RE-EXAMINING SPANISH 'RESYLLABIFICATION'*

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1. Introduction

In this paper I re-examine Spanish syllabification, focusing mainly on what has traditionally been labeled 'resyllabification.' This terminology is a reflection of a serial approach to phonology where an ordered set of rules was carried out on the input, the output of one rule being the input to the next rule in the sequence. In this fashion it was claimed that syllabification took place at the level of the word, and again later at a phrasal level. This ordering was able to account for different patterns of syllabification in different contexts, as separate rules were used for each case (Harris 1993, Hualde 1992, among others). In this paper I re-examine the data relevant to Spanish syllabification, focusing especially on 'resyllabification' and the behavior of prefixes in syllabification. Close analysis of the data leads to the proposal of a morphological status for Spanish prefixes different from what has commonly been assumed. Taking into account the morphological status of prefixes, I offer an analysis of 'resyllabification' within Optimality Theory (OT) (Prince and Smolensky 1993), where, rather than an ordered set of rules, a set of universal constraints, ranked in order of preference by the specific language, operates on the input to produce the actual phonetic output. The assumption within OT that all constraints operate simultaneously makes the notion of **re**syllabification impossible. After providing an analysis of 'resyllabification,' I will return briefly to previous analyses in order to demonstrate where they fall short and in what ways my analysis is capable of overcoming those difficulties.

2. Data

There are several aspects which must be considered when dealing with Spanish syllabification. The words in (1) show that whenever a consonant appears between vowels, it becomes the onset of the following vowel rather than the coda of the preceding vowel. Codas are allowed in Spanish, as in the final syllable of in (1), but only if the consonant cannot become an onset instead.

(1) Preference for consonants to be onsets

'food'
'to dawn'
'banana'

The data in (2) go even further than those in (1) in demonstrating the preference for onsets rather than codas in Spanish. This data shows that Spanish creates complex onsets in order to avoid having codas.

(2) Preference for complex onsets

‘to speak’
‘pilgrim’
‘sublime’
‘applause’

The data in (3) show that onsets are preferred over codas, even if this means that the final consonant of a word is syllabified as the onset to the initial syllable of the following word.

(3) Onsets across word boundaries

‘unbearable heat’
‘elegant club’
‘an elephant’
r ‘same results’

The data in (4) demonstrate a preference that consonants syllabify as onsets across prefix boundaries as well.

(4) Onsets across prefix boundaries

‘unexpected’
‘undone’
‘submarine (adj.)’

(1)-(4) demonstrate that Spanish has a very strong preference for its consonants to be onsets rather than codas, even when they do not appear in the same morpheme, or even the same word. (5)-(6), however, provide exceptions to this generalization.

(5) No complex onsets across word boundaries

‘beautiful club’
r ‘come (pl. imper.) quickly’

(6) No complex onsets across prefix boundaries

r ‘to right (nautical)’
r ‘underline’

Whereas (3) shows that a word-final consonant syllabifies as the onset to the initial syllable of the following word when it otherwise would not have an onset, (5) shows that complex onsets are not formed in this way, even though the consonant cluster would form an acceptable complex onset in Spanish.

The data in (6) demonstrate that complex onsets are not formed across prefix boundaries either, even though the consonant cluster would produce an acceptable complex onset.

There is one more set of data to consider. In many dialects of Spanish, an in coda position aspirates. The data in (7) illustrate this process. The of and aspirates in the singular, when in coda position, as in (7a). In the plural forms in (7b), however, the same is an onset and does not aspirate.

(7) Aspiration of /s/ in coda position

(a)	'cough'
	'month'
(b)	'coughs'
	'months'

Not all aspirating dialects of Spanish aspirate /s/ only when it is in coda position (see Kaisse 1998 and Wiltshire 1999 for a typology). Some of these aspirating dialects, both in Spain and the Americas, show the interaction between aspiration and 'resyllabification' seen in (8)-(9) (Colina 1997, Harris 1993, Kaisse 1998, and Wiltshire 1999).

(8) Aspiration and syllabification across word boundaries

'month is'
'two bears'
'two wings'

(9) Aspiration and syllabification across prefix boundaries[1]

'undone'

In (8), aspiration of a word final /s/ takes place, even when it is syllabified as the onset of the initial syllable of the following word, and therefore is not a coda as we would expect in cases of aspiration. The datum in (9) shows that a prefix final like a word final , aspirates even when syllabified as the onset of the initial vowel of the base word. This dialectal data has been the basis of previous OT analyses (Colina 1997, Kenstowicz 1995, and Wiltshire 1999) and will be the basis for the analysis put forth here.

