BLOCKING OF SPANISH /S/-ASPIRATION: THE VOCALIC NATURE OF CONSONANTAL DISHARMONY*

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Many dialects of Spanish, in southern Spain, the Canary Islands and the Caribbean, are noted for reduction of syllable- and word-final /s/ to [h], en route to complete elision of /s/. In several of these dialects, particularly in Andalusia, there is a strong tendency for aspiration of word-final prevocalic /s/ to be blocked when the immediately following consonant is /x/: *los hijos* [losího(h)] vs. *los otros* [lohótro(h)]. The alternative is complete loss of /s/ in the same contexts. Both reactions occur in dialects where the posterior fricative /x/ is realized as [h], identical to the phonetic results of /s/-reduction. This avoidance of identical consonants appears to signal the operation of the Obligatory Contour Principle, disallowing identical adjacent feature matrices. However, it is argued that consonantal disharmony is not involved, but rather the unique configuration represented by a vowel flanked by [h]. The two instances of [h] are analyzed as [-voice] specifications added to the feature geometry defining the intervening vowel. Since these features are added before the default [+voice] feature of the vowel has been inserted by a redundancy rule, the latter cannot operate without violating the universal constraint on crossing of association lines.

1. INTRODUCTION

1.1. One of the major achievements of contemporary phonological theory is the acknowledgement that phonological features are mutually interdependent, and are arrayed in hierarchical structures, whose topological particulars are reflected in processes that affect selected groups of features in an implicational fashion. Another theoretical advance is the awareness that autosegmental linking and spreading can affect features other than tone, and in particular is the model best suited to describe harmony processes. The combination of 'feature geometry' models (cf.

Clements 1985, 1987; McCarthy 1988; Sagey 1986) and autosegmental analyses of harmony and assimilation have yielded the highly constrained claim that all phonological processes involving linking or delinking take place under strict adjacency, on some tier (cf. Archangeli and Pulleyblank 1987). Finally, the Obligatory Contour Principle (OCP), stating in essence that identical adjacent matrices are disallowed, makes important claims regarding phonological derivations (cf. McCarthy 1986). The OCP requires that, e.g., long vowels and geminate consonants be dually linked to a single feature matrix. Varying interpretations of the OCP have been proposed to deal with cases in which identical matrices become adjacent during the course of a phonological derivation, through morphological adjunction, syncope, etc. If such adjacency occurs, either obligatory dual linking may take place, or dissimilatory effects may alter one or both of the segments in question. There is also a body of evidence that the OCP acts not only as a passive filter, such as a morpheme structure constraint, but can also block the application of rules which would create an unresolvable adjacency of identical feature specifications (cf. Yip 1988).

1.2. The theoretical proposals just mentioned have been combined in an attempt to account not only for vowel harmony/disharmony, but also for harmony processes involving consonants. One important question concerns the relative scarcity of long-distance harmony of syntagmatically non-adjacent consonants (i.e. for which vowels are transparent), compared to the high frequency of vowel harmony processes which take place across intervening consonants. This asymmetry can be accounted for by positing that the geometrical representation of vowels in some sense 'protrudes beyond' the phonological structure of consonants, thus allowing non-adjacent vowels to 'pass over' consonants which lack the superstructure in question. This is commonly done through the postulate of some sort of Secondary Articulator node or cluster. An alternative approach is to posit different levels of 'tier scansion' (cf. Archangeli and Pulleyblank 1987), based on the

level(s) of prosodic structure which a rule scans to define its input. Rules exhibiting 'minimal scansion' operate on the lowest tier on which the features required for the rule are defined; this generally requires adjacency of both vowels and consonants. A rule utilizing 'maximal scansion' will scan the broadest possible prosodic constituents containing the elements in the structural description: syllable heads for vowels and the skeleton for consonants. Long-distance effects are thus predicted for vowels (since consonants can intervene between syllable heads), but not for consonants (since skeletal adjacency is required).

In languages which freely admit consonantal harmony/disharmony processes, most analyses postulate that vowels and consonants occupy separate tiers, at least during the early stages of phonological derivations. This claim is easy to sustain for languages characterized by template morphology, such as the Semitic family. For languages lacking independent morphemes defined by templates, it is necessary to discover predictable C-V patterns for syllables or roots, so that segments need not be linked to the skeleton in the underlying representation, thereby effectively allowing vowel/consonant separation.

1.3. All of the theoretical claims just mentioned are backed by significant research paradigms, and contribute integrally to the evolution of a tightly constrained and maximally universal theory of phonology. Any challenges to this integrity are therefore of interest, for they require either calibration of the theory or new insights into the nature of the proposed counterexamples. The present study deals with an ostensibly problematic case, in which certain Spanish dialects exhibit consonantal disharmony phenomena in apparent defiance of accepted models of feature geometry and consonant/vowel separation. It will be shown that, although the OCP is indeed involved, trans-vocalic consonantal harmony is not at issue. In the dialects under discussion, what initially appears to be an OCP effect involving consonants in fact is a manifestation of contradictory feature specifications on a single intervening VOWEL. The results simultaneously provide support for the lack of

consonant/vowel separation in languages like Spanish which contain neither template morphology nor completely predictable CV patterns. Also supported is the action of the OCP to block application of a general rule, when identical adjacent feature values would arise as a result.

2. SPANISH /S/-REDUCTION AND BLOCKING EFFECTS

2.1. Spanish, like most other Romance languages, is not noted for the existence of consonantal harmony processes. In certain dialects, vowel harmony phenomena are found, which show that autosegmentalization of vocalic features is a viable option in Spanish.[1] Spanish does not normally exhibit consonant harmony/disharmony or other evidence of separate vowel and consonant tiers. There is one interesting exception to the latter generalization, involving the reduction of /s/ to [h] in many dialects, and the interaction of this process with the realization of the posterior fricative usually represented as /x/. In essence, in a broad cross-section of Spanish dialects the combination [...hVh...] is avoided, i.e. two instances of an aspiration or laryngeal fricative separated by a vowel, whether the [h] results from reduction of /s/, or from an instantiation of the 'velar' fricative /x/, which in these dialects is more properly represented as /h/. The configuration [...hVh...] is usually avoided through retention as [s] of an /s/ which would ordinarily undergo weakening to [h], in circumstances where [...hVh...] would result. The precise configurations for blockage of /s/-reduction vary among dialects, as do collateral manifestations of the avoidance of [h...h] sequences. The issue of avoiding a close succession of [h]'s has most often been noted for Andalusian dialects, but comparative evidence suggests a more fundamental constraint common to all Spanish dialects which combine weakening of /s/ with realization of /x/ as [h]. The initial impression that blockage of /s/-reduction occurs only across word boundaries is disconfirmed by closer scrutiny of consonantal behavior in a variety of Spanish dialects. It

will be suggested below that both the blockage of a usually general rule and the frequent presence of a word boundary in the conditioning environment are epiphenomena of a completely general phonological constraint.

2.2. The most frequently recurring prohibition of [...hVh...] sequences occurs in conjunction with the weakening of /s/ to [h]. Moreover, the most transparent cases involve reduction of word-final /s/ before vowel-initial words. This is therefore a useful departure point for the study of a general pattern of Spanish consonantal behavior.

In many Spanish dialects, including those of southern and western Spain, the Canary Islands, the Caribbean region and much of Central and South America, syllable- and word-final /s/ suffers frequent weakening. The most common result is a weak aspiration [h]; total elision frequently occurs phrase-finally and/or in rapid speech. Historically, aspiration of /s/ appears to have begun in preconsonantal contexts; whether word-internal or word-final preconsonantal contexts were the first to suffer reduction is the subject of an unresolved debate (cf. Lipski 1984; Seklaoui 1989:22; Terrell 1979, among others). There are still dialects in which only preconsonantal (and sometimes phrase-final) /s/ is reduced, e.g. the upper sociolects of Buenos Aires, Montevideo and Lima. In more 'radical' Spanish dialects (a term borrowed from Guitart 1978), aspiration of word-final /s/ is normally extended to prevocalic contexts: *los amigos* [lohamígoh].

