

## The Many Faces of Spanish /s/-Weakening: (Re)alignment and Ambisyllabicity

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### 1. Introduction: Spanish word-final /s/-reduction

The weakening of syllable- and word-final /s/ to [h] and ultimately to [∅] is frequent in Spanish, and permits accurate delimitation of dialect zones in Spain and Latin America. Although /s/-reduction (SR) is a highly ramified process with considerable sociolinguistic, regional and idiolectal variation, the broad outlines are clear. Both historically and synchronically, /s/ weakens to [h] in preconsonantal contexts (via autosegmental bleaching of supralaryngeal features): *las mesas* [lah mesas] 'the tables,' *hasta* [ahta] 'until.' Phrase-finally and before vowels, /s/ remains as sibilant [s]. The second stage, syllable-final SR (FSR), extends SR to all syllable-final contexts, including phrase-final (*vamos* [bamoh] 'let's go'), while retaining word-final prevocalic /s/ as [s] (*es así* [es asi] 'it is thus'). This distribution is found in transitional zones between dialects with higher and lower rates of SR. The extension of FSR to include word-final prevocalic /s/ occurs in the phonologically most advanced dialects. Prevocalic FSR (PFSR) has no direct phonetic motivation as weakening in the syllabic rhyme, but is rather an analogical extension which results in paradigmatic regularity: all instances of word-final /s/ are realized as [h], regardless of the presence or nature of a following segment.

### 2. Word-initial /s/-reduction in Spanish

In most Spanish dialects, intervocalic /s/ is rarely reduced when not word-final. However in some regions, typified by much of El Salvador and Honduras (Lipski 1983, 1985), parts of Colombia, some Andalusian dialects, as well as northern New Mexico and southern Colorado, word-INITIAL postvocalic /s/ is frequently reduced: *la semana* [lahemana] 'the week.' Initial /s/-reduction ISR is usually less frequent than word-final prevocalic SR, but it only occurs in dialects where the latter process has been generalized. This fact, combined with identical paths of phonetic evolution ([s] → [h]), suggests that the two SR processes are intimately related. If all aspects of Spanish SR can be accounted for by a single model, including marginal varieties as well as large dialects, the understanding of Romance phonology will be further enhanced. The present study offers some suggestions towards the eventual unification of FSR and ISR,

seen not simply as isolated curiosities but rather as exemplars of generalized processes of syllabic realignment.

### 3. Generative rules for word-final /s/-reduction

Earlier analyses of the extension from FSR to PFSR have invoked some form of rule generalization as the motivating force, although the formal expression of the conditioning environments does not convincingly transcend the mere conflation of two separate rules (for a discussion of some attempts, cf. Terrell 1979, Guitart 1981, Lipski 1984). Harris (1983: 46-47; 1993) offered the first coherent attempt at situating PFSR in a lexical phonological framework. He proposed a single rule reducing /s/ in the syllabic rhyme. Unlike the original, phonetically-motivated rule of FSR (which is a post-lexical rule), Harris proposes that PFSR is activated in the lexical component. This accounts for the fact that PFSR affects word-final /s/ regardless of the presence and nature of following segments. To account for PFSR, rhyme-final reduction is ordered before resyllabification, the latter being a general postlexical rule in Spanish which attaches a (single) word-final consonant to the onset of a following onsetless syllable. In Spanish dialects in which FSR is not extended to prevocalic environments, FSR remains as a post-lexical rule, ordered after resyllabification or possibly formulated in a way as to be logically independent of resyllabification.

### 4. Generative rules for initial /s/-reduction

There is no phonetically-motivated process in Spanish which reduces or otherwise affects word-INITIAL /s/, unlike FSR. If ISR is somehow to be analyzed as an extension of FSR, no kernel of word-initial phonetic modifications can be adduced as the source of the extension. Despite the lack of a ready phonotactic springboard from which to launch an additional wave of generalization of FSR, the global effects of combining ISR and FSR are easy to describe: when two words come together, the accuracy with which word boundaries are phonetically delimited is reduced, as is the precision with which word boundaries need be specified in SR. In dialects containing only PFSR, the phonetic sequence [VhV], where the [h] is phonologically derived from /s/, must be analyzed as /Vs#V/. By extending SR to word-initial environments, the configuration /V#sV/ is also a possible source. The ultimate generalization would include word-internal /VsV/ combinations, and in some marginal varieties of Spanish this extension is in its incipient phase.