3. The Status of Spanish Prefixes

In previous accounts of Spanish syllabification, prefixes have either been treated equally with other affixes or have been ignored altogether. Obviously, ignoring prefixes is not satisfactory, as they must also be syllabified, and treating them equally with other affixes has also been problematic as will be shown. The data show an interesting characteristic of prefixes: Segments in prefixes do not behave the same as other segments within a word with respect to syllabification. In fact, syllabification at prefix boundaries is identical to syllabification at word boundaries. Should it be assumed, then, that prefixes are words that just happen to appear without a space between them and their base words in orthography? Certainly not. A prefix cannot be considered a word for two reasons: First, a prefix cannot stand by itself, but must attach to a base word. Secondly, words can carry stress while prefixes cannot. But still the fact remains that in syllabification prefixes behave as if they were words (recall →).

It is interesting to note that prefixes in these dialects are similar to clitics. Crystal (1997) gives the following definition of *clitic*: "A term used in grammar to refer to a form which resembles a word, but which

cannot stand on its own as a normal utterance, being structurally dependent upon a neighboring word in a construction." This also describes the behavior of prefixes in the data presented above. Spencer's (1991) explanation of clitics seems to describe even further the behavior of prefixes seen above:

> Clitics, like affixes, are elements which cannot exist independently and can thus be regarded as a kind of bound morpheme. A typical clitic will attach itself to some other word or phrase… Since clitics attach themselves to fully inflected words…we would be unwilling to think of the clitic as some kind of inflection. In this sense clitics are more like independent words.

The data presented above shows that prefixes in some aspirating dialects of Spanish syllabify as if they were words. This seems to indicate that they are a separate unit from their base word, in contrast with suffixed morphemes where syllabification matches that found within the base. Again, prefixes parallel clitics in this sense. Evidence that Spanish clitics are domains separate from their base words is found in the object pronouns. The clearest example is the inflection of third person forms of direct object pronouns, which inflect for both gender and number, as seen in (10).

(10) Third person direct object pronouns

3rd pers. DO pronouns	singular	plural
masculine	*lo*	*los*
feminine	*la*	*las*

This inflection, which is a characteristic of words, shows that Spanish clitics must be separate phonological domains from their base word, as both the object pronoun and the base word can inflect.

I propose that what prefixes and clitics have in common that allows them to behave as a separate phonological unit from their base word, though they are still bound syntactically to the base word, is that they are a separate phonological domain (PD). A PD is defined as a morphological grouping, containing one or more morphemes, which is input to the phonology. That is, the phonology can refer to a PD, but not to one particular morpheme within the PD. Since suffixed words act as one unit in syllabification while a prefixed word acts as two units, there is evidence that suffixed words are one single PD. Therefore the prediction is made that in suffixed words the phonology will not refer to only the base or only the suffix in a suffixed word. In a prefixed word, however, where the base and prefix are separate PDs, the phonology may refer to each PD individually, as seems to be the case in 'resyllabification' in the aspirating dialects under consideration. If in these aspirating dialects the 'resyllabification' pattern occurs at PD boundaries, there is no difficulty in producing the correct result, as will be shown in the next section.

It must be pointed out that PD is a concept that is not only useful for explaining the syllabification patterns in certain aspirating dialects, but can be used in many other cases as well. It can be used to explain why clitics can inflect, as seen for Spanish direct object pronouns in (10). Since the phonology treats each PD separately, a clitic and its baseword can both inflect since they are separate PDs. This means that a word can be made up of more than one PD (ie. words with enclitics). Since PDs can combine to form a word, this makes an analysis of compounding fairly straightforward. The question of stress placement may be seen as a hinderance to postulating PDs, as it seems that some PDs, such as prefixes and clitics, cannot be stressed, while others, such as content words, can. This is no more of a hinderance to postulating PDs, however, than having unstressed words is to postulating that words exist. If there are strong (ie. stressable) PDs and weak (ie. unstressable) PDs, then there is no problem. Since some words, such as prepositions, are

not stressed, a distinction is needed anyway to determine what may and may not be stressed. Strong and weak PDs accomplish this in a straightforward manner.