In general, word-final /s/-aspiration (SA) is not directly affected by the phonological shape of a following word, except for the nature of the initial segment (consonant, stressed or unstressed vowel). Since a word-final /s/ before a consonant-initial word remains in syllable-final position, reduction to [h] normally occurs. In dialects where weakening of final /s/ is categorical, a following word-initial unstressed vowel yields rates of SA comparable to preconsonantal contexts. In some Spanish dialects where SA is common, the presence of a word-initial STRESSED vowel represents a partial barrier to reduction of word-final /s/ (cf. Alvar, et al. 1973; Guitart 1981, 1982; Harris 1983:46-7;

Lafford 1982; Lipski 1984; Seklaoui 1989; Terrell 1977, 1979, 1981, 1983 and the references contained therein). The most convincing cases involve the combination DETERMINER + NOUN, as in *las once, mis únicos, estos otros*, etc. The precise syntactic and metrical conditioning responsible for the inhibiting influence of the stressed vowel continue to be the subject of intense analysis, and will not be pursued further in the present study. The remaining remarks will be limited to Spanish dialects for which word-initial stressed vowels present no particular obstacle to final SA, even in DETERMINER + NOUN combinations. This includes nearly all of Andalusia, much of the Canary Islands, and the more radical dialects of the Caribbean.

2.3. Under normal circumstances only the first segment of a following word can potentially influence word-final SA; an exception occurs in dialects in which the posterior fricative is also realized as [h], similar or identical to the result of word-final prevocalic SA. Word-final prevocalic SA is blocked when the following word contains [h] in the onset of the immediately following syllable: *los hijos* [losího(h)], *los ajos* [losáho(h)], *los ojos* [losóho(h)]. Blockage of SA before a following [h] may even occur before word-initial UNSTRESSED vowels, a context in which SA is otherwise categorical in the same dialects: *mis hijitos* [misihíto(h)], *más ajenos* [masahéno(h)]. The blockage of SA before [h] takes one of two forms. The most common is the failure of SA to apply, retaining word-final /s/ as [s]. The alternative is complete deletion of word-final /s/, which is otherwise a rare outcome of prevocalic /s/-reduction in these dialects.

The blockage of SA only occurs when [h] is the immediately following consonant, with an intervening vowel. If one or more consonants intervene between the word-final /s/ and [h], SA is not blocked: *las orejas* [lahoréha(h)], *los ángeles* [lohánhele(h)]. In the dialects under consideration, blockage of word-final prevocalic SA is general when the first consonant in the following word is onset-INITIAL [h], and occurs only sporadically when the immediately following consonant is syllable-FINAL [h] < /s/: *los astros*

[lohάhtro(h)]-[losάhtro(h)] (cf. Torreblanca Espinosa 1976:58). The latter cases will be reanalyzed below.

2.4. The inhibition of final SA has been noticed by Spanish dialectologists, whose comments are instructive in demonstrating that more than an occasional coincidence is at stake. A perusal of some of the accounts provides insight into native speakers' intuitions concerning disharmonic processes.

Carbonero (1982:33), describing the speech of Seville, notes that:

> la s se pronuncia con regularidad cuando en la sílaba siguiente aparece el sonido j, para evitar la posible cacofonía que produciría la presencia de dos sonidos similares tan cercanos: no se dice "loh oho" sino *los oho* 'los ojos'; ni "loh iho" sino *los iho* 'los hijos'.

Vaz de Soto (1981:79), describing the same dialect, states:

> ... no es raro que reaparezca la 's', sobre todo en pronunciación culta o cuidada ... y siempre, por razones de eufonía, si sigue una 'j' en la sílaba siguiente: 'los-ojo' ... 'mis ijo' ... 'dos-ajo'.

Torreblanca Espinosa (1976:58), studying a dialect of southeastern Spain, declares:

> en el habla de Villena, hay otra posición donde el alófono [s] se conserva al final de palabra: cuando, en la palabra siguiente, aparece una fricativa laríngea, al final de la primera sílaba, o una fricativa faríngea, inicial de la segunda sílaba. Ejemplos: [lasăhpä:] "las aspas", [dosóho:] "dos ojos".

Rodríguez Castellano and Palacio (1948:591-2), commenting on a central Andalusian dialect in which SA is nearly categorical, note that:

> entre personas campesinas de avanzada edad, no se aspira esta s en palabras que tienen otro sonido aspirado, de cualquier origen que sea ... y se comprende que sea así, pues aunque la tendencia a aspirarse la *s* es general, en este caso tenía que hacer excepción por un sencillo motivo de disimilación. El que no se diga **loh oho* "los ohos" se debe a la misma razón que ha im-

> pedido el mantenimiento de la h en la forma etimológica hiho (<filiu).

Cummins (1974:72) gives numerous cases of alternation between [s] and [h] for word-final prevocalic /s/ in southwestern Spain; although [s] does occasionally occur when the first consonant following the word-initial vowel is other than [h], /s/-reduction is uniformly blocked by the presence of a following [h]: [seis ihu] *seis hijos*, etc.[2] In the Canary Islands, where final SA is categorical in nearly all regional dialects, Catalán (1960) also notes blockage of final SA when two 'aspirations' would occur in close succession.

> La [s] surge, no sólo en el habla cuidada de la oratoria, sino conversacionalmente siempre que se entrecomilla o subraya una palabra; y desde luego, es aún obligada, en ciertos casos, cuando queda intervocálica por fonética sintáctica ... el progresivo desvinculamiento de la -[h] implosiva respecto al fonema /s/ se patentiza en la tendencia marcada del habla popular a preferir la -[h] ... en la mayor parte de las situaciones en que se convierte en explosiva por fonética sintáctica; sólo en las voces en que hay otra aspirada en la sílaba inmediata triunfa la -[s] por disimilación ... *únos-óhoh, grándes-ohoh, ésos-ahnoh ... nos-ábreh la puérta, cómpras-óhah ...*; en las voces esdrújulas la disimilación se produce aunque medie una sílaba átona entre las dos aspiraciones: *fiéras-águilah, los-útileh de trabáho* ... y, en contra-partida, no ocurre la disimilación en las voces agudas, pese a la aparente proximidad de las dos aspiradas: *máh atráh, báh atráh ... noh iráh a desir ...*

Catalán's description suggests an even longer-range disharmonic effect, but the inhibiting effects which he ascribes to [h] in combinations like *los útiles* is in reality a manifestation of the well-attested inhibition of SA before stressed vowels in DETERMINER + NOUN combinations.

The maps of the *Atlas lingüístico y etnográfico de Andalucía* (Alvar et al. 1973) provide limited confirmation of the blocking of /s/-reduction before [h], despite the fact that only citation forms were used, rather than examples from connected speech. The two relevant test items are *los ojos* (map 1631) and *los árboles* (map 1632). In both cases, the final /s/ of a determiner is followed by a stressed word-

initial vowel, a context typically favorable to the retention of /s/ as [s] even in /s/-reducing dialects. Indeed the /s/ of *los* in *los árboles* emerges as a sibilant in many regions, but among more radical dialects of eastern Andalusia, aspiration to [h] is also frequent. In some eastern Andalusian zones, the final /s/ disappears altogether, laxing the preceding vowel. In the case of *los ojos*, the final /s/ of los is uniformly a sibilant (except for some cases of total loss in eastern Andalusia). Significantly, the sibilant pronunciation is found even in those areas where final /s/ is aspirated in *los árboles*. No cases of the contrary distribution are found, i.e. where the first /s/ in *los ojos* is pronounced as [h] or elided, while the first /s/ in *los árboles* is pronounced as a sibilant. Given the nature of the sample, these data are not conclusive in themselves, but they confirm the implicational relation described above.

