. It contains data about all varieties of Spanish, European and American.

analysed as an epenthetic vowel and the nouns are underlyingly monosyllabic.

(32) a. noch(e) 'night' > nochec-it-a
b. coch(e) 'car' > cochec-it-o
c. llav(e) 'key' > llavec-it-a

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

(33) ley /léi/ 'law' > leyec-it-a [le.ye.θí.ta]

The reason that these bases behave they do is clear: once it is followed by a vowel, the /i/ becomes the onset and as it regularly happens with glides in Spanish, it turns into the consonant [j̯].

The form *-ec-* also appears when the base contains a stress-motivated diphthong. 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 as a single vowel (34). This property, *pace* opacity, is also visible in derived words (35).

(34) contar 'to tell', /kon.táɾ/
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'

(35) a. cuento 'tale' /kuén.to/
b. contador 'tale teller' /kon.ta.dóɾ/

Whenever the base contains a diphthong that depends on the position of stress, the diminutive normally comes accompanied by an allomorph with *-ec-*:

(36) a. cuento > cuent-ec-ito
b. tierra 'earth' > tierr-ec-ita
c. nuevo 'new' > nuev-ec-ito

c) The segment *-cec-* is part of the allomorph whenever the base in isolation is monosyllabic and ends in a stressed vowel.

(37) a. té 'tea' > tecec-it-o
b. pie 'foot' > piecec-it-o

To summarise, from this empirical overview the following properties have been noticed:

(38) Properties of productive Spanish diminutives
  a. Diminutives combine with words of different grammatical categories
  b. Diminutives do not change the grammatical category of the base
  c. Diminutives do not turn the noun into mass or alter the gradability of the adjective
  d. Diminutives do not change the grammatical gender of the base
  e. Diminutives must be accompanied by a noun marker
  f. Diminutives can iterate
  g. When the base combines with the diminutive, sometimes a special allomorph (typically including the segments *-c-*, *-ec-* and *-cec-*) might be used
  h. The distribution of the segments inside the allomorph seems to follow phonological principles

2.2. German

The properties of the German productive diminutive *-chen* contrast sharply with those of the Spanish diminutive. To begin with, this diminutive only combines with nouns. Some bases that normally materialise as adjectives can marginally be coerced into nouns and then they admit the diminutive (as in 39). In such cases, the result is systematically a noun. The word in (39) could be marginally interpreted as 'a little commodity', but here the diminutive cannot be a modifier of the degree information of the adjective, as in Spanish.

(39) ?das Güt-chen
  the.NEUT good-DIM

The diminutive also changes the gender of the noun, which must become neuter. No exceptions to this are reported, to the best of my knowledge, in grammar books or by native speakers.

(40) der Ball > das Bäll-chen
  the.MASC ball > the.NEUT ball-DIM 'the little ball'

The German diminutive *-chen* also alters the information of the base. As Wiltschko (2006) points out, German diminutives turn mass nouns into count nouns (German *Brot* 'bread' > *Brötchen* 'bread roll'). The German noun *Bier* 'beer' is a mass noun; the diminutive *Bier-chen* can only refer to a small glass of beer.

This is not the case in Spanish: with the diminutive, the noun *cerveza* 'beer' can still be used as a mass noun: *Tomar mucha cervecita* 'to.have much beer-dim'. There are a couple of apparent counterexamples, which we will address later in this article (see examples 85, 86).

German *-chen* cannot be iterated either (53).

(41) *Kind-chen-chen

In contrast with Spanish as well, the productivity of the German diminutive is also different. In Spanish, *-it-(o)* has a high productivity and almost any noun, adjective or adverb can combine with it. The possible exceptions are some abstract nouns referring to qualities (42), but even in these cases they are marginally acceptable.

(42) ?libertad-c-it-a
freedom-INFIX-DIM-CM

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.

With respect to the phonological structure, the German diminutive *-chen* can trigger some non-productive changes in the base. This is, of course, the well-studied phenomenon of Umlaut: the presence of the suffix, containing a front vowel, changes the vowel quality of the base to palatal.

(43) 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

This quick overview shows that the *-chen* diminutive in German has properties distinct from the Spanish one.

(44) Properties of German *-chen*
a. The diminutive combines only with nouns
b. The result is also a noun
c. The diminutive turns a mass noun into a count noun
d. The diminutive only produces neuter nouns
e. The diminutive cannot iterate
f. The diminutive can trigger Umlaut in the base

2.3. Czech

Czech productive diminutives can be shown to have the same properties as Spanish diminutives. First of all, they can be combined with a variety of grammatical categories, keeping the category of the base intact (45; notice that Czech also allows for diminutives in verbs, something which is not generally assumed of Spanish). They systematically preserve the grammatical gender information of the base, and even its marking (46). Moreover, they can iterate (with palatalisation sometimes being triggered) (47).

(46) a. mal-y 'small'
small-agr

b. mal-ič-k-y
small-DIM-DIM-AGR

c. sp-a-t 'to sleep'
sleep-ThV-INF

d. sp-in-k-a-t
sleep-DIM-DIM-ThV-INF.

(47) a. ruk-a 'hand' > ruč-k-a
HAND-FEM. HAND-DIM-FEM

b. strom-ø 'tree' > strom-ek-ø
tree-MASC. tree-DIM-MASC.

(48) a. strom-eč-ek
tree-DIM-DIM 'little tree'

b. ruč-ič-k-a
hand-DIM-DIM-FEM. 'small hand'

The diminutive does not turn a mass noun into count. As (49a) is mass, so is (49b). It does not alter the gradability of the adjective either; the adjective in (46b) is just as gradable as (46a).

(49) a. čokola:d-a
chocolate-CM

b. čokola:d-k-a
chocolate-DIM-CM

The diminutive also triggers phonological changes in the base. 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 (50), taken from Scheer (2003:100-101).

(50) 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 (50b), but the vowel does not change if the long form of the diminutive is used (50c). A base with a long vowel stays long if the short form is used (50a), but needs to shorten it if the long form is used (50d). 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. In §4 we will dispute that this is the right analysis of the pattern, but for the time being what interests us is that here, as in Spanish and German, the diminutive has phonological effects, which will allow us to compare the three languages.