4. A Theoretical Analysis of Spanish Syllabification

Taking prefixes to be PDs, I now move on to a theoretical analysis of syllabification, focusing especially on 'resyllabification' within OT. I will propose an arrangement of universal constraints that will not only produce the correct results as seen in the data, but also give insight into the system of syllabification in Spanish.

The constraint ONSET (11) is commonly used in OT to account for the preference for consonants to be onsets rather than codas. ONSET will cause a consonant to syllabify as the onset of the following vowel rather than as the coda of the preceding vowel, as seen in the tableau for the word *mamá* in (12).

(11) ONSET: Every syllable has an onset.

(12)

Candidates	ONSET
☞	
	*!

Since the syllabification of the intervocalic consonant as the coda of the first syllable causes the second syllable to be onsetless, this form violates ONSET. The form with onsets in both syllables is the optimal form.

While ONSET forces an onset in (12), it cannot force the formation of complex onsets, as evidenced by the tableau for *cubre* in (13).

(13)

Candidates	ONSET

Since in this case all syllables in both forms have onsets, some other constraint must force the complex onset to be formed. The data show a preference for consonants to be onsets rather than codas, something which is not fully expressed in ONSET, as it requires syllables to have onsets, but does not prevent syllables from having codas. Another commonly used constraint, NO CODA (14), is used in combination with ONSET to force complex onsets as seen in (15). While ONSET is satisfied in both of the candidates in the tableau, NO CODA forces the complex onset (Colina 1995).

(14) NO CODA: Syllables do not have codas.

(15)

Candidates	ONSET	NO CODA
☞		
		*!

Recall, however, that complex onsets are not formed across word and prefix boundaries. There is no longer a need to distinguish between these two types of boundaries, however, as we may simply refer to phonological domain (PD) boundaries. A constraint ranked above NO CODA will be needed to specifically deal with this environment. It must, however, be ranked below ONSET, as consonants may syllabify across PD boundaries if the following syllable would otherwise not have an onset.

Colina (1995) prososes an ALIGN constraint (16) to account for 'resyllabification' environments.[2] Rather than refer to stems as does Colina (1995), we may refer to PDs in the ALIGN constraint to account for prefixes as well as words, something not possible by referring to stems alone. Colina's (1995) formulation of ALIGN is given in (16), with my proposed revision in (17).

(16) ALIGN: Every initial stem-edge should match to an initial syllable edge. (Colina 1995)

(17) ALIGN (revised): Every initial edge of a ***phonological domain*** should match to an initial syllable edge.

As word internal consonant clusters are, by definition, not at the PD edge, this will not affect the formation of complex onsets word internally, and it will prohibit them across PD boundaries, as seen for the phrase *club lindo* in (18) and for the prefixed word *subliminal* in (19). As seen in these tableaux, the ranking of ALIGN above NO CODA prohibits the formation of complex onsets across PD boundaries.

(18)

Candidates	ONSET	ALIGN	NO CODA
☞			**
		*!	*

(19)

Candidates	ONSET	ALIGN	NO CODA
☞			**
		*!	*

All syllabification data can be explained by this analysis, except for the aspiration data in (8)-(9). In these cases is syllabified as an onset across a PD boundary, but aspirates as if it were in coda position. Kenstowicz (1995) proposes the constraint Uniform Exponence (UE) (20) to account for this aspiration.

(20) Uniform Exponence: minimize the differences in the realization of a lexical item (morpheme, stem, affix, word). (Kenstowicz 1995)

UE prevents a lexical item from having more than one phonetic realization (ie. it restricts allomorphy). Kenstowicz looks at the prefix *des-* and notes that it always appears as in some aspirating dialects regardless of whether the is an onset or a coda and claims that UE forces this since an undominated constraint forces aspiration when the is in coda position, and having a second realization of the prefix would violate UE. He assumes, however, that this constraint applies just to *des-* since the in surfaces as in the singular, but as in the plural, as in (7). The data in (8) make it clear, however, that UE does not apply just to *des-*. I propose, therefore, that Kenstowicz is on the right track with UE, but that it is formulated too broadly.

As Kenstowicz pointed out, UE does not work for *mes* and *meses*. The in question in these words is indeed morpheme final, but the data in (7)-(9) show that UE is only applicable to PDs, rather than to any lexical item as Kenstowicz proposes, and this is not PD final in the plural (cf. the discussion about the differences between prefixes and suffixes in section 2). I propose a reformulation of UE as UE-PD (21).