In Latin American Spanish, blocking of /s/-reduction is not widely documented, although careful observation of many dialects reveals configurations comparable to those found in Andalusia. In one of the few explicit descriptions, Castelli and Mosonyi (1986:117) give data from Venezuelan Spanish:

> Las palabras bisílabas que comienzan fonéticamente en vocal acentuada y cuya primera consonante es el fonema /h/, no permiten la aspiración de /s/ final de la palabra anterior.

As examples, the authors cite *los ojos, buenos hijos* and *unos ajos*. The restriction of SA blockage to disyllabic words appears to be coincidental; Spanish contains relatively few proparoxytones of the form *Vh...*, but it is likely that a combination such as *los ágiles* would also impede final SA in the same dialect.

Another environment not explicitly mentioned in the published literature, but in which blockage of SA is observable to a lesser degree, involves word-final /s/ when an instance of [h] PRECEDES: the final /s/ in *cajas especiales, ojos abiertos, coges algo*, etc. also resists weakening to [h] in dialects where final SA is generalized. In recorded field interviews by the present writer this trend has been observed

in Seville, the Canary Islands, and in several Caribbean dialects, including Cuban, Panamanian, and Puerto Rican. No quantitative data will be presented here, since the text frequency of the sequence /...hVs#V.../ is too low to be statistically significant. Previous quantitative studies have not focused on this environment, since attention has been limited to the context immediately FOLLOWING word-final /s/ and its effects on SA.

Instead of blocking SA, an alternative route of evolution is followed in some dialects in which /x/ is realized as [h]: word-final prevocalic /s/ simply disappears when /x/ is the immediately following consonant (e.g. Carrasco Cantos 1981:82, García Martínez 1986, Moya Corral 1979, Zamora Vicente 1943). Equally significant is the behavior of word-final prevocalic /s/ before a following [h] in dialects where SA is categorical, but in which the phonetic realization of intervocalic /x/ is significantly different from that of word-final prevocalic reduced /s/ > [h]. For example, Salvador (1957:225) finds it noteworthy that in the Andalusian dialect of Cúllar-Baza, reduction of word-final prevocalic /s/ is not blocked by the presence of /x/ in the following syllable 'como ocurre en otros lugares.' In the Cúllar-Baza dialect, final /s/ is elided rather than aspirated in this context, so the sequence [...hVh...] is avoided.

2.5. In partial summary, the data just surveyed give evidence of systematic, although not exceptionless, blockage of final SA before word-initial (usually stressed) vowels followed by [h], with the latter consonant preferably in intervocalic position. The inhibiting effect of initial stressed vowels on SA is combined with the avoidance of [...hVh...] to provide an especially propitious environment for the observation of consonantal disharmony. DETERMINER + NOUN combinations involving commonly-used nouns, e.g. *mis hijos, dos ojos,* provide frequently recurring syntagms in which avoidance of SA can be implemented. Speakers are likely to internalize such frequent combinations and to consistently realize the article with final [s]. Blockage of final SA in infrequent combinations such as *niños ágiles, más ajeno,* or *tienes ajo* is less apt to be no-

ticed, since the first time such a combination is pronounced, a speaker is likely to apply final SA in the normal fashion. If the combination recurs frequently enough to provoke the cumulative malaise which ultimately triggers disharmony, only then might SA be consistent enough as to be noticed. This accounts for the fact that explicit mention of blockage of SA nearly always involves DETERMINER + NOUN pairs.

There are additional circumstances in which the same disharmony phenomena may be observed. One case occurs in many regional dialects of El Salvador and Honduras, where word-INITIAL /s/ is subject to reduction when following a vowel-final word (Lipski 1983, 1985, 1986). In practice, initial SA usually occurs in closely-knit syntactic configurations, such as DETERMINER + NOUN (*la semana*), ADVERB + CLITIC (*no se puede*), NOUN + ADJECTIVE or ADJECTIVE + NOUN (*parque central, cincuenta centavos*), etc. A scan of an extensive corpus of recorded material fails to reveal a single instance of initial SA when the syllable immediately following the /s/ contains [h]: *la cejuda, lo sujetaron, una sajadura,* etc. Due to the scarcity of configurations allowing this assertion to be tested, the conclusions are suggestive rather than definitive, but the general patterns of initial SA in these Central American dialects fall in line with the behavior of final SA in southern Spanish and Caribbean dialects.

2.6. The phenomena described above all involve the presence of a word boundary, the extension of an originally syllable-final SA to intervocalic contexts through the juxtaposition of a vowel-initial word. In the case of word-initial SA in Central American dialects, the syntactic conditioning appears to result from a fleeting misanalysis of the position of the word boundary. If the avoidance of [...hVh...] combinations is the result of OCP-induced consonantal disharmony or similar constraints based on phonological adjacency on some appropriate tier, then there should be no necessary syntactic conditioning. In fact, the constraint in question does hold word-internally; its effects are obscured by the scarcity of opportunities for

observation of the disharmony. There are two phenomena which provide corroborative data; one is the blockage of word-internal SA adjacent to [h], and the other is a global morphophonemic constraint against underlying /...hVh.../ combinations.

In the same Central American dialects where word-initial /s/ is weakened, the change /s/ > [h] occasionally affects word-INTERNAL intervocalic /s/, particularly before unstressed vowels.[3] In Honduran/Salvadoran Spanish, reduction of word-internal intervocalic /s/ is never as common as in contexts involving /s/ adjacent to a word boundary, but at the vernacular level it is common to hear words like *casa, cosa, presidente,* etc. pronounced with intervocalic [h]. A scan of the same corpus fails to produce a single case where aspiration of intervocalic /s/ would produce a [...hVh...] sequence: *Josefina, pasajero, pajizo, anglosajón, agasajar, masajista,* and the like never exhibit the change /s/ > [h]. The low text frequency of probative cases makes the evidence more circumstantial than conclusive, but there is consistency with previous results.

In many languages, OCP effects involving sequences of nonadjacent segments do not directly manifest themselves by blocking or triggering rules, but may exist as more subtle morpheme structure constraints whose synchronic existence at times emerges only upon a detailed quantitative cross-section. For example, Mester (1986) verifies the existence of OCP effects and hierarchically arranged feature tiers in Javanese by computing co-occurrence frequencies for a large number of Javanese morphemes. Such morpheme structure constraints, while formally describable by the OCP, may become partially lexicalized across time, admitting lexical exceptions particularly among recent borrowings or neologisms. OCP effects may represent the results of gradual evolution, and occasional exceptions do not necessarily invalidate the postulate of OCP-induced co-occurrence constraints. In scanning the Spanish lexicon, it becomes apparent that for all practical purposes, Spanish lacks morpheme-internal sequences of the type /...xVx.../ or /...hVh.../. Combinations in which another consonant intervenes, such as *Jorge, ajonjolí, jengibre,* etc., demon-

strate that consonants block the OCP effects triggered by two instances of /x/ separated only by a vowel, and provide further support for the analysis to be proposed in Section 5. The handful of Spanish words containing /...xVx.../ sequences have a vanishingly low frequency in normal speech, are borrowings from non-Romance languages, and often prevail in dialects where /x/ is given an obstruent (e.g. [+high]) pronunciation: *jején* 'gnat,' *jeja* 'white wheat,' *jijallo* 'a type of bramble,' *jojoto* 'immature corn' [Venezuela], *jojana* 'mocking tone of voice,' *jajá* 'type of bird' [Argentina], *Gijón* 'a city in northern Spain,' *Jujuy* 'a city in northern Argentina,' etc. The reasons for the low frequency of /...xVx.../ combinations in Spanish may originally have been accidental, reflecting the early Romance sources of modern Spanish /x/. The latter sound (which was pronounced [s] or [z] in medieval Spanish) comes from a variety of sources, including the intervocalic cluster /-kl-/ (e.g. *oculu* > *oclu* > *ojo*), the combination /li/ (e.g. *filiu* > *hijo*), the combination /-ks-/ (e.g. *fixu* > *fijo*), initial /g-/ (e.g. *gentem* > *gente*), and several other possibilities. Rarely in Romance did more than one of these proto-sources of /x/ appear in close succession, separated only by a vowel.