By combining PFSR with ISR, /s/ is reduced to [h] both word-finally (post-vocally) before a vowel, and word-initially (prevocally) after a vowel. This corresponds to an intervocalic environment, which obligatorily contains a

word boundary on one side or the other of the /s/. Using // to represent a mirror-image environment, this can be shown as:

(1)  $s \rightarrow h // \text{ \_\_\_ } \# V$

Although some Spanish data can be described by (1), there is no a priori evidence to suggest that a true mirror image rule is at work, rather than a largely fortuitous combination of FSR and a rule reducing word-initial /s/ to [h]. Within lexical phonology (cf. Kaisse and Shaw 1985, Kiparsky 1982a, 1982b, 1983, Mohanan 1985, 1986, Mohanan and Mohanan 1984), both 'halves' of a genuine mirror-image rule must apply identically to the same strata in the same fashion (cyclic or noncyclic); anything short of this requirement undermines claims of a true mirror-image generalization. Harris (1983) has claimed last-cyclic status for PFSR, resulting in the independence of this rule from the presence or nature of following segments. Within the lexical phonological component, access to internal morphological structures disappears successively, as the result of Bracket Erasure at the end of each cyclic stratum. Access to syntactic information, as well as considerations which go beyond the word boundary (e.g. the presence and nature of preceding or following segments), is excluded, since lexical phonological rules operate prior to the concatenation of lexical items into phrase-level discourse.<sup>1</sup>

There is no evidence for cyclic application of ISR, although given the fact that most Spanish morphological derivation is formed through suffixation, probative examples are extremely rare. Nor does ISR seem to be a last-cyclic rule: a preceding word boundary AND the presence of a final vowel in the preceding word must be mentioned. Unlike with PFSR, indirect mention of syntactic boundaries cannot be effected through syllable types which must necessarily undergo phrase-level resyllabification; word-initial /s/ is onset-initial in all configurations. Also, unlike PFSR, ISR cannot avoid the obligatory presence of a preceding word: whereas *antes* 'before' may be pronounced with final [h] in any and all contexts, *semana* 'week' is never pronounced with initial [h] when phrase-initial. This line of reasoning yields the conclusion that ISR is a postcyclic and postlexical rule.

##### 5. The typological classification of initial /s/-reduction

Kaisse (1985: 22-23), in response to such indisputably syntax-dependent postlexical phenomena as French *liaison*, proposes a more fully articulated postlexical phonology. Two types of rules are posited: P<sub>1</sub> (external sandhi) rules, which still have access to word boundaries (although syntactic bracketing has been erased) and P<sub>2</sub> (fast speech) rules, which have only phonetic conditioning. However, one of the diagnostics of the proposed P<sub>1</sub> rules is insensitivity to pause (and in general, to rate and register variation). Spanish ISR

is sensitive to all these factors, and exhibits all the other earmarks of a fast-speech phenomenon. PFSR is much less sensitive to pause and rate. Although it appears that Spanish dialects in which ISR is operative have created an amalgam of two unidirectional rules which may at times operate as a fast-speech phenomenon, it is impossible to reconcile the formal status of PFSR as a last-cyclic or external sandhi rule and the demonstrably fast-speech nature of ISR. This incompatibility argues against a simple mirror-image generalization such as (1).