(21) UE-PD: minimize the differences in the realization of a ***phonological domain***.

UE-PD would be violated if in the output a PD were realized differently than it is realized in another output. Since an undominated constraint must force aspiration of /s/ in coda position, UE-PD would be violated if the same PD were realized without aspiration elsewhere. This will resolve the problem Kenstowicz encountered by producing the correct result for *des-* and by not applying to *meses* as the in question is not PD-final since suffixes are not separate PDs (cf. section 2). The operation of UE-PD is seen in (22) for the input .

(22)

Candidates	ONSET	UE-PD
☞		
		*!

Since ONSET is satisfied in both candidates in the tableau for *deshecho* in (22), UE-PD becomes the deciding factor, preferring the aspirated form, as aspiration is forced in all cases where the /s/ of *des-* is a coda. If *des-* were realized with an [s] here, the same PD would have 2 realizations, violating UE-PD. While UE-PD does not apply to *meses* since the in question is not PD-final, there is nothing to prevent the from aspirating, as seen in the tableau in (23). Since both forms satisfy ONSET and UE-PD does not apply, these forms tie, falsely predicting cooptimal outputs.

(23)

Candidates	ONSET	UE-PD

An independently proposed Faithfulness constraint (24) (used by Colina 1997 to solve this problem) requires phonetic realizations to match the underlying forms. Of course, this constraint is violable in order to satisfy more highly ranked constraints, but when this is not the case, there should be no deviation from the underlying representation. In the case of a change in the segment, as is the case here, there are certain features which do not correspond in the input and output, even though there is a segment present. This lack of correspondence breaks the tie in candidates for *meses*, as seen in (25).

(24) Faithfulness: A correspondent in the input should have a correspondent in the output. (Colina 1997)

(25)

Candidates	ONSET	UE-PD	Faithfulness
☞			

			*!

With these data accounted for, the analysis is complete and correctly accounts for all aspects of Spanish syllabification.

5. Previous Analyses and Their Shortcomings

I now return briefly to a few of the key previous constraint-based analyses of Spanish syllabification in order to point out their shortcomings and demonstrate that the analysis I propose does not encounter the same difficulties.

Colina (1995) uses an approach to syllabification similar to that which I have proposed here, using ONSET, ALIGN, and NO CODA to account for syllabification within a word and across word boundaries. The problem is that she does not account for prefixes. While I have shown that these three constraints account for syllabification of prefixes, this account is based on my claim that prefixes are separate PDs from their base word. Without this assumption, Colina's analysis would be unable to account for the behavior of prefixes in syllabification, as seen in (26).

(26)

Candidates	ONSET	ALIGN	NO CODA
			**!
☞			*

This tableau shows that when prefixes are not distinguished from other affixes, the incorrect form is selected, since ALIGN only applies to stems. So while these constraints can indeed account for prefixes, Colina cannot account for them without additional assumptions and the rewording of ALIGN to refer to PDs.

Colina (1997) attempts to expand upon her earlier analysis of syllabification by taking into account the dialectal aspiration data accounted for here, which she had not treated in Colina (1995). She pointed out, like I have here, that Kenstowicz's assumption that UE applies only to *des-* is incorrect. Trying to account, then, for the alternation between and in *mes* and *meses*, she claims that UE does not apply to *meses* since *mes-* is not just a morpheme, but also surfaces as a word. She proposes that the correct constraint for this situation is Kenstowicz's Base Identity (27).

(27) Base Identity (BI): Given an input structure [XY] output candidates are evaluated for how well they match [X] and [Y] if the latter occur as independent words. (Kentowicz 1996)

Since *mes* and *es* occur as independent words, Colina claims that BI is the correct constraint. An application of Colina's analysis is shown in (28) for *meses*.

(28)

Candidates	UE	Faithfulness	BI
☞			**
		*!	*

Since Colina claims that UE does not apply in (28), Faithfulness is the deciding factor, meaning that is the optimal candidate, even though it violates BI twice while only violates it once, as violates Faithfulness, which is ranked higher than BI.

While it seems that Colina has provided a solution, there are a couple of problems. Colina crucially claims that UE does not apply to *meses* because *mes* and *es* both appear as words in the language. For this reason she claims that BI is the relevant constraint. The problem with this is that UE, as formulated by Kenstowicz, applies to a 'lexical item.' There is little doubt that is a lexical item. Regardless of whether it appears alone or with other morphemes attached to it, is stored in the lexicon as the morpheme meaning 'month,' making it a lexical item. Therefore UE should apply, since in Kenstowicz's (1996) formulation, which Colina (1997) adopts, reference is to a "lexical item."