Aside from the relative scarcity of /...xVx.../, the reluctance of native speakers to freely accept such combinations is somewhat unusual in Spanish, where combinations of identical consonants separated by a single vowel are not uncommon. Certainly /...kVk.../ and /...gVg.../ sequences are not infrequent (although the very term *cacofonía* suggests that some speakers may find the combinations less than euphonous), so that neither [+back] or [+high] is necessarily implicated in the general avoidance of /...xVx.../ sequences. Similarly, sequences of identical labial, dental, and palatal consonants are evidently not excluded by morpheme-structure constraints of the OCP type, although there exist few phonological processes operating intermorphemically which would further test the possibility of OCP-based co-occurrence restrictions.[4]

2.7. The existence of word-internal avoidance of [...hVh...] provides additional support for the notion that some type of OCP-induced phenomenon is at stake. The presence of word boundaries is not crucial to the constraint, although combinations involving word-final SA provide the most common test cases. Once expanses larger than a single word are involved, additional prosodic conditioning must be invoked. Given the variability of SA reduction in different environments, the precise domain of the constraint is not clear, but the largest expanse appears to be the clitic group (in the sense of Nespor and Vogel 1986). This accounts for the frequent blockage of SA in DETERMINER + NOUN and ADJECTIVE + NOUN combinations. Occasionally the entire phonological phrase may be at stake, as suggested by Catalán's example of *compras hojas*, a V + DO sequence.[5]

2.8. Due to the phonotactic distribution of Spanish /s/ and /x/, when avoidance of [...hVh...] is manifested by blockage of SA, the /s/ in question occupies the first of the two relevant consonantal positions, while the following [h] is a realization of the posterior fricative /x/. For most Spanish dialects,[6] the only way in which [...hVh...] could arise from *two* instances of underlying /s/ would be in the configuration /...s#VsC/, as in *las hostias, los ostiones, estos asnos*, etc. Torreblanca's (1976) citation of SA blockage in *los astros* and *las aspas*, and Catalán's (1960) observation of SA blockage in *esos asnos* both give avoidance of [...hVh...] as the motivating force. However, syllable-final [h] < /s/ does not routinely trigger SA blockage in any /s/-reducing dialect; otherwise, we would expect frequent retention of /s/ as [s] in *hijastro, es esto, eres español, tienes asma, las cajas, tu gesto*, etc. In fact, such combinations do not trigger SA blockage with anything approaching the regularity of combinations in which the second [h] is intervocalic, as in *más ajo*. In the phrases *esos asnos* and *las aspas*, the well-documented inhibition of final SA before stressed vowels in DETERMINER + NOUN groups is the decisive factor; the fact that a syllable-final /s/ is realized as [h] following [...hV] does not usually override an otherwise expected SA. In

other words, the true sequence avoided by blockage of SA is [...hVhV...]. The fact that not all instances of [h] are 'equal' in blocking SA must be accounted for in any comprehensive analysis of these disharmonic phenomena.

3. DOES SPANISH DEMONSTRATE CONSONANT/VOWEL TIER SEPARATION?

3.1. The preceding section has shown that in a subset of Spanish dialects, general phonological rules are blocked or triggered (SA and /s/-deletion, respectively), in order to avoid derivations producing [...hVhV...] sequences as output. The blocking of rules or the prompting of a 'repair strategy' (cf. Paradis 1988) in order to avoid identical adjacent feature specifications is the signature behavior of the Obligatory Contour Principle. In the Spanish data under discussion, the two instances of [h] are not syntagmatically adjacent, and any analysis claiming inter-consonantal OCP effects must define a suitable feature geometry, in which the consonants in question are adjacent on some plane (cf. Mester 1986). There are two basic means of achieving this goal: (1) complete separation of vowels and consonants on separate tiers, and (2) specification of the geometric structures defining vowels and consonants in such a way that vocalic features do not interfere with the propagation of consonantal features and vice versa.

3.2. Vowel-consonant tier separation is largely associated with languages exhibiting 'template' morphology involving the interdigitation of morphemes formed entirely of consonants or vowels. The Semitic family is the major source of examples (McCarthy 1979, 1981), but some Native American languages have also been included in this category (cf. Archangeli 1984). A more subtle manifestation of separate vowel and consonant tiers comes in languages in which the linear order of C and V elements is entirely predictable from general syllabic or word templates, and for which physically nonadjacent elements can be treated

as adjacent for purposes of autosegmental processes (cf. McCarthy 1989, Yip 1988, 1989).

3.3. There is no evidence in Spanish which suggests tier separation of vowels and consonants. Spanish exhibits no template-based morphology (but cf. Harris 1980 for a partial exception), nor is C-V structure predictable, except within the bounds of broad syllabic templates (Harris 1983, Núñez Cedeño 1985). In particular, nothing indicates that consonants occupy a separate tier, where OCP effects could occur across intervening vowels. In some languages (cf. Mester 1986 for case studies), a separate consonantal plane is revealed by the combination of quasi-fixed C-V patterns and morpheme structure constraints which disallow totally or partially identical consonants at the underlying level. Spanish does not disallow identical consonants separated by a vowel, although the repetition of more than two identical consonants is sometimes a reflection of onomatopoeic or comical effects. Nothing suggests that such consonants are multiply linked across the intervening vowels, a configuration which would be required by the OCP if consonants occupied a distinct tier. Both historically and synchronically, identical consonants separated by a single vowel are differentially affected by metathesis, dissimilation or modifications which target only one of the consonants, thus showing that nothing like Geminate Inviolability is at work (Schein and Steriade 1986, McCarthy 1986), thereby permitting the inference that the consonants are individually linked to the skeleton. As a final observation, if blockage of SA before [h] were the product of tier separation of consonants, one would expect to find OCP effects involving consonants other than [h]; however, no such effects have been documented.

3.4. It is worth mentioning that, despite the controversy concerning the level(s) of application of the OCP, and its possible effects (morpheme structure constraint, inhibiter or trigger of rules), there is near universal concensus that the OCP can be overridden by postlexical rules such as syncopation, vowel fusion, etc. Blockage of SA before [h] can

apply across word boundaries, thus after Tier Conflation, which would collapse separate C and V tiers even if such were presumed to exist underlyingly. Assuming that the OCP motivates blockage of SA, the effects must take place on a tier which retains its integrity following Tier Conflation, and which is impervious to disintegration by fast-speech phenomena (cf. also Kaisse 1985). At stake is not a general prohibition against co-occurrence of identical consonants in Spanish, but rather a very specific constraint which targets [h].

4. ON ARTICULATOR-BASED SEPARATION OF CONSONANTS AND VOWELS

4.1. Even if a language exhibits effects suggesting that consonants operate autonomously with respect to vowels, this does not necessarily require complete tier separation. Refined models of articulator-based feature geometry can provide a viable alternative. Without postulating phonologically independent vowel and consonant planes, it is the nature of speech production that the articulators used in producing vowels are not activated during the production of most consonants, and vice versa. Assuming a special 'vowel' articulator (Steriade 1987 proposes that the Dorsal articulator is exclusive to vowels, while the Velar articulator is used for velar and uvular consonants), the strictly consonantal articulators such as Labial and Coronal can be projected on separate tiers, thus allowing phonological adjacency of consonants across intervening vowels, which lack the articulator nodes in question and therefore are transparent to interconsonantal spreading.