##### 6. Initial/final /s/-reduction and ambisyllabicity

Although Harris (1983) analyzes FSR as a last-cyclic rule, there is nothing to prevent a rule of this form from operating post-lexically, even as a fast-speech rule, as long as it applies prior to resyllabification. The same indirect reference to word boundaries which makes resyllabification possible as a fast-speech post-lexical rule can also be employed by a process such as ISR. ISR operates on word-initial postvocalic /s/, and the /s/ remains in onset-initial position throughout the derivation. As currently formulated, resyllabification has no effect on word-initial consonants, and if ISR is a fast-speech rule, it should 'see' this word-initial /s/ as simply another instance of intervocalic /s/, whether ISR applies before or after resyllabification. This is not what occurs, however; ISR manifests a 'memory' for word boundaries even after resyllabification. ISR, in dialects for which this process is frequent, consistently selects for word-initial /s/ even in fast speech.

The explanation is to be found in the resyllabification process itself. In dialects where originally syllable-final consonantal processes have been extended to word-final prevocalic contexts (principally reduction of /s/ and velarization of /n/), resyllabification does not always detach the word-final consonant from the rhyme of the first syllable, but can rather create an AMBISYLLABIC consonant. If the extension of word-final consonantal modifications to prevocalic contexts is represented by an ambisyllabic consonant following resyllabification, this would account for native speakers' high level of awareness of word boundaries even in rapid speech (cf. McCarthy 1993 for a somewhat similar case). This awareness remains in all dialects and in all speech styles, and only in vestigial dialects or creoles does a word-final consonant occasionally become lexically reassigned to a word-initial position: *sojo* < *ojo* 'eye,' *sijo* < *hijo* 'son,' etc.

By allowing resyllabification to produce ambisyllabic consonants, FSR can now apply following resyllabification (indeed, the two processes become logically independent of one another), since the resyllabified /s/, although associated to the onset of the following syllables, remains connected to the preceding rhyme, hence satisfying the structural description of (5). The ambisyllabic consonants resulting from resyllabification provide a means for



identifying word boundaries at the level of fast-speech phenomena, since ambisyllabicity arises only across word boundaries and, according to the suggestions above, only when an originally syllable-final process gets extended to word-final prevocalic contexts. In those Spanish dialects where ISR has become a frequent concomitant of PFSR, resyllabification has been extended to make word-INITIAL postvocalic /s/ ambisyllabic, via the unique and typologically marked processes of leftwards ambisyllabification. This /s/ is then affected by the general rule of FSR. The extremely low frequency of occurrence of both prevocalic FSR and ISR before STRESSED vowels in turn follows from the general constraints against ambisyllabicity before stressed vowels (cf. Kahn 1976). Word-final /s/ may reduce before word-initial stressed vowels providing that the /s/ is not part of a determiner, e.g. *es alto* 'he/it is tall,' *más hombre* 'more [of a] man,' etc. It is probably the case, however, that the lexical category of the word ending in /s/ is not directly at issue, but rather the prosodic status of the phrase in which the word appears. If the /s/ is part of a determiner, it invariably remains with the following word as part of the clitic group, with resyllabification occurring virtually without exception. In many other cases, particularly when the final /s/ is part of a verb or noun, more prosodic boundaries may be crossed between the final /s/ and the following word; it is in these instances when inter-dialectal differences on resyllabification, hence application of FSR, become most apparent.

By the analysis just offered, FSR can apply THROUGHOUT the postlexical component, as well as (possibly) as a post-cyclic lexical rule. This multi-level applicability explains the differential behavior of PFSR and ISR with respect to rate of application as well as velocity. PFSR, in dialects which have evolved ISR, is largely independent of speech rate and register and applies uniformly, thus justifying last-cyclic lexical status. ISR, on the other hand, remains rate- and register-dependent. Resyllabification, and particularly the creation of ambisyllabic word-initial consonants, is also rate-dependent, and ISR is the superficial manifestation of FSR applying after a modified form of resyllabification.<sup>2</sup>

### 7. A constraint-based approach to Spanish /s/-reduction

The preceding discussion has attempted to formulate rules for aspiration of Spanish word-final and word-initial /s/ within the framework of linear derivational phonology. The resulting analysis can be easily paraphrased in terms that are consistent with learnability and speech processing, but are difficult to reconcile with the formalism of phonological rules. In particular, the notion of a 'mirror image' rule not associated with transparent neighborhood association (i.e. autosegmental spreading), but which rather requires reference to a word boundary, represents enough of a break with observations of phonological processes in many languages as to merit reconsideration within

different theoretical frameworks. The essence of Spanish /s/-aspiration in word-final prevocalic and word-initial postvocalic environments hinges on a combination of ambisyllabicity (representable within standard multi-tiered models) and potentially bisyllabic resyllabification across word boundaries—whence the need for 'mirror image rules.'