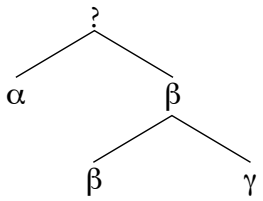
To summarise, Czech productive diminutivisation displays the following properties:

(51) Properties of Czech productive diminutives
- a. Diminutives combine with words of different grammatical categories
- b. Diminutives do not change the grammatical category of the base
- c. Diminutives do not turn a count noun into mass or vice-versa or alter the gradability of the adjective
- d. Diminutives do not change the grammatical gender of the base
- e. Diminutives can iterate
- g. When the base combines with the diminutive, vowel length can be altered depending on the length of the vowel of the diminutive

3. Accounting for the syntactic and semantic properties: heads vs. specifiers

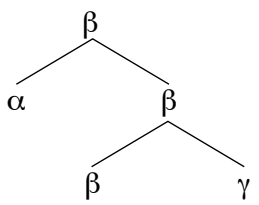
In this section we will argue that the syntactic and semantic properties of Spanish and Czech diminutives are expected if we treat these items as specifiers of a grammatical category, while those in German show that the diminutive behaves as a head that selects the NP. As is assumed as standard given Bare Phrase Structure (Chomsky 1993) and the requisites under which a head projects (Chomsky 2004), the crucial difference between a head and a specifier is whether, when an object α merges with a set β such as it has internal structure, the label of the whole is β or α.

(52)

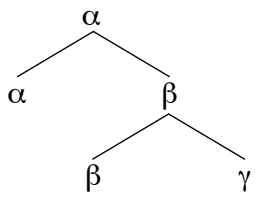


If the label that gets projected is β, α will be interpreted as a specifier; if the label is α, then α will be the head of the whole construction.

(53) a.



b.



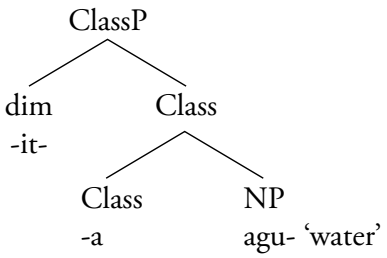
Different sets of properties follow from here: in order to project its label, an ele-

ment must select in some way the set with which it merges. This means that in (53a) the new element is not selecting β, but in (53b) it does select it. Moreover, in (53b), the new element projects its label to the whole, so after the merge the structure has a new label; this is not the case in (53a).

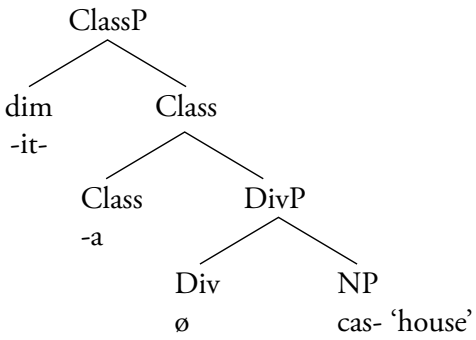
Consider why, given this distinction, the productive Spanish and Czech diminutives are specifiers. The structure in (53a) explains right away that the diminutive does not change the semantic or syntactic properties of the base, as the label β is still projecting. If additional assumptions are made, it also explains that it combines with words of different grammatical categories, as a does not select the label β in this structure. Moreover, it also makes it expected that the diminutive can iterate: after β has projected its label again, another α can be merged in the structure because the object with which α merged still has the same label as it had before α was merged. In contrast, (53b) explains the properties of German *-chen*: the fact that the diminutive alters the properties of the base is explained because the diminutive assigns a new label to the set after the merge; the fact that it only combines with nouns follows from the fact that in order to project α must select β; the fact that it does not iterate follows from the fact that the label selected by the second diminutive is different after merging with the first diminutive, and the lower productivity of the affix follows on the assumption that selection can be accompanied by selectional restrictions stated in the phonological representation of the vocabulary item.

The proposal that the Spanish diminutive is actually a specifier has already been suggested in Eguren (2001). Here we will follow the spirit of this author's analysis. The specific proposal is that the Spanish diminutive merges with the noun with a projection where the class marker of the noun is introduced–and also, when combining with adjectives or adverbs, with the equivalent class markers– (54); this projection is part of the extended projection of the grammatical category, and is shared by all nominal categories. Here we represent the structure for the particular case of nouns.

(54) a.



b.



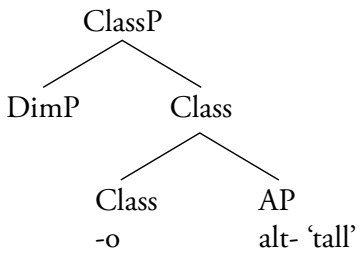
Some clarifications about the assumptions that we make with respect to the nominal structure are in order. We are assuming that the NP contains gender information, and that this gender information can motivate the selection of the class marker, represented in ClassP. ClassP is present in every noun in Spanish, be it mass or count. Note that here we part ways with Borer's (2005) proposal that the classifier is always associated with a Divisor function that turns the count noun into mass, and therefore is only present whenever the noun is count. Countability depends in our representation of a distinct syntactic head, DivP, which is only present whenever the noun is count.[5] Thus (54a) corresponds to a mass noun, and (54b) to a count noun; the diminutive does not affect the presence or absence of DivP, as is always introduced in the specifier of ClassP. See Alexiadou & Gengel (2011) and Picallo (2007) for the proposal that class markers are somehow related to the classifier.

In the case of adjectives, the diminutive occupies the same position and it is therefore desirable that the place where it is merged inside the structure is the same. In Spanish, adjectives also have class markers, and as such we expect the diminutive to

5 The fact that in languages like Japanese or Chinese, noun classifiers appear only when the noun is count is assumed here to be an effect of spell out. In such languages, the Class head is filled by the noun stem through head movement, so the noun stem synthetically expresses both. When Div is present, there is an intervening head, which prevents the synthetic expression, and then the noun stem materialises NP only and it is necessary to introduce an additional lexical item, described as the noun classifier, to fill the head Class. See Fábregas (2012) for an elaboration of this analysis.

be introduced as the specifier of whatever projection introduces it, which we label here also as ClassP.

(55)



The projection to which the diminutive attaches in the case of adverbs is more difficult to identify, given that adverbs do not form a homogeneous class and the similarities between the classes, beyond their non-agreeing behaviour, have not been explored. However, the diminutive also compulsorily appears next to the class marker, and some adverbs can be shown to have class markers (56a, 56b, 56c), which can lead to the conclusion that in other cases the marker is null (56d) and is overtly realised when the diminutive is present.