4.2. Languages for which this type of exclusively vocalic articulator can be motivated are predicted to demonstrate OCP effects involving pairs of consonants separated by a vowel, either through multiple linking of identical consonants in [C-V-C] combinations (with concomitant geminate inviolability), or through OCP-induced rule blocking or triggering. However, if vowels are indeed characterized

by a single articulator node, say Dorsal, then the remaining consonantal articulators must be equally autonomous, each individually linked to the Place node. This means that OCP effects should manifest themselves for ALL pairs of identical consonants, involving each of the appropriate articulators.

4.3. In Spanish, no such broad-scale effects are observable, nor have they ever existed. The case of potential [...hVh...] combinations is unique, which casts doubt on the legitimacy of attributing this blockage to a simple OCP effect. Moreover, finding a suitable feature value or articulator node which could form an appropriate tier is problematical, due to the feature specification of the segments involved.

The Spanish posterior fricative /x/ has many regional variants, including a postvelar spirant [X], a velar fricative [x], a palatal fricative [ç] (with prepalatal articulation before front vowels), and a weak aspiration [h], voiceless or voiced. Using standard binary distinctive features, the velar fricatives are [-anterior], [-coronal] and [+back], with the difference between [x] and [X] being handled by a feature such as [distributed] or [strident] (Harris 1969:193), or [high] (Halle and Clements 1983:33). The specification for [h] is not as clear, since this symbol has been used for a variety of sounds and phonological types, including sonorants or glides (cf. Halle and Clements 1983:33). Assuming some type of consonantal specification for [h], it must differ from the velar fricatives in being specified as [+low], and possibly [+spread glottis]. Within an articulator-based model (cf. Sagey 1986, Steriade 1987, Halle 1988), [x] and [X] would be characterized by activation of the Dorsal articulator, while [h] arguably uses no tongue-body articulator at all, or else involves a Tongue Root articulator.

4.4. The description just given may seem initially promising in suggesting a tier upon which the OCP can block successive instances of [h], given that blocking of SA apparently only occurs in dialects in which /x/ is realized as [h].[7] If the phonetic realization of /x/ is always assumed to in-

volve a Dorsal or Velar articulator, then there is no accounting for the lack of OCP effects involving velar STOPS in Spanish, which freely co-occur across intervening vowels. On the other hand, if a separate articulator exclusively characterizes [h], this articulator could define a tier upon which the OCP could operate. The lack of comparable OCP effects on other articulator-based tiers would still require comment, but as an interim measure, en route to an eventual comprehensive explanation, it could be stipulated that only the articulator defining [h] splits off to exhibit autonomous OCP effects. This might represent synchronic leftovers of earlier configurations, or some articulatory basis for prohibiting sequences of [h] in close succession might be suggested. However, such a line of reasoning becomes increasingly untenable upon detailed consideration of the phonological structure resulting from the 'aspiration' of /s/ to produce [h].

4.5. An HL reviewer has suggested a possible tier upon which physically non-adjacent instances of [h] could trigger OCP effects. This entails assuming that [h] is defined not by any Supralaryngeal features (thus not by any articulator dependent on the Place node), but rather by the feature [+spread glottis], which is directly dependent on the Laryngeal node. Vowels have no Laryngeal specification; [+voice] is predictable and added by a redundancy rule. Thus on the Laryngeal tier the two instances of [+s.g.] would be adjacent. This intriguing possibility does not stand up to further scrutiny, since by the same line of reasoning liquids and nasals, also lacking Laryngeal specifications, should be similarly transparent to OCP effects involving [+s.g.]. Words like *Jorge, ajonjolí* and *jengibre* provide ready intramorphemic counterexamples, while the notable absence of SA blocking in combinations like *mis angelitos, es urgente* and *los aljibes* provide additional evidence that putatively adjacent instances of [+s.g.] are not at issue. Vowels, but never consonants, are the only transparent elements involved in the avoidance of [...h...h...] sequences.[8]

5. REDEFINING THE PHONOLOGY OF [H] AND THE BLOCKING OF SA

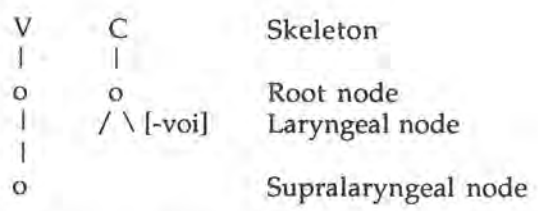
5.1. The shift /s/ --> [h] has been described using distinctive features such as [coronal]. If this is done, nothing explains why (prevocalic)[9] /s/, initially specified as [+coronal] among other features, would end up as [h] (and never as [x] or [X], even in dialects where the latter phones represent /x/). In dialects of Spain containing the interdental fricative /θ/, the latter segment groups with /s/ in syllable-final position, undergoing weakening to [h]. In the same dialect cluster (spanning most of southern and southwestern Spain), it is not uncommon for other syllable-final consonants, particularly /l/, /r/ and the few obstruents that appear in this position, to 'reduce' to [h], in addition to other possible modifications (cf. the maps of Alvar et al. 1973). This reduction takes place independently of the realization of /x/, which in the dialects under discussion may be realized as [X], [x] or [h].

Goldsmith (1981) was the first to characterize SA not as a feature-changing phonological rule, but as an autosegmental delinking of supralaryngeal features. In terms of feature geometry, this represents delinking the Supralaryngeal node of /s/. Since SA is not a feature-changing rule but rather a delinking rule, the sound usually transcribed as [h] involves the activation of *no* articulators, i.e. no Place or Manner node, except inasmuch as low-level rules might introduce default features. The latter, however, are not viable candidates for OCP effects, and there remains no articulator-based tier upon which instances of repeated [h] could be blocked across intervening vowels, all of which have supralaryngeal feature specifications. Whatever is involved in blocking SA before [h], consonantal OCP effects operating on articulator- or feature-defined tiers cannot be at work.

5.2. When SA delinks the Supralaryngeal node of /s/, what is transcribed as [h] arises when the Supralaryngeal

features of the preceding vowel link to the Root node of /s/ (cf. Hualde 1989a):

(1)



The delinked /s/ becomes in effect a voiceless continuation of the preceding vowel. In the case of word-final prevocalic SA, the delinked /s/ ultimately links to the following vowel as well. This analysis is particularly true in the case of [h] flanked by non-low vowels, where the turbulence identified as [h] is caused by the (voiceless) airstream traversing the buccal constriction represented by the vowels' point of articulation (cf. Catford 1977:250; Kim 1970:111). By extension, when [h] occurs intervocalically, either intramorphemically or through resyllabification, the [-voice] autosegment is linked to both flanking vowels.[10] This configuration is implicitly acknowledged in many descriptions of SA. For example, García Martínez (1986:78-9) describes the behavior of word-final prevocalic /s/ in a dialect of southeastern Spain as follows:

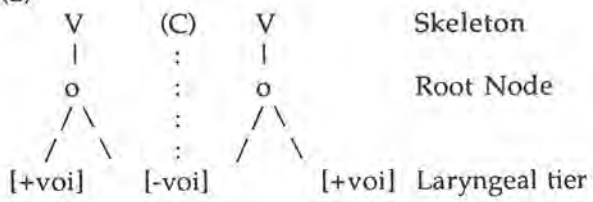
> la *-s* no se articula, no hay aspiración sorda que envuelva o cubra a la vocal siguiente; la aspiración, leve, entre los sonidos vocálicos anterior y posterior es un soplo que adquiere tal signo.

Carrasco Cantos (1981:82), describing a dialect of central Andalusia, states that when word-final /s/ occurs in prevocalic position,

> ambas vocales (final e inicial), nunca llegan a articularse unidas; por el contrario, puede percibirse entre ambas un pequeño soplo expiratorio o un alargamiento de la vocal final cuando son éstas del mismo timbre.'