Resyllabification of word-final consonants in Spanish creates a misalignment between morphological and syllable boundaries (e.g. Kenstowicz 1994: 280). This varying mismatch is best handled within Generalized Alignment theory (McCarthy and Prince 1993). The dialectal variation associated with Spanish /s/-reduction can in turn be handled most effectively in a constraint-based framework such as Optimality Theory (OT). In OT, ordered derivations disappear in favor of the simultaneous evaluation of candidate analyses against a series of presumably universal constraints. Languages and dialects differ in the relative ranking of these constraints and consequently the extent to which they can be violated while still producing an acceptable phonological output in a given language/dialect. Spanish dialects differ in their manifestations of /s/-reduction due to varying ordering relationships among the constraints which circumscribe the phenomena of /s/-weakening. It will be seen that relatively minor readjustments of ranked constraints are responsible for the gamut of dialect variation in Spanish /s/-weakening. In order to analyze Spanish /s/-reduction within the framework of OT, the following constraints must be motivated:

(1) The first constraint is abbreviated \*s\$, and disallows syllable-final [s] in dialects characterized by /s/-weakening. In terms of Generalized Alignment Theory, the constraint is **ALIGN-Left** ([s],  $\sigma$ ), requiring that [s] occur only at the left margin of a syllable boundary (cf. Itô and Mester 1994: 32f.). Since the only two possible positions for [s] in general Spanish is onset-initial (as a single onset) or coda-final, this constraint will disallow [s] in syllabic codas. Ambisyllabic consonants are assumed to violate this constraint. The specific results produced by adherence to this constraint need not be mentioned explicitly; assuming that bleaching of supralaryngeal features (Hualde 1989) or slot-deletion are the standard outcomes for Spanish consonants which violate constraints, either a set of laryngeal features [h] or a deleted /s/ will be the predictable result.

(2) The other syllable-specific constraint might be heuristically designated as \*\$h, disallowing syllable-initial [h]. In Spanish dialects in which /s/ is aspirated, the result differs qualitatively from the posterior fricative /x/, even in those dialects in which the latter phoneme emerges as a weak pharyngeal. This constraint disallows [h] (by definition resulting from feature-bleaching of /s/ or another appropriate consonant) from appearing as a syllable onset. Once more, this is a specific instance of a general syllabic alignment constraint, in this case **Align-Right** ([h],  $\sigma$ ), requiring that [h] occur only as the final element of a syllabic coda. Ambisyllabic consonants will violate this constraint.

(3) **ONS**, a variant of the standard constraint **ONSET** which disfavors syllables lacking an onset. In the case of Spanish, this constraint operates almost inexorably to ensure resyllabification of a word-final consonant as the onset of a vowel-initial syllable in the following word, providing that a close syntactic juncture exists. This is most clearly illustrated in the DET + NP combination (e.g. *el oro* [e-lo-ro]), and more generally between a functional head and its complement (*por eso* [po-re-so], *has hecho* [a-se-čo]).

(4) Spanish intra-word resyllabification runs afoul of the **ALIGN** series of constraints, in particular **ALIGN (Word, R, σ, R)** (**ALIGN-R**) requiring alignment between the right edge of a word and the right edge of a syllable. In the case of Spanish /s/-weakening, these constraints are only operative with respect to the word originally containing /s/. Thus in the combination *los amigos*, only **ALIGN-R** is potentially relevant. In the original formulation of alignment theory, ambisyllabic consonants violate alignment constraints (McCarthy and Prince 1993: 130-1). However the present analysis adopts the refined perspective of Itô and Mester (1994, forthcoming), ambisyllabic consonants do not violate alignment constraints. To complement the fact that the **ALIGN** constraints are not violated by ambisyllabic consonants, Itô and Mester (1994) propose the additional characterization of **CRISP EDGES**. This notion in effect requires that morphosyntactic and prosodic boundaries coincide.