(56)

a.	cerc-a close-CM	>	cerqu-it-a close-DIM-CM
b.	abaj-o down-CM	>	abaj-it-o down-DIM-CM
c.	lej-os far-CM	>	lej-it-os far-DIM-CM
d.	aquí-ø here-CM	>	aquic-it-o here-dim-CM

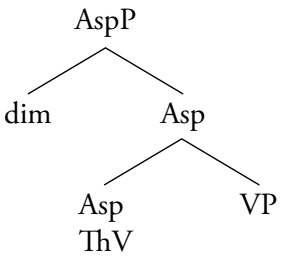
In the case of Czech, we need also to consider which projection the diminutive merges with in the case of verbs. Native speakers report that the diminutive is interpreted with verbs as an implication that the event did not happen in a continuous fashion, but was interrupted, irregular or consisting of small little events. This suggests that the diminutive here is introduced as a specifier of an aspectual head, and carries the equivalent of the noun classifier in verbs, the theme vowel. See Jablonska (2007) for the proposal that theme vowels are associated with aspectual information in some Slavic languages, perhaps cross-linguistically.[6]

6 In Spanish the equivalent of these Czech diminutives combined with verbs are forms like those in (i), where the extra morpheme is generally analysed as an interfix.

(i)

a.	dorm-i sleep-ThV	>	dorm-it-a sleep-INT-ThV 'sleep irregularly'
b.	bes-a kiss-ThV	>	bes-uqu-e-a kiss-INT-ThV-ThV 'kiss irregularly'

(57)



It should be noted right away that the structures do not predict per se that the class marker or theme vowel introduced by the diminutive will be spelled out with the exponent corresponding to the noun, adjective, adverb or verb. To the best of our knowledge, there are cases of both kinds both in Spanish and Czech: cases where the marker changes its form in the diminutive and cases where it stays the same. This will have to be determined in the phonological component, in the form of selectional restrictions of the classifier by the stem. This is an aspect of the analysis that we will not develop here. See Fábregas (2012) for a proposal of this aspect.

What seems to be necessary at least in the case of Spanish is that once the diminutive is present, an overt class marker must be introduced. This property will allow us to determine the feature content of the lexical item that spells out as a diminutive, which, as we can infer from the previous set of data, cannot be directly associated to any grammatical category. Our proposal is that what we are labelling dim in the previous trees corresponds to a category-neutral projection (that is, lacking any category features) containing an uninterpretable class marker feature ([uCM]) and a set of semantic properties, which for convenience we will label [dim]:

(58) dim [uCM, dim]

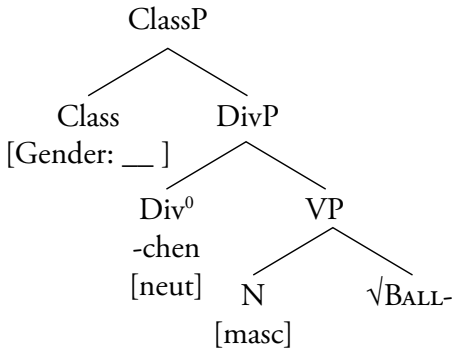
The semantic content of dim is one of the open issues of debate, and it is well known that in the traditional literature on Spanish (cf. for instance Náñez 1973) different proposals have been put forward. The fact that the Spanish diminutive –and to the best of our knowledge, also the Czech one– can combine with a wide variety of elements, including proper names whose denotational properties are unclear, suggests that its meaning has to be very underspecified. At the end of the day, what all the uses of the diminutive seem to have in common is some kind of speaker attitude with respect to the addressee or the speech act. We will assume that this semantic content is thus related to these speech-oriented notions.

Let us move now to German. In these languages the diminutive properties are

Perhaps these forms are not so different from Czech; the interfixes are phonologically close to exponents that are independently attested as diminutives (*-it-*, *-uc-*…). Unifying these cases with diminutives in Spanish would open other lines of research that we do not have the space to develop here.

those expected of a morpheme that turns a mass noun into count and defines gender information (neuter in this case). If *–chen* is a Divisor head that contains information about the class to which the noun belongs, then it follows that it can only be combined with objects that are nouns or that have been turned into nouns, as the DivP compulsorily selects nouns. See Wiltschko (2006) for a similar, though not identical, proposal about German and other languages.

(59)

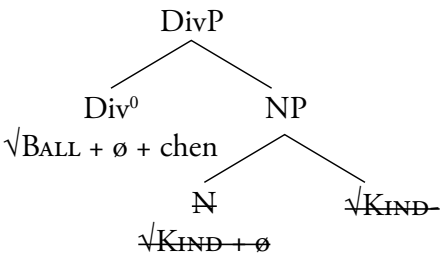


We assume that the Div head imposes its gender information onto the class marker, which we represent by adding gender information to the DivP and endowing the head [Class] with an uninterpretable gender feature in search of a value. Given locality, gender in the DivP is closer to gender in NP and therefore Class will check its feature with Div.

Consider now the structures proposed from the perspective of the command units (CUs). The productive diminutive in Spanish and Czech forms a different CU than the one defined by the sequence formed by the lexical category and its functional projections: the diminutive forms a phrase in a specifier position. Additionally, head movement cannot be the way in which the diminutive and the class marker end up linearized after the lexical category, because head movement never targets a specifier position by skipping intermediate heads. If linear order has to be accounted for inside the structure, then the other option to obtain the linear order would be through phrasal movement.

In contrast, the German diminutive *-chen* belongs to the same CU as the noun phrase. Furthermore, the diminutive and the noun are in the right configuration to allow head movement to revert the linear ordering as part of a PF operation (Embick & Noyer 2001). No phrasal movement is required here.

(60)



In this section we have argued based on the syntactic and semantic behaviour of the diminutives in these three languages that in one case the diminutive is a head (ClassP), while in the other cases, it is part of a complex specifier. Consequently, in one case the diminutive and the noun form one CU, while in the other cases, the diminutive heads its own CU. This is expected to have repercussions for the phonological behaviour of diminutives in these different languages. We will explore this in the next section.

4. Phonological properties: same CU, different CU

4.1. Spanish: the base forms an independent phonological domain

In this section we will show that the presence of the allomorphs and the specific form that they adopt (with *-c-*, *-ec-* or *-cec-*) is expected if the base has to form an independent phonological domain from the one introduced by the diminutive. The allomorphs have two clear effects that are well-known phonological principles:

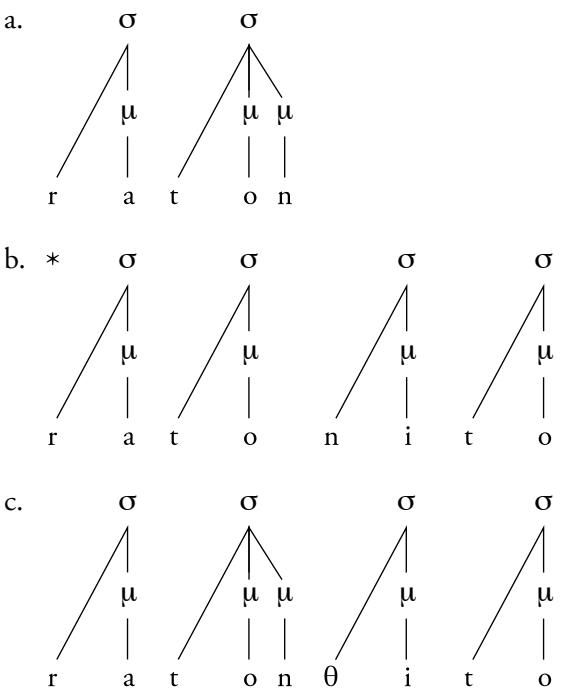
– the base is a minimal word (a binary foot in Spanish)
– the base keeps in the whole form the syllabic structure that it had

Consider from this perspective why bases which are already bisyllabic need to use an allomorph whose last segment is -c. The insertion of the consonant segment *-c-* prevents the word resyllabifying with the affix, as shown in (61).

(61) rà.ton.cí.to

This can be understood as the effect of a constraint that satisfies faithfulness to the syllabic structure of the base: what was defined as a mora on the base is still a mora in the complex form (MAXIMIZE MORA(SONORANT)). If the syllabic structure of the base *ratón* is the one in (62a), after syllabification of the complex form in (62b), without the extra segment, the /n/ has lost its moraic status –on the assumption that Spanish does not allow ambisyllabic moras (Morén 2001). When the extra segment is present, the final sonorant keeps its moraic status (62c). If this is the right analysis, we automatically explain why the extra segment is introduced in bisyllabic words ending in a sonorant, as these are the only consonants that can have moraic status in Spanish.

(62)



This constraint can be interpreted as a procedure that ensures that the base is as close as possible to the underived form, and although it is consistent with the idea that the base has to form an independent phonological domain, it is not per se evidence of this. However, the behaviour of the allomorphs containing the longer segments *-ec-* and *-cec-* gives more direct evidence of this.

The longer segments are part of the allomorph whenever the base in itself is not bisyllabic. In these cases, the presence of the extra segments containing *-e-* allows for extra syllables to be defined. Once syllabification takes place, the base belongs to a binary foot, as shown in (63) using the notation ϕ. In other words, the base now has a shape with the phonological form of a minimal word in Spanish.

(63) a. From *Dios* > $(\text{dio.se.})_{\phi}$ $(\text{ɋi.to})_{f}$
b. From *ley* > $(\text{le.ʝe.})_{\phi}$ $(\text{ɋi.ta})_{f}$
c. From *noch(e)* > $(\text{no.ʧe.})_{\phi}$ $(\text{ɋi.ta})_{f}$
d. From *pie* > $(\text{pie.ɋe.})_{\phi}$ $(\text{ɋi.to})_{f}$

The question that comes to mind now is why the base could not use the initial vowel of the affix, /i/, to get the second nucleus that is required to have a binary foot. Of course, this would have meant that the affix did not form a binary foot anymore, but that would have been enough to satisfy the requirements as far as the base is concerned. The fact that additional segments are introduced instead of reusing those present in the affix is reminiscent of the impossibility of resyllabifying the coda of some prefixes with

a sonorant from the base (64). Combined with the evidence that the base must form a binary foot by itself, this suggests that the base has to form an independent phonological domain by itself, wherein several phonological principles are internally met.

(64) sub.lu.nar
sub-lunar

The extra syllabic positions can also be useful to let the base keep the stress pattern that it had in isolation, especially when that stress pattern is necessary to keep other effects. This is the case of the bases that contain diphthongs dependent on stress. Here the presence of the segment guarantees that the diphthongized vowel will receive rhythmic stress, as in (65); we assume that rythmic stress is assigned every two syllables counting rightwards from the position of the main word stress, as is standard.

(65)
```
        *
(*      *)
(bue.  ne.)  (θi.  to)
```

Without this extra syllable made possible by the extra segments of the allomorph, stress could not be kept in the diphthong, as this would be an instance of stress clash –whereby two contiguous syllables cannot both have filled positions in the stress grid. Again, the fact that the base inside the derived form keeps as many phonological properties as possible with respect to the underived form is coherent with the proposal that it forms its own phonological domain.

(66)
```
      *
(*    *)
(bue.) (ni.  to)
```

One question that comes to mind at this point is whether these effects we are describing are general in Spanish or not. Do morphological bases in the general case keep their shape as close as possible to the underived form, and do they tend to form independent binary feet? The answer is no. Consider the following words derived from bases that must show 'longer' allomorphs with the diminutive:

(67) a. pan 'bread' > em-pan-ar 'to bread' /em.pa.nár/
bread pre-bread-ThV
b. pan 'bread' > panec-it-o
bread bread-dim-cm

(68) a. pez 'fish' > pec-era 'aquarium' /pe.θé.ɾa/
fish fish-ery
b. pez 'fish' > pecec-it-o
fish fish-dim-cm

(69) a. nuevo 'new' > nov-ísimo
new new-suplt 'very new'
b. nuevo 'new' > nuevec-it-o
new new-DIM-CM

In the examples in (67) and (68) we can see that other affixation processes do not require the use of longer allomorphs, and that the infractions that were unacceptable in the case of diminutives are here illustrated: the base resyllabifies with the suffix altering the moraic status of a sonorant (67a); the base does not form a bisyllabic foot by itself (67a, 68a) 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 (69a).

The conclusion supported by these data 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 grammatical category of the base, these constraints do not have to be met.[7]

This phonological behaviour is expected if the base belongs to a different CU from the one formed by the diminutive and the desinence. First of all, the diminutive forms its own CU, as a complex specifier; secondly, phrasal movement is required for the base to be linearised to the left of the diminutive.