5.3. The impasse surrounding the behavior of [h] in the Spanish dialects under consideration comes from regarding this element as a CONSONANT, linked to some combination of consonantal features. Once [h] is analyzed as linked to appropriately arrayed VOCALIC matrices, the blockage of SA before [h] finds a more coherent explanation. In the Spanish dialects in which a following /x/ blocks prevocalic SA, /x/ is realized as [h]. Onset-initial /x/ = [h] is also linked to the features defining adjacent vowels, resulting in a branching of [voice] on the Laryngeal tier, as well as a retention of the timing slot associated with /x/. When /x/ = [h] occurs word-initially or postconsonantally, this linking is only to the following vowel. Intervocalic [h] will be simultaneously linked to the features of both the preceding and the following vowel, emerging on the surface as a a [-voice] specification inserted between two (redundant) [+voice] specifications:

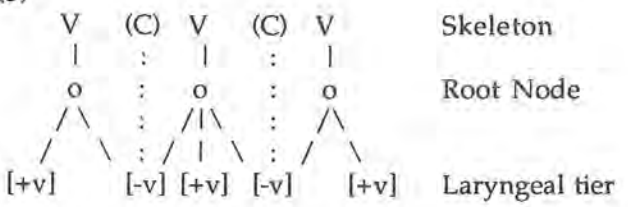
(2)



In connected speech, the [h] *resulting from delinking of word-final prevocalic /s/ acquires the same configuration* as in (2). This has often been described as a manifestation of general resyllabification, by means of which a single word-final consonant becomes attached to the onset of a following vowel-initial word (regardless of whether reduction of /s/ takes place before resyllabification, as suggested by Harris 1983, or is independent of resyllabification, as per Guitart 1981, 1982). In the special case of [h], since this element possesses no inherent supralaryngeal features, it could be argued that resyllabification is irrelevant; mere juxtaposition of the [-voice] laryngeal specification with flanking vowels will automatically result in linking to the supralaryngeal features of both vowels.

5.4. Consider now the representation of [VhVhV]:

(3)



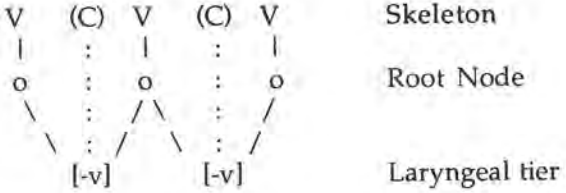
In (3), the second vowel (between the two instances of [h]) is TRIPLY linked on the Laryngeal tier; [+voice] is added by a late redundancy rule. The data reviewed above indicate that (3) is disallowed; the specific mechanisms by which this prohibition is activated remain to be clarified.

One conceivable modification of (3) involves postulating a separate Root node for each value of [voice], under the theoretical assumption that each class node dominates only one value of a given feature (Piggott 1989). It could then be simply stipulated that at most two Root nodes be associated with a single segment, drawing on the (possibly universal) nonexistence of triply specified 'complex' segments based on differing values of a single feature.[11] It might also be possible to leave the single Root node, invoking a putatively universal constraint against any 'contour segment' (a segment characterized by both values of a binary feature or by the successive presence and absence of a privative feature) presenting more than one +/- alternation.

Such proposals, while feasible within current models of phonology, remain stipulative and do little in the way of accounting for the full range of phenomena in /s/-reducing Spanish dialects. The general avoidance of [...hVh...] bespeaks of OCP effects, and the previous difficulties in motivating an OCP-induced model involved the failure to define a tier in the feature geometry which would simultaneously allow non-adjacent consonants to be phonologically adjacent (making vowels transparent to the OCP effects in question) and make other intervening consonants

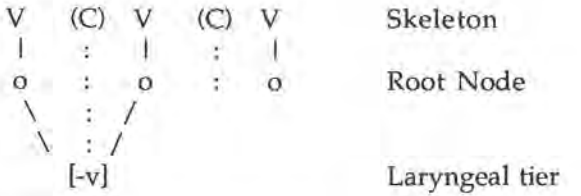
opaque (blocking the OCP effects). The revised structure in (3) illustrates that successive CONSONANTS, adjacent at any level of the description, are not at issue, but rather the multiple specification for voicing of a SINGLE segment: a vowel flanked by two instances of [h]. It is also apparent, given underspecification, that the [+voice] value of the vowel is not only absent underlyingly, but need not be referred to anywhere in the derivation, being subsequently added by a late redundancy rule.[12] The results of applying SA before word-initial [VhV...] would be:

(4)



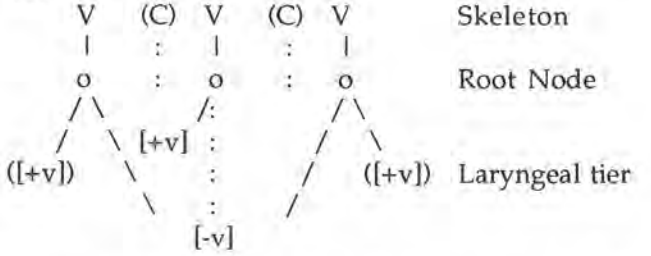
In (4), two [-voice] specifications become adjacent in a single vowel. Given the general conventions on autosgemental linking, as well as the OCP's dual potential to either block a derivation or trigger a repair process, the impending creation of configuration (4) can be dealt with in two fashions. Each has the effect of making (3) ill-formed, hence of disallowing [...hVh...] combinations. First, assuming that at the point when flanking [h]'s are associated to the vowel the latter remains unspecified for [voice], the OCP could simply block creation of configuration (4). The other alternative is to allow both [-voice] autosegments to attach to the root node of the vowel. By any version of autosegmental linking (e.g. the Shared Features Convention of Steriade 1982:48f.), these identical values associated to a single node must be merged:

(5)



At such point as the redundancy rule adding [+voice] to vowels would apply, presumably at the end of the derivation, there is no way for [+voice] to be added without 'splitting' the linking of [-voice] to the middle vowel, a violation of autosegmental line-crossing and, arguably, of geminate inviolability. In either scenario the derivation is blocked. At present, there is insufficient evidence to force a choice between the two scenarios; indeed, it is possible that each applies in different circumstances. If the derivation is blocked before producing (4), then failure of SA to apply would be predicted. On the other hand, if (5) is created, ill-formedness could be circumvented by delinking the [-voice] autosegment from the first vowel before the redundancy rule adding [+voice]:

(6)



This would have the effect of eliminating the first [h] (and, through stray erasure, the accompanying skeletal slot), which is the other option taken in many Spanish dialects to avoid [...hVh...] combinations.[13]

5.5. In dialects where blockage of prevocalic SA does not occur, structures like (3) are not at issue. The [h] resulting from SA can feasibly be represented as a relinking to the Place node of preceding and/or following vowels, but differences in the articulation of intervocalic /x/ preclude configurations such as (3)-(5). This occurs when /x/ has consonantal characteristics, requiring that the C-slot associated with /x/ remain linked to a bundle of features which includes a Place node and corresponding feature values. Such a segment is a true obstruent, does not adopt the Place node of adjacent vowels, and does not create multiply-linked vowels as in (3). The consonantal value of /x/ is clearest in dialects in which a velar or postvelar friction is noticeable. In still other dialects, a voiced fricative instantiates SA, which when inserted between two (redundantly voiced) vowels, cannot produce a structure like (3).[14] A succession of three [+voice] values would be indistinguishable from a hiatus of two contiguous vowels; as a result, some supralaryngeal features must be postulated for the fricative sound representing reduced /s/. In some dialects, it may even be possible for the delinked [h] < /s/ to acquire consonantal features following resyllabification.[15] In none of the circumstances just mentioned will a structure like (3) be created, and neither the OCP nor geminate inviolability can affect the sequence.

5.6. One final detail remains to be considered, the effective non-existence of OCP effects involving [h] derived from preconsonantal or phrase-final /s/: *las aspas, gesto, cajas,* etc. The analysis presented in the preceding sections does not directly address this assymetry, but some suggestions may be offered. There are two fundamental ways of approaching the problem. The first is to reject the analysis of phrase-final and preconsonantal [h] < /s/ as in (1). The second is to draw on the differences of syllabic linking in search of a principled explanation. Each course of action will be briefly explored in turn.