In Spanish dialects in which only superficial (i.e. preconsonantal and phrase-final) /s/ (*desde, vámonos*) but not word-final prevocalic /s/ (*los amigos*) is aspirated, word-final prevocalic /s/ is presumably ambisyllabic before word-initial unstressed vowels in close juncture, thus violating \*s\$. However, \*\$h is ranked even higher, so that the ambisyllabic /s/ is not subject to aspiration. The constraints are ranked:

- (3) ONS >> ALIGN-R >> \*\$h >> \*s\$

Tableau 1 illustrates the prohibition of aspiration of word-final prevocalic /s/ in dialects which aspirate syllable-final /s/; ambisyllabic consonants are placed in curly brackets: {s}.

In Spanish dialects in which word-final prevocalic /s/ is aspirated or deleted (and this includes most of southern and southwestern Spain, the Canary Islands, the Caribbean area, and many Central and South American dialects), the constraint \*s\$ is ranked higher than \*\$h, thus ensuring that ambisyllabic word-final prevocalic /s/ will aspirate:

- (4) ONS >> ALIGN-R >> \*s\$ >> \*\$h

Ambisyllabicity is blocked before stressed vowels in close syntactic/prosodic relationships, particularly DET + NP (*los otros*) and auxiliary verb + participle (*has hecho*).

Tableau 1: /s/-reduction only syllable-finally

Candidate	ONS	ALIGN-R	*\$h	*s\$
los.a.mi.goh	!*			*
loh.a.mi.goh	!*			
lo.sa.mi.goh		!*		
lo.ha.mi.goh		!*	*	
lo{-s}a.mi.goh				*
lo{-h}a.mi.goh			!*	*

Tableau 2: reduction of word-final prevocalic /s/ (in close prosodic linkage)

Candidate	ONS	ALIGN-R	*s\$	*\$h
los.a.mi.goh	!*		*	
loh.a.mi.goh	!*			
lo.sa.mi.goh		!*		
lo.ha.mi.goh		!*		*
lo{-s}a.mi.goh			!*	
lo{-h}a.mi.goh				*

Word-initial prevocalic /s/ is not aspirated, since the optimal place for word-initial /s/ is to remain syllable-initial. Ambisyllabicity of word-initial /s/ would represent leftward 'slippage' that would violate one or more constraints (Tableau 3):

Tableau 3: no aspiration of word-initial postvocalic /s/

Candidate	ONS	*s\$	*\$h
la.se.ma.na			
la.he.ma.na			!*
las.e.ma.na	!*	*	
lah.e.ma.na	!*		
la{-h}e.ma.na			!*
la{-s}e.ma.na		!*	

### 8. A constraint-based model of initial /s/-reduction

The most innovative Spanish dialects are those in which word-initial postvocalic /s/ is already aspirated. Intuitively, as suggested by earlier analyses, these dialects differ from those studied above in that prevocalic /s/ is aspirated on EITHER side of a word boundary, presumably the result of extensive ambisyllabification of word-final prevocalic consonants, later extended to encompass word-initial postvocalic consonants, not through a need to create syllable onsets, but merely as an analogical misanalysis typical of isolated dialects lacking a strong normative tradition. These dialects in effect allow 'slippage' in the creation of ambisyllabic consonants, which now reassociate not only rightwards but leftwards as well. With an OT/Generalized Alignment model, these dialects require an additional constraint: **AMBISYLLABIC** (AMBI) REQUIRES an ambisyllabic linking of a word-initial consonant preceded in the appropriate syntactic/prosodic configuration by a vowel-final word. Word-INITIAL postvocalic consonants are not made ambisyllabic in most Spanish dialects, since the principal function of resyllabification, hence ambisyllabicity, is avoiding onsetless syllables (e.g. Kahn 1976; McCarthy and Prince 1993: 130; Kenstowicz 1994: 281), especially the combination C\$V, the maximum possible contravention of sonority sequencing. In Spanish dialects in which word-initial postvocalic /s/ is aspirated, the resulting constraint ranking is:

(5) ONS >> AMBI >> \*s\$ >> \*\$h

This is the same relative ranking as in dialects which aspirate word-final prevocalic /s/ (with the additional intercalated **AMBI** constraint), since word-initial /s/ is only aspirated in dialects which also aspirate word-final prevocalic /s/. Tableau 4 provides representative configurations:

Tableau 4: aspiration of word-initial postvocalic /s/

Candidate	ONS	AMBI	*s\$	*\$h
la.se.ma.na		!*		
la.he.ma.na		!*		*
las.e.ma.na	!*	*	*	
lah.e.ma.na	!*	*		
la{-h-}e.ma.na				*
la{-s-}e.ma.na			!*	

The OT analysis is in accord with what is known about the diachronic

evolution of Spanish dialects, in that the following stages can be identified: (1) aspiration of syllable-final /s/ but no aspiration in word-final prevocalic contexts; (2) extension of aspiration as in (1) to also include word-final prevocalic environments; (3) extension of aspiration as in (1) and (2) to also encompass word-initial postvocalic /s/. The transition from stage (1) to stage (2) comes through reordering the constraints \*s\$ and \*\$h, in effect facilitating not only rightward resyllabification of word-final prevocalic consonants, but also creating ambisyllabic configurations. At this juncture the general Spanish avoidance of leftward misalignment is still in effect. In dialects characterized by isolation and drift, the proscription of leftward realignment of word boundaries is loosened, as represented by the addition of the constraint **AMBI**, which allows leftwards ambisyllabification.

### 9. Extensions of the present analysis to other word-final consonants

An additional dividend of this analysis is its potential extension to other phenomena affecting Spanish word-final consonants. The most noteworthy process is velarization of word-final /n/, a phenomenon affecting numerous dialects in Spain and Latin America. There are some dialects in which word-final prevocalic /n/ remains as an alveolar (e.g. *son otros, un ogro*) while velarizing in phrase-final contexts (in preconsonantal environments, homorganic assimilation to the following consonant is the normal result). There are, however, many Spanish dialects in which extension of velarization to word-final prevocalic environments is the norm (*son otros* [so otros]). This process has represented a dilemma to phonologists, since Spanish does not allow syllable-initial [ŋ] (indeed, most native speakers of Spanish are hard-pressed to articulate such a sound), and when forced to pause in the midst of a combination such as *bien hecho*, Spanish speakers inevitably place the pause after the /n/, despite the fact that there is no perceptible pause in connected speech, which sounds as though the usual resyllabification had taken place. A similar set of constraints will account for the dialectal differences in Spanish, including **ALIGN-L** ([n], σ) (\*n\$), which disallows syllable-final [n] in velarizing dialects, and **ALIGN-R** ([ŋ], σ) (\*\$ŋ), which disallows syllable-initial [ŋ]. Spanish dialects which do not extend word-final velarization of /n/ to prevocalic environments rank \*\$ŋ higher than \*n\$. Dialects which velarize word-final prevocalic /n/ reverse the order of these constraints. Tableaux 5 and 6 show the results.