Even if Colina could somehow prevent UE from applying to forms such as *meses*, the analysis offered here would be superior on theoretical grounds. Colina claims that BI is the relevant constraint, but then ranks it last. In other words, due to the low ranking of BI, it can be violated freely, which does not explain the behavior of . Whether BI is violated or not, the results would be the same, as can be seen in the tableau in (28). This is nothing more than phonology by default, and has no explanatory power. Using UE-PD produces the same result while giving a detailed explanation for the behavior of

Wiltshire (1999) accounts for prefix aspiration and syllabification with a recursive structure as seen in (29) for *deshecho*.

(29) Recursive structure from Wiltshire (1999)

PW PW

By using recursive structures, the phonology may refer to a particular type of boundary, whether the single open bracket ([ ) seen in (29) between the prefix and the base word or a closed bracket followed by an open bracket ( ][ ) which would be the case between phonological words, or a single closed bracket ( ]) signifying end of word and phrase, or it may refer to any bracket without specifying what kind[3]. This device allows for an analysis that produces correct results as the phonology would refer to all brackets for aspiration of in the dialects of interest here, but misses the important morphological realization, which I have argued for above, that in these dialects prefixes are PDs. The recursive structure in (29) does not allow for phonologically independent units smaller than the word, as is required by the possibility for a clitic to inflect independently from its base word as seen for Spanish direct object pronouns in (10). Therefore, while Wiltshire (1999) provides a fairly solid alternate account, it requires positing recursivity, which would otherwise not be necessary, where the analysis I have presented takes advantage of an independently motivated morphological category, simplifying the theoretical machinery needed to make the analysis work.

Hale, Kissock, and Reiss (1998), in an attempt to eliminate the need for output-output correspondence in OT, claim that Kenstowicz's UE constraint is not needed to account for *des-* in aspirating dialects of Spanish. They claim that since it always appears as , the underlying representation of the final segment must be rather than . This, then, is true of all other cases in which is the only form seen on the surface. This seems reasonable if we find not only in coda position, but also when syllabified as the onset of the following syllable. The problem with this claim, however, is not seen in the data given in the syllabification literature. Aspiration is a characteristic of informal speech, and when speakers are in more formal situations or are being careful about their pronunciation, often emerges. For example, I conducted an experiment with some speakers of a Puerto Rican dialect who follow the aspiration patterns outlined in the data in (9)-(11) without fail in casual conversation. When asked to read a paragraph aspiration occurred 100% of the time where it would be expected. When asked to read a list of words from

the same paragraph, a more formal task, they produced [s] over 90% of the time. This lack of aspiration indicates that the underlying representation is rather than . While it is not unreasonable to imagine a reanalysis of the underlying form to in some dialects, or at least by some speakers, there would need to be sound evidence taking into account different formalities of speech register since aspiration, regardless how much more common it may be than , is often a result of style.

6. Conclusion

In this paper I have presented evidence that Spanish prefixes cannot be treated the same as other affixes, but rather have proposed that they are separate phonological domains from their base word. Taking into account the status of prefixes, I have proposed an OT analysis of Spanish syllabification and 'resyllabification' which correctly accounts for all of the data while overcoming the difficulties of previous analyses of Spanish syllabification.

Notes

* I would like to thank the phonetics and phonology group at The Ohio State University and the audience of LSRL 29 for valuable comments on earlier versions of this paper. I am especially indebted to Jen Muller, Tom Stewart, and Caroline Wiltshire for their indispensable suggestions.

1 I give only one example here because of the limited data available. Many Spanish prefixes are no longer productive, so finding a clearly productive s-final prefix which attaches to a vowel-initial base word is not as easy as one would hope. *Des-* is one prefix meeting these requirements and so is used here with the note that while it is not the only possible example, it is certainly the clearest.

2 Colina's constraint is actually ALIGN', but this diacritic is used to distinguish this constraint as a slightly different version of McCarthy and Prince's (1993a) ALIGN constraint. As this is not an issue here, I omit the diacritic.

3 In Wiltshire's analysis of aspiration and resyllabification the phonology does not refer to all of these possibilities, but rather only to a closed bracket or any bracket. All of these possibilities, however, are theoretically possible.

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