The validity of analysis (1) for phrase-final SA can be called into question. Detailed analysis of SA in many Spanish dialects reveals that complete loss of phrase-final

/s/ is much more common than 'aspiration'; the latter is sometimes perceptible in stressed final syllables as in *vamos pues*. What is transcribed as 'aspirated' phrase-final /s/ may actually have more consonantal characteristics, characterized by some low-level actuation of articulators not directly connected with the preceding vowel. If there are indeed empirical differences between phrase-final and onset-initial [h], then the former is not properly characterized as in (1), but rather as a true consonant whose [-voice] specification is not linked to the preceding vowel.

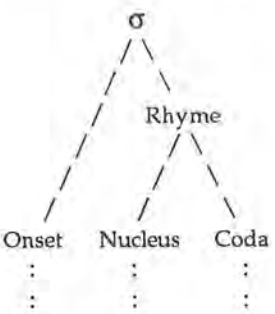
The case of preconsonantal SA takes on a different cast. There is cross-dialectal evidence that following delinking of the Supralaryngeal node of rhyme-final /s/, the resulting configuration links to the Supralaryngeal node of the following consonant. Sometimes only /s/ is affected, with no discernible change of the following consonant. Thus, for example, it is frequent for the result of SA before /k/ and /g/ to emerge as a velar fricative [x], linking to the Supralaryngeal node of the velar consonant. In other instances, bilateral influence occurs, as in the frequent devoicing (and eventual absorption) of voiced obstruents following delinked /s/: /sb/ > [ɸ], /sd/ > [θ], /sg/ > [x] (cf. Hualde 1989a). In any event, the [-voice] representing /s/ does not link to the preceding vowel, and a configuration like (4) does not arise.

The line of reasoning which rejects the analysis of syllable-final /s/ as a [-voice] autosegment linked to the preceding vowel deserves further attention, but as matters stand the a priori acceptance of such a view represents a weakening of theoretical claims. In the absence of definitive evidence that the sounds transcribed as [h] in both syllable-final and syllable-initial position have different phonological or phonetic characteristics, it is stipulative to shunt aside certain instances of [h] merely because they do not participate in the avoidance of [...hVh...]. There is another line of thought which retains the fundamental insights captured by the analysis of (1)-(4), based on recent advances in the theory of the syllable. The data utilized in the present study indicate that [h] < /s/ does not ordinarily trigger OCP effects when it is in the syllable rhyme. In preconso-

nantal and phrase-final position, /s/ cannot link to a following syllabic node, so it remains unambiguously in the rhyme. In cases of word-final /s/ followed by a vowel-initial word, the most frequent environment for the type of OCP effects studied above, resyllabification links the /s/ to the onset of the following syllable (although not necessarily severing the link with the preceding syllable, as will be seen below).

Goldsmith (1989, 1990) presents an expanded view of the distribution of feature values among the constituents of the syllable, based on the concept of licensing. In this approach, each syllable has two licensers: the syllabic node and the coda. According to the Licensing Criterion: 'Each distinctive feature in a representation must be licensed by its closest licenser ... each licenser may license no more than one occurrence of each feature' (Goldsmith 1989:148). Assuming a syllabic structure such as (7):

(7)



{Syllable node}

the onset and the nucleus will be jointly licensed by the syllable node, while the coda will have a separate set of licensing criteria. Codas typically allow fewer feature distinctions than do onsets and in no language is the opposite case true; in the theory discussed here, this is indicated by making the set of features licensed by the coda a proper subset of the features licensed by the syllable node.

In Spanish (at least the dialects studied here), the coda does not license [voice], despite apparent counterexamples. The most commonly-occurring elements in the coda are

/s/, liquids and nasals. The latter two classes, being sonorants, are unspecified for [voice], while /s/ has no voiced counterpart. The only 'voiced' consonant occurring in patrimonial Spanish words is /d/; it can still be argued that a voicing distinction is not maintained in the coda, since voiceless obstruents do not contrast with voiced obstruents in this position.[16] Obstruents in the rhyme are subject to much variation in actual voicing, all of which indicates that [voice] is not a relevant contrast; preconsonantal voiceless obstruents (e.g. in *doctor, etcétera, cápsula*) often emerge as voiced fricatives, phrase-final /d/ is heard as [θ] or [t] in some dialects, and disappears in others, and so forth. If the Spanish coda does not license [voice], then the [-voice] associated with /s/ need not be specified except by a late redundancy rule. If /s/ remains in the rhyme, configuration (1) will not arise, since there will be no [-voice] associated with /s/ at the time of the delinking. Therefore, the type of paradox associated with the transition from (4) and (5) to (3) will not arise, since BOTH values of [voice] (associated with vowels and delinked /s/) will be added by redundancy rules.

When word-final prevocalic /s/ is linked to the following syllable by resyllabification, it falls under the licensing potential of the (following) syllable node, which does license [voice]. However, resyllabification does not necessarily entail completely severing the association of /s/ to the preceding syllable. Evidence of ambisyllabicity in Spanish has been presented by Amastae (1986), D'Introno et al. (1989) and others. Under these circumstances, a word-final prevocalic /s/ could be simultaneously linked to the preceding syllable and licensed by the onset of the following syllable: 'a given autosegment may associate to a position without being licensed by that position, just in case that autosegment is licensed by some other licenser' (Goldsmith 1989:149). Since the Spanish syllable node licenses [voice], the [-voice] of /s/ would need to be specified, [-voice], would associate to the Laryngeal node of the flanking vowels as in (4), and the remainder of the process described above would take place. In Spanish dialects where word-initial SA also occurs, the [-voice] of word-ini-

tial /s/ is already licensed by the syllable node, while ambisyllabic linking to a preceding word-final vowel will trigger the relevant OCP effects.

The analysis based on feature licensing and syllable assignment sheds light on the fact that when a [...hVh...] sequence would result, final SA is more frequently blocked before stressed vowels (*los ajos*), than before unstressed vowels (*más ajeno*). Amastae (1986) provides evidence that a stressed preceding vowel attracts an onset-initial consonant into an ambisyllabic configuration. By extension, unambiguous assignment of an intervocalic consonant to the following vowel is enhanced when the second vowel is stressed. An intervocalic consonant before an unstressed vowel shows more signs of being ambisyllabic. Extrapolating to resyllabification across word-boundaries, complete resyllabification of word-final consonants may not occur before unstressed initial vowels. For those Spanish dialects where stressed initial vowels routinely inhibit SA in DETERMINER + NOUN constructions, resyllabification of the final /s/ may never be total before unstressed vowels. SA, affecting consonants in the syllable rhyme, would operate AFTER resyllabification, rather than before (as suggested by Harris 1983). In Andalusian dialects where final SA occurs regularly before stressed vowels except when the following consonant is [h], SA apparently operates prior to resyllabification. Before an initial unstressed vowel, resyllabification may not fully detach the [h] from the first vowel; in most combinations where blockage of SA is noted, the vowel preceding the /s/ is unstressed. If syllabic linking to the following vowel does not occur, then the licensing of [-voice] by the onset of the following syllable will not occur, and a configuration such as (4) will not ensue. On the other hand, a final [h] < /s/ before a stressed vowel would be unambiguously resyllabified, thus potentially participating in OCP effects with a following [h].

The theory of licensing and syllable assignment requires no modification of the analysis of [h] in contact with vowels nor of the OCP effects which result in [...hVh...] combinations; such a theory is preferable to approaches which

stipulate a different structure for [h] depending upon its position within the syllable. At present, the suggestions advanced above are tentative, and are offered in the spirit of stimulating further discussion. If this approach proves valid, it will have broader implications for the interaction of consonantal modifications and word-final resyllabification in Spanish.