It is significant that among all Spanish dialects which both aspirate /s/ and velarize /n/, there is no known dialect which consistently aspirates word-final prevocalic /s/ but does not extend word-final velarization of /n/ to prevocalic environments, nor conversely are there dialects which velarize word-final prevocalic /n/ but fail to aspirate word-final prevocalic /s/. This confirms earlier intuitions (e.g. Lipski 1988) to the effect that a single set of constraints affects the entire gamut of word-final consonantal modifications. To aspiration



of /s/ and velarization of /n/ can be added vocalization of /l/ and /r/ in the Cibao region of the Dominican Republic, assibilation of final /r/ in Ecuadoran Spanish, and lateralization of word-final /r/ in many Caribbean Spanish dialects.<sup>3</sup>

Tableau 5: no extension of word-final [ɾ] to prevocalic contexts

Candidate	ONS	ALIGN-R	*\$ <sub>ɾ</sub>	*n\$
un.a.ni.mal	!*			*
u <sup>h</sup> .a.ni.mal	!*		*	
u.na.ni.mal		!*		
u. <sup>h</sup> a.ni.mal		!*	*	
u{-n-}a.ni.mal			!*	
☞ u{- <sup>h</sup> -}a.ni.mal				*

Tableau 6: velarization of word-final prevocalic /n/

Candidate	ONS	ALIGN-R	*n\$	*\$ <sub>ɾ</sub>
un.a.ni-mal	!*		*	
u <sup>h</sup> .a.ni.mal	!*			
u.na.ni.mal		!*		
u. <sup>h</sup> a.ni.mal		!*		*
u{-n-}a.ni.mal			!*	
☞ u{- <sup>h</sup> -}a.ni.mal				*

## 10. Conclusions

The constraint-based analysis of Spanish /s/-reduction captures the notion that rightward misalignment through resyllabification is the norm in Spanish, whereas leftward misalignment only occurs in dialects in which massive rightward misalignment is combined with an absence of normative pressure. One of the principal advantages of the present analysis is that all facets of Spanish /s/-reduction (and similar processes affecting word-final consonants vis-à-vis resyllabification) are accounted for by a single unified family of alignment constraints, all of which are widely attested cross-linguistically. Spanish /s/-reduction creates a complementary distribution between [s] and [h], as well as a redefinition of the phonetic signalling of word boundaries in connected speech;

relative alignment with respect to syllable and word boundaries circumscribes the possible outcomes, and an analysis based on ranked constraints captures the facts of inter-dialectal variation. Velarization of word-final /n/ creates a similar complementarity between [n] and [ɳ], whence the similarity in the extension of /n/-velarization to word-final prevocalic contexts. The same holds for liquid vocalization in Cibaeño Spanish, where the semivocalic [i] occurs only rhyme-finally, and differs phonetically from the (onset-initial) realization of /y/ in Dominican Spanish. The [i] resulting from word-final liquid vocalization is never resyllabified as an onset, even in very close syntactic juncture (Alba 1979: 7, 11; Guitart 1980). The same holds for semivocalic word-final [i] in other dialects (cf. Harris 1983: 61); *hay algo* is never resyllabified as \*[a-ial-ɣo], even in dialects in which /y/ is realized as a very weak approximant. The very infrequent extension of word-final lateralization of /r/ (as in *comer algo*) may be due to the fact that the (coda-final) [l] resulting from lateralization of /r/ is identical to the onset-initial [l] which instantiates /l/ in all Spanish dialects; thus no syllabic alignment constraints can appropriately allow for lateralization of word-final prevocalic /r/ while disallowing lateralization of word-internal intervocalic /r/.

The present analysis offers the additional dividend of providing a refined perspective on the epiphenomena of rule ordering and accommodation of ordered rules within a constraint-based framework. In traditional generative phonological terms, resyllabification and word-final /s/ aspiration are in a 'counter-bleeding' relation in dialects in which word-final /s/ aspirates even before a following vowel-initial word. McCarthy (1997) and Roca (1997: 7-9) demonstrate the fundamental incompatibility of counter-feeding and counter-bleeding order with OT, since the results are superficially opaque and therefore less optimal than a configuration in which all constraints have simultaneously operated on the underlying representation. McCarthy (1997) and others have proposed 'Sympathy' as a means of obtaining as the preferred candidate the same result as ordered counter-feeding or counter-feeding rules. In the case of Spanish word-final /s/-aspiration and similar processes, the fact that aspiration occurs in an ambisyllabic environment entails that strictly speaking resyllabification (i.e. ambisyllabification) does not stand in a counterbleeding relationship to /s/-aspiration: an ambisyllabic word-final prevocalic /s/ still meets the structural description for /s/-aspiration, since it is partially linked to the syllabic rhyme. Thus the key factor determining whether word-final prevocalic /s/ is aspirated is whether the particular dialect finds (partially) syllable-final [s] or (partially) syllable-initial [h] least tolerable. The differing ranking of these constraints within OT accounts for the inter-dialectal data. Given that /s/-aspiration occurs in an ambisyllabic environment, issues of rule ordering vanish; the apparent opacity of re(ambi)syllabified word-final prevocalic [h] is mitigated by the fact that this consonant never fully separates from the rhyme of the preceding syllable. Once /s/-reduction is depicted as the