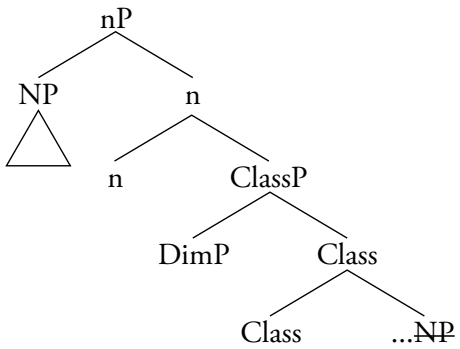
7 Note that it is not possible to explain this phonological independence by claiming that the diminutive suffix in Spanish can form its own prosodic word (adding to this case previous proposals by Booij 2000 and Plag 2003). When the affix is a prosodic word, the suffix should behave like a non-bound form allowing coordination as a separate segment, as each one of the elements coordinated would be an independent phonological word (cf. i, taken from Plag 2003; the sign ω stands for phonological word). This is not how the diminutive behaves. (iia) is the way of expressing in Spanish the sequence 'small boys and small girls'. The coordination cannot be done below the word level, however (iib; the pronounciation /e/ of the conjunction is due to it immediately preceding an /i/).

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

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

We conclude, thus, that the inability of the diminutive to phonologically integrate with the base is not caused by its independent prosodic status as a unit, but is a result of the syntactic configuration in which it appears; as a unit, it is not phonologically autonomous.

(70)



The identification of the landing position of the base 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 to the affix. For explicitness' sake, we propose that this landing position is the specifier of nP, where the index of identity associated to the set denoted by the NP is assigned (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.

At this point, what we have is two different CUs, and therefore two different phonological units that have to satisfy independent well-formedness criteria.[8]

8 Bermúdez-Otero (2007) brings up a potential counterexample to our proposal: forms like *azuquítar* 'small sugar', from *azúcar*, where the diminutive acts as an infix. Prima facie, this form is a counterexample because it would seem that in order to insert the affix inside the base the two forms should be combined inside one single phonological domain. We admit that this is a troubling case for our analysis, specially because there are no reasons to believe that the segment *-ar* of *azúcar* should be segmented as another constituent (as it is never substituted by another segment) and the diminutive here has the properties of a specifier, not turning the mass noun into count or changing any of its properties. The question that needs to be explored here is at what point of the phonological representation the diminutive becomes an infix. It is clear that, even if the base and the affix are independent phonological domains, at some point in the representation they have to be combined inside one single prosodic word –as the form has only one word stress and resyllabification takes place between the last consonant of the allomorph and the initial vowel of the affix. Perhaps it is at this point that the diminutive becomes an affix with nouns such as these, on the assumption that in the variety of speakers that choose the form *azuquítar* instead of *azucarcito* (attested in *Google*) the allomorph *azucarc-* is absent from the lexicon. In the absence of this allomorph, treating the diminutive as an infix could be the optimal solution to the phonological constraint of keeping the final *-r* of the base in the coda at the same time satisfying the phonological requisite of having an unstressed *-o* or *-a* after the diminutive, which is basically Bermúdez-Otero's analysis. It is clear that more should be understood about the different levels available inside the phonological component to combine different domains.

4.2. German: the base and the affix integrate in the same phonological domain

Let us move now to German and the phonological changes triggered by the suffix *-chen*. We have shown that this change reduces to Umlaut, which can be considered a variety of vowel harmony: the front quality of the vowel in the suffix (/e/) alters the quality of the vowel of the base.

(71) Hut (/hút/) > Hüt-chen (/hýtçen/)

The question is whether this phonological change is of a different nature than those that we have seen for Spanish, where they could be plausibly explained if the base and the diminutive had to form autonomous phonological domains of their own. We will argue that this is the case, and that Umlaut here is a sign that both the base and the suffix belong to the same phonological unit.

It has been noticed a number of times that vowel harmony is a very local process that can be interrupted by a variety of factors internal even to one single prosodic word; for example the presence of an intervening sonorant (cf. Uffman 2006 for Shona loan words). In some languages, vowel harmony is blocked when there is more than one consonant between the two vowels (cf. Krämer 2001 for Yucatec Maya, Archangeli & Pulleyblank 1994 for Lango). The following examples, from Assamese, are taken from Mahanta (2008). In Assamese, /i/ and /u/ trigger [ATR] harmony on the preceding vowels (72a). As shown in (72b), when between the /i/ and the target vowel there is more than one consonant –even if they do not occupy a high position on the sonority scale– harmony is blocked.

(72) a. kʰɔrɔs 'spend' > kʰoros-i 'prodigal'
b. sɔkrɔ 'circle' > sɔkr-ika 'platelet'

It is also well known that vowel harmony does not apply between the elements of a compound in languages such as Turkish. The suffix in (73a) and (73b) changes its form due to harmony in frontness with the last vowel of the base, but there is no harmony between the two stems involved in a compound (73c): the first stem has front vowels, the second, back.

(73) a. /adam-lar/
man-PL.

b. /køily-ler/
villager-PL.

c. /byɟyk-baba/
big-father 'grandfather'

Independently, there is evidence that in (productive and semiproductive) compounds each one of the stems keeps parts of its phonological independence. Consider-

ing the case of Spanish, notice that even if the word's stress falls in the second stem, the first stem can keep the stress-motivated diphthong (74a) that it had when word stress fell on the independent form (74b).

(74) a. cuenta-cuentos (/kuentakuéntos/)
tell-stories 'story-teller'

b. cuenta (/kuénta/)
tell.3SG

Whether a word initial /a/ is stressed can be diagnosed in Spanish because, even if the noun is feminine, the article *el* (not *la*) has to be used. This is the case with *agua* 'water' (75a); note that the same applies when the stem is the first constituent in a compound even if the noun is feminine (75b), suggesting again that the stem keeps its own stress at some level.

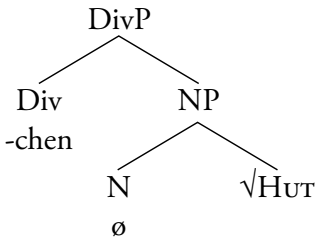
(75) a. {el/*la} agua (/água/)
the water (FEM.)

b. {el / ??la} agua-nieve
the water-snow (FEM.) 'the sleet'

If the reason for which compounds do not show vowel harmony between their two members is that inside compounds each element still keeps part of its phonological independence, then we can conclude that belonging to the same phonological domain is a necessary –but not sufficient– condition to allow for vowel harmony. Some languages even impose additional requisites having to do with the maximal number of consonants that can intervene. This would lead us to conclude that Umlaut in German requires that the two morphemes belong to the same phonological domain.

This is expected in our analysis of German *-chen* as a head that selects the noun phrase. In the configuration (76), both morphemes belong to the same CU, and morpheme order can be obtained by PF head movement.

(76)



Once head movement applies at PF, Umlaut can take place. There is a correlation, then, between head movement and Umlaut; this is coherent with the proposal that Umlaut is a very local operation that happens only when both elements are part of the same phonological representation.

4.3. Czech: the base forms an independent phonological domain

Remember that Czech, whose diminutive shows the behaviour of that in Spanish, displays phonological effects in the presence of the diminutive. Scheer (2003) and Caha & Scheer (2007) treat these effects (repeated in 77) as templatic effects: there is a phonological constraint about the volume that the lexical items have to fill at a particular point in the derivation. As the constraint is formulated in these previous works as 'the diminutive word has to consist of at least three moras', it seems crucial that both the base and the diminutive have to be evaluated at the same time, and this would contradict the one-to-one mapping between structure and phonology that we have argued for in the case of Spanish and German. If Scheer's proposal is right, then Czech diminutives would have the structure of Spanish but the kind of phonological mapping displayed by German.

(77) 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'

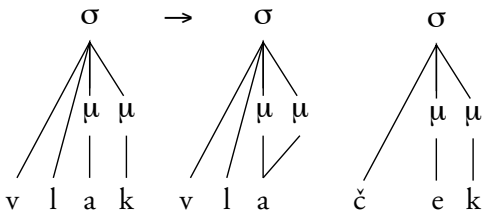
There are two empirical problems with this account, though. One is that in the formulation that diminutives have to consist of at least three moras (Caha & Scheer 2007:6a), it remains as a mystery why shortening of /y/ is necessary in (77d). Secondly, the restriction cannot explain why we have the form in (78a), and not the longer version in (78b), which we would predict if three moras had to be present.

(78) a. strom > strom-ek 'little tree'
b. strom > *stro:m-ek
c. strom > *strom-i:k [P. Pitloun, p.c.]

We will here propose an alternative analysis of these cases that covers the unexpected facts of the previous account. This account will show that the constraint is better understood as a requisite that the base, in isolation, must be bimoraic. This requisite is expected if the base has to be phonologically computed without direct reference to the diminutive affix, as predicted by the syntactic analysis where the Czech diminutive forms an independent CU from the base.

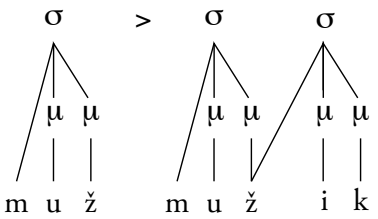
Our proposal is that the length changes of the vowel are triggered or not by the requisite that the base must be bimoraic, in collaboration with other potential moraic elements in the syllable. Consider first the case of lengthening of a short vowel, as in *vlak* 'train' > *vla:č-ek*. Assume that Czech assigns moras to consonants in the coda position. If this is the case, the underived form has two moras, the short /a/ and /k/. However, after the vowel-initial diminutive is added, the consonant does not belong to the coda anymore, so it loses its moraic status. Consequently, the vowel lengthens to occupy the second mora position required.

(79)



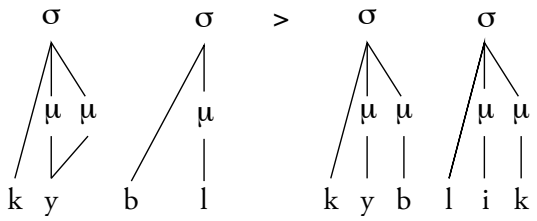
Contrast this with the case of a short vowel that does not lengthen. All the cases of this are, to our understanding, cases of sonorants and nasals (77c, 78a). One crucial property of sonorants, as opposed to other kinds of consonants, is that they can be ambisyllabic (Morén 2001), being associated simultaneously to the coda of a syllable and the onset of the following one – and, depending on the phonetics of the language, translate as a geminate or not. The absence of lengthening is expected if the final sonorant is ambisyllabic. Before adding the diminutive, it is associated with a mora position in the coda; after resyllabification, it gets associated additionally to an onset position, but without abandoning the coda.

(80)



Consider now the case of the long vowel that shortens. This can be obtained if something that was not moraic in the base becomes moraic after resyllabification, forcing the vowel to lose one mora to pass the phonological requisite. In *ky:bl* > *kybl-i:k* the crucial difference is that in the base, the /l/ is syllabic, and thus /b/ is the onset of that syllable and therefore, doesn't count as moraic. Once the vowel-initial affix is added, /l/ becomes its onset, and /b/ now becomes the coda of the previous syllable. It gets assigned a mora by position (Weight by Position, Morén 2001:122) and the vowel has to shorten.

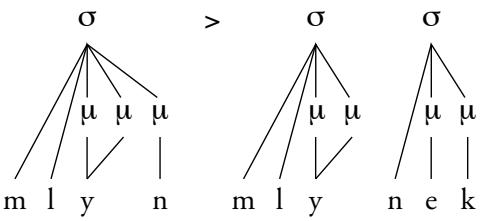
(81)



Consider, finally, a word with a long vowel that does not shorten in the diminutive, like *mly:n* > *mly:n-ek*. Here we propose that the final sonorant gets assigned a mora in the base form because it is in the coda position, but after resyllabification it

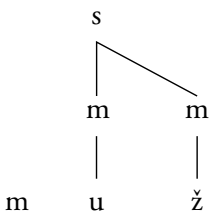
gets reanalysed as the onset of the following syllable, leaving the two moraic positions for the vowel.

(82)

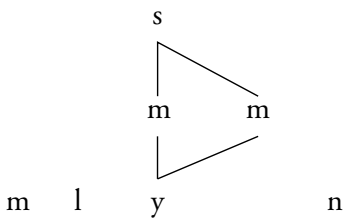


Admittedly, there is an ugly aspect to this analysis, and it is advisable to concentrate on that for a moment. Here we are assuming that some sonorants are ambisyllabic and some others are not (contrasting thus *mužik* with *mly:nek*). The explanation can be reduced to the information contained in the lexical entries: in the case of *muž* we can assume that the final sonorant is associated with a mora in the phonological representation of the lexical entry (83a), while in *mly:n* the final /n/ is not represented in the lexical entry as a mora and only gets this status when found in a coda position, by a productive rule (83b).

(83) a. *muž* N, 'man'



b. *mly:n* N, 'mill'

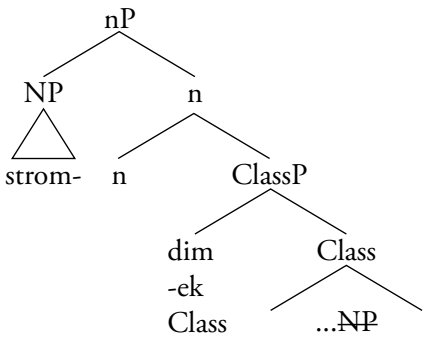


If this is so, ambisyllabicity only emerges when necessary to be faithful to the lexical representation of the item, that is, when necessary to keep the segment as a mora, and will not be used if the lexical representation does not provide this information. This could be codified in OT terms as a Max-Link Mora (Sonorant) constraint ranked in Czech higher than the one that bans ambisyllabicity (while in Spanish it

would be ranked lower). This is clearly a stipulation,[9] but it is also fair to say that it is a stipulation that affects the level of the grammar where all the information is idiosyncratically listed, the list of lexical entries.

The requisite that the base has to be bimoraic even at the expense of altering the vowel representation in the base suggests, as was the case with Spanish, that in this language the diminutive treats the base as a different phonological domain from the affix, as the solution of altering the shape of the base is used instead of reusing the material outside the base. This is predicted in our analysis. In Czech, as was the case with Spanish, the affix is a complex specifier and the morpheme order has to be achieved by phrasal movement. This results in the following representation (84), where the base and the affix belong to two different CUs, and thus each one of them forms its own phonological domain.

(84)



5. Further evidence for the structural account: Spanish *-illo* as German *-chen*

Up to now, we have shown that the syntactic structure is able to explain the mapping onto phonology and the semantic contribution of the affix in the languages that we have selected, without the need to stipulate the linear ordering of the elements involved and rules based on that linear ordering. This is coherent with an explanation where the structure is the crucial factor in the interpretation of phonology, but it does not provide immediate evidence denying the proposal that specific vocabulary items are associated to specific phonological rules. This final section concentrates on Spanish and provides evidence that the same vocabulary item –a diminutive– can appear both as a specifier and as a head.

We have already reported that the diminutive *-ill-* can be used as the productive diminutive in Central Peninsular Spanish and is the normal form in the Southern Peninsular varieties. The diminutive *-in-* is used as the productive diminutive in Asturian

9 Unfortunately for our purposes, Czech stress is not weight-sensitive (Kučera 1961), and the language does not exhibit the tense / lax distinction that is used to independently diagnose for ambisyllabicity in other languages.

Spanish and other Northern varieties. With this in mind, consider (85) and (86). In these cases, the same affix is used, but here it has the semantic property of turning the mass noun into a count unit. (85), over the base *azúcar* 'sugar', means 'sugar cube', and (86), over the base *chocolate* 'chocolate', means 'chocolate bar'.

(85) azúcar > azucar-ill-o

(86) chocolate > chocolat-in-a

These kinds of examples are not productive in Spanish. We are not aware of other cases where the diminutive affix has the power to turn a mass noun into count; perhaps, the two examples in (85) and (86) exhaust the list. However, the obvious phonological relation with the bases *azúcar* and *chocolate* makes it implausible that they are not derived by combination of morphemes, and then we have to face the conclusion that *-ill-* and *-in-* look a lot like diminutive morphemes available in several varieties of the language.

But these are only attested with nouns, as in German. Again similar to German, they can alter the gender of the noun. (87a) can be feminine, but (87b) must be masculine; conversely, (88a) is masculine and (88b) is feminine. This is visible because of agreement with the quantifier, which in the (b) examples of each pair is count and in the (a) examples, mass, but it is also visible under agreement with adjectives: contrast (89a) and (89b).

(87) a. mucha azúcar
much sugar

b. muchos azucarillos
many sugar cubes

(88) a. mucho chocolate
much chocolate

b. muchas chocolatinas
many chocolates

(89) a. el chocolate negr-o
the.MASC chocolate black-MASC
'the dark chocolate'

b. la chocolatina negr-a
the.FEM chocolate bar black-FEM
'the dark chocolate bar'

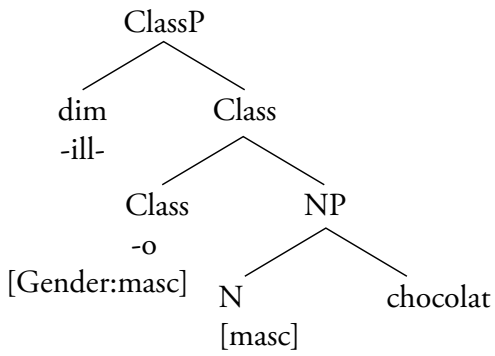
These uses of the diminutive cannot be iterated. If another diminutive is added, this second diminutive has the behaviour of the regular diminutive, and does not change grammatical gender with respect to the one assigned by the first one.

(90) azucar-ill-ill-o pequeñ-o
sugar-DIM-DIM-CM small-MASC

This shows that in the cases of (85) and (86) the diminutive behaves as in German, even if the same lexical item can also be used –at least in some varieties– as the productive diminutive with the other set of properties. Crucially, as we expect, there are no unexpected phonological effects in the bases in these cases. No allomorph of the base *azúcar* is used in such cases, even if the final consonant of the base needs to be resyllabified with the diminutive, losing its moraic status. This is expected in our analysis if the diminutive here behaves as a head.

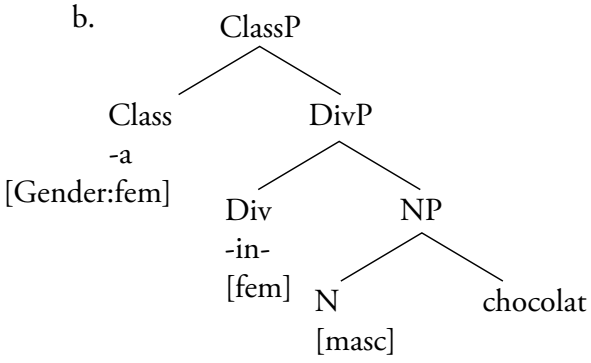
Consider now our specific proposal. We are claiming that the lexical item *-ill-* can appear in two positions. The one is the regular one for productive diminutives, where it displays the regular properties of Spanish diminutives (91a). The second one is the one that the German diminutive takes, as the head Div, containing specific gender information that overrides that which is contained in NP and thus is the probe of agreement of Class (91b).

(91) a.



chocolat-ill-o ‘chocolate-dim’

b.



chocolat-in-a ‘chocolate bar’

What this representation brings up is the question of what property of diminutives such as *-ill-* and *-in-*, as lexical items, allows them to be introduced either as specifiers of Class or the head Div itself. Why these two projections in particular and not others? The answer derives directly from the feature endowment of the diminutive in our proposal (remember 58): the diminutive is category-neutral and its only property is to check a class feature. What the two positions in which the diminutive can be introduced have in common is precisely that they are both immediately adjacent to the class marker: one is its specifier, the other is the head Div, which can condition the insertion of the class marker. The reason that this lexical item can be introduced in either place derives from its feature endowment, as expected in a late insertion theory. Any position (locally) related to the class marker will be a position where the diminutive can be inserted.

If this is true, we have a straightforward prediction about a third place where the diminutive should also be inserted. Throughout this paper we have been assuming that N is a head into which gender information can be introduced, and this feature has influence on the type of class marker that will be inserted. Thus, we expect the diminutive to also be inserted in N, and as such we expect that in those cases it will exhibit nominaliser behaviour, as it will impose the noun category onto whatever structure it dominates.

This prediction is borne out. In some cases, the presence of the diminutive is necessary for an adjective to be used as a noun. These cases have been traditionally described as cases of conversion –a poorly understood phenomenon in terms of its productivity– but that kind of analysis does not offer a straight explanation of the contrast in (92). The same adjective cannot be converted into a noun on its own (92a), but once the diminutive is present, it can (92b). Given that the semantics of the diminutive seems to be very underspecified and related to an attitude towards a speaker, it seems stipulative to argue that the diminutive has some semantic effect that makes conversion possible. It appears that a more direct analysis is to accept that this is not a case of conversion, but a case of overt nominalization through the diminutive affix.

(92) a. delgad-o > ??un delgad-o
thin.ADJ-CM a thin.N-CM

b. un delgad-it-o
a THIN-DIM-CM
'a thin person'

Let us wrap up this section and consider the wider picture again. The general conclusion of this section has been to present direct evidence that an account of the mapping between semantics, syntax and phonology has to be based on structural properties and cannot concentrate on individual lexical items. Even if diminutives in Spanish have the behaviour of specifiers, it is a mistake to directly associate these lexical

items to specifier positions, because in (less productive) cases they can act as divisor heads and as nominalisers. This is precisely what a syntactic account expects: depending on the properties of the structure, a set of features might emerge as a head or as a specifier, and combine with elements of different nature depending on the elements that have been selected from the numeration.

6. Conclusions

We have argued through a study of the Spanish, German and Czech diminutives that the mapping between syntax, phonology and semantics follows the principle expected from an account that concentrates on properties of the structure and not of the individual lexical items. Our empirical study has shown three things: (a) a syntactic and semantic behaviour characteristic of a specifier comes accompanied by a phonological behaviour as an independent domain; (b) this is not matched by any linear position: even if German, Spanish and Czech diminutives linearise to the right of the base, they do not behave in the same way; (c) this is not dependent on the lexical item involved either, as the same lexical item can be shown to display different properties in different cases. The comparison presented here argues in favour of the proposal that it is the syntactic constituency, and more in particular Uriagereka's Multiple Spell Out, that determines the phonological properties of an element inside a word. This theory has the advantage that it is easy to test in other languages outside of the scope of the present article. Languages that have a morphology based on continuous segments should, given our proposal, behave in the same way, with affixes that change the grammatical properties of their bases forming a phonological domain with the base, and those that do not modify these properties forming their own phonological domains. This makes our theory subject to straightforward falsification, as the counterexamples can be argued in any language that uses continuous segments to express morphosyntactic properties, and this is a clear advantage of any scientific theory. Admittedly, the predictions for languages that use templatic morphology, such as Hebrew or Standard Arabic, are not so clear: the problem is that in those languages the base and the affixes must always integrate into the same phonological unit, as there are restrictions on the phonological size of a word and there are templates which dictate severe conditions on how segments from one exponent intertwine with segments of the other. A natural extension of this proposal would be to explore what kind of phonological differences are attested between morphemes of both classes in templatic languages, along lines initiated by Arad (2003).

The main consequence of our proposal is that the same analysis can account for 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 suggests 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 still happen to single out the same kind of constituents is considerably unattractive, because in such theories the match has to derive from independent unidentified principles.

In relation to the last point, 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 to 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.

Before concluding this paper, a caveat is perhaps in order. Our general take on the architecture of language presupposes the derivational model that is generally accepted in mainstream Generative Grammar. Nothing of what is shown here is an argument in favour of or in opposition to a Parallel Model architecture (along the lines of Jackendoff 2002, Culicover & Jackendoff 2005). The phenomena studied here do not confirm a parallel model because here the mapping between syntax, semantics and phonology is isomorphic –that is, we do not find direct evidence that phonology or semantics is a generative model able to generate a structure different from what syntax feeds it. As is explained in Culicover & Jackendoff (2005:16-25), a straightforward prediction of the Parallel Architecture model is that semantics and phonology are generative and mismatches between the domains defined in each level are expected; in contrast, with the effects we have discussed in this paper, a simple translation of the syntactic structure is enough. However, the absence of these effects does not constitute evidence against a Parallel Architecture, either. The breadth of the question that the debate between derivational and parallel models addresses is so big that a study with a much wider empirical coverage would be necessary; perhaps in the case of diminutives the three levels happen to define equivalent domains, but when looking to higher-level constructions mismatches could be identified that potentially could argue in favour of a parallel model –see the discussion about intonational phrases and syntactic embedding in Jackendoff (1987) or the one about ellipsis in Culicover & Jackendoff (2005:233-248). Deciding between the two kinds of model is beyond the scope of this paper; we hope, however, that at least we have been able to provide a convincing analysis of a fragment of the grammar of natural languages, and an argument that shows that the assumptions

in many lexicalist theories are unnecessary.

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Reception date: 11/03/2013
Revision date: 24/04/2013
Acceptation date: 17/06/2013

Antonio Fábregas
antonio.fabregas@uit.no
Universitetet i Tromsø