6. SUMMARY AND CONCLUSIONS

The blocking of /s/-reduction in some Spanish dialects results from the inhibiting effects associated with the Obligatory Contour Principle. What appears to be a form of long-distance consonantal disharmony is an illusory result. Spanish demonstrates no consonant-vowel tier separation, nor any harmonic behavior among nonadjacent consonants (except in play languages and baby talk). The lack of such harmonic interaction is a direct consequence of the feature geometry characterizing Spanish consonants vs. vowels. The only harmonic effects found in any Spanish dialects involve articulators such as Tongue Root which are otherwise inert in Spanish phonology.

The apparent disharmony involving successive instances of [h] results from the phonological structure of this element in the dialects studied. Both the delinked /s/ and the weakly articulated /x/ emerge as simply voiceless offsets or onsets of adjacent vowels, losing their integrity as consonants and at times ultimately failing to remain attached to the skeleton. A vowel flanked by two [h]'s thus acquires two peripheral [-voice] accretions to its Laryngeal node. Since voicing of vowels is specified only by a late redundancy rule, the two [-voice] specifications would be physically adjacent and hence be merged by the OCP. This structure could not then be re-separated to allow for addition of the [+voice] value, and the sequence [...hVh...] is thereby ruled out in these Spanish dialects.

Speakers who have generalized /s/-reduction to occur even before [Vh...] have further restructured their phonological representation of one or both instances of surface

[h]. In the case of word-final SA, the most common result is simple loss of the final /s/, leaving only a slight temporal extension to instantiate the corresponding skeletal slot. The alternative reaction is the strengthening of the resyllabified [h] through onset hardening, giving the segment consonantal features which preclude the OCP effects induced by (2).

The significance of the Spanish phenomena discussed above goes beyond the description of dialectal variants in a single language. In particular, the notion that 'aspiration' of syllable-final obstruents in Romance can be analyzed as delinking of the Supralaryngeal node followed by assumption of the Place node of a neighboring vowel has been reinforced. The Obligatory Contour Principle has been confirmed as a factor serving to impede the application of otherwise general phonological rules.

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NOTES

* I am grateful to the HL reviewers for pointing out a number of inconsistencies in earlier versions, and for suggesting numerous improvements. I alone am responsible for the ensuing results, and for any remaining errors or inaccuracies.

[1] The vowel harmony processes found among Spanish dialects are of two varieties. One, found in dialects of northwestern Spain, involves morphologically-conditioned harmony based on the features [ATR] and [high] (cf. Hualde 1989b; McCarthy 1984; Penny 1969, 1970, 1978; Vago 1988; Wilson 1988). The other variety, found in Andalusian Spanish, involves [ATR], and was originally triggered by the loss of a word-final

consonant (cf. Lieber 1987, Zubizarreta 1979). In both processes, intervening consonants are transparent to harmonic effects. Among the remaining Romance languages, vowel harmony (metaphony) is most common in the regional languages and dialects of Italy, where it has become intimately intertwined with the morphological inflection of nouns, adjectives and verbs. Vowel harmony is also prevalent in Portuguese dialects.

[2] The raising of the final vowel in *hijos* is a regional feature of this Extremeño dialect, and is unrelated to modifications affecting /s/.

[3] The exceptional case of *nosotros* > [nohótro(h)] is morphologically conditioned, and occurs in Spanish dialects where other instances of intervocalic /s/ remain unmodified.

[4] One other combination which is perhaps as uncommon as /...xVx.../ is /...fVf.../, and most occurring cases are either nicknames (e.g. *Fefa* < *Josefa/Josefina*, *Fofo* < *Rodolfo/Adolfo*) or colloquial words of unknown origin (e.g. *féferes* 'personal belongings,' with variant *chécheres*, *fofo* 'soft'). The consonant [f], like [h], is characterized by the lack of activation of tongue-blade articulators. In vernacular Spanish of many regions, /f/ routinely acquires a bilabial articulation, and, particularly before semivocalic [u], becomes [h] (i.e. never becoming a velar fricative [x], despite the description of this process as 'velarization' in many studies). The conversion of /f/ to [h] involves total delinking of the Supralaryngeal features of /f/. As observed, for example, by Lloyd (1987: 214), '[ɸ] before a vowel, pronounced with slightly more laxness, will result in a voiceless air stream followed by the vibration of the vocal cords required by the following vowel.' At the vernacular level, then, a combination of the type /...fVf.../ could potentially evolve as in (2), thus contributing to the avoidance of new creations of this sort. This remains speculative at this point, however.

[5] The present writer is aware of no cases where the relevant domain involves more than two words. An HL reviewer queries whether SA blockage might be expected to occur in phrases like *vas a Gerona*, but no such instances have been documented by this author, or in the published literature.

[6] Except for dialects in which word-initial or word-internal vocalic /s/ is frequently aspirated. This includes parts of Central America (to be discussed below), archaic Spanish of New Mexico (Espinosa 1909), several areas in Colombia (Flórez 1951, 1978), and sporadic occurrences in Chile (Oroz 1966: 104), southern Spain, and the Canary Islands.

[7] The reason for the hedging is that this assertion can only be supported by 'negative evidence,' i.e. the lack of attested blocking of /s/-weaken-

ing in dialects where /x, receives a velar articulation. Chilean Spanish, where the articulation of /x/ ranges from velar to palatal, and where rates of /s/-weakening are very high is one test case; to my knowledge, /s/-weakening is not inhibited in /s#VxV/ environments (e.g. Cepeda 1990). Paraguayan Spanish might represent another test case, except for the frequent apperance of a glottal stop representing word-final /s/ before a stressed vowel. Peripheral Argentine dialects present similar configurations, as do transitional dialects of southeastern Spain (e.g. in parts of Murcia, Albacete, Alicante, etc.), but blockage of /s/-aspiration in the environments under study has not been documented.

[8] A reviewer queries whether non-syllabic vocoids behave as vowels with respect to the blocking of /s/-aspiration. The number of potential environments is vanishingly small; it is my impression that a combination such as *los auges* would produce the same inhibitory effects as, e.g. *los hijos* in an appropriately configured dialect, but I am aware of no empirical documentation. The pre-Hispanic toponym *Jauja* is found in Peru, in a region where /x/ receives a velar fricative pronunciation, and so avoids a [...h...h...] combination. The word is occasionally used in other regions, to refer to a mythical 'never-never land,' but I have no information on how this word would be pronounced in dialects where /x/ is normally realized as [h]. In an informal survey, I asked several speakers of Caribbean dialects in which /x/ is pronounced as [h] how they would pronounce the (written) word *Jauja*. Some elided the second /x/, some pronounced one or both instances of /x/ with some velar friction, and some put a slight pause after the first syllable.

[9] In preconsonantal position, it is common for 'aspirated' /s/ to emerge as a velar fricative before velar consonants. However, the result of 'aspiration' of prevocalic /s/ is consistently [h] in all dialects known to me.

[10] An HL reviewer has queried what would happen if [h] resulting from prevocalic SA or instantiating /x/ were to be voiced. If intervocalic [h] is analyzed as [-voice] on the Laryngeal tier flanked by two [+voice] specifications, then a 'voiced aspiration' should be represented as [+voice], and be indistinguishable from a sequence of two vowels (except perhaps for length). In fact this is what probably happens when word-internal intervocalic [h] is 'lost' in colloquial speech, e.g. in the Caribbean and much of Central America: *trabajo* > *trabao*, etc. It is conceivable that speakers could avoid the sequence [...hVh...] by voicing the first [h] < /s/ (or the second [h], for that matter). The accompanying 'aspiration' would in this case not be simply the result of constriction at the vowels' point of articulation, but rather some sort of default resulting from the [+consonantal] specification remaining in the root node of

the delinked /s/. In practice an intervocalic voiced aspiration is hard to hear; only a few instances are found in the ALEA (Alvar et al. 1973