result of the simultaneous interaction of ranked constraints, the ordering paradoxes of previous analyses are overcome. There is no need to postulate separate rules, ordered rules, mirror-image environments, or rule generalization. A greater degree of unification of consonantal reduction phenomena is possible within this framework. The preceding analysis is consistent with the growing evidence that alignment is one of the fundamental bases for phonological constraints, very possibly the source for all optimality constraints.<sup>4</sup>

## Notes

1. However, by requiring that FSR be ordered before resyllabification, syntactic boundaries are still present in disguised form: the existence of a rhyme-final [h] immediately followed by a vowel can only indicate the presence of a word boundary prior to resyllabification, by both language-specific and universal syllabification conventions.
2. It might be objected that the interpretation just offered violates the Linking Constraint (e.g. Hayes 1986), or the Uniform Applicability Condition (cf. Schein and Steriade 1986) according to which association lines in phonological rules are interpreted as exhaustive. The Linking Constraint is typically invoked to account for such phenomena as geminate inalterability, whereby rules distinctively affecting geminate consonants cannot operate upon singly linked consonants, and vice versa. In these circumstances, the association lines referred to in the Linking Constraint are those linking phonological matrices and skeletal slots: a geminate segment consists of a single phonological matrix linked to two skeletal slots. An ambisyllabic consonant, however, consists of a single phonological matrix AND a single skeletal slot; the multiple linking takes place between skeletal slots and the syllabic tier. Although the same formalism is used to depict autosegmental association between phonological features and skeletal slots as between the skeleton and syllabic nodes, two different types of association are involved. Autosegmental association involves temporal relations of simultaneity and successivity (cf. McCarthy 1989, Sagey 1988). Association to the syllabic tier, on the other hand, involves a more abstract level of constituency, in which considerations of linear order are derivative, rather than basic. The Linking Constraint need not apply to syllabic association (although Kahn 1976 makes rules such as aspiration of voiceless stops in English contingent upon non-ambisyllabicity), and therefore FSR can apply both to unambiguously rhyme-final /s/ (preconsonantal and prepausal) and to ambisyllabic /s/ (following resyllabification).
3. Occasionally the final /n/ of a prefix is velarized, by analogy with the word-final process (e.g. *enaltecer* [e.ˈalteser] 'to exalt,' *inhumano* [i.ˈumano] 'inhuman'; cf. Cedergren and Sankoff 1975). To date there are no known Spanish dialects which allow for leftwards velarization of word-initial

postvocalic /n/, which would be homologous to aspiration of word-initial /s/. I have heard fleeting examples such as [tuˈombre] for *tu nombre*, which are incipient cases of leftward velarization, but perhaps because velarization of /n/ is so strongly associated with word-final position, extension of velarization to word-initial /n/ has not become generalized.

4. The reduction of allomorphy in Spanish /s/-reduction through the extension of the process to all word-final environments—including prevocalic cases which entail some sort of resyllabification—is consistent with Correspondence Theory (McCarthy and Prince 1995), which favors identity between input and output forms. Correspondence Theory predicts paradigmatic uniformity among derived items; thus, for example, an input containing a string such as Spanish [kása] < /kasas/ 'house (pl.)', whose [h] stems from avoidance of a constraints such as \*s\$, would preferentially maintain this [h] even in the face of potential resyllabification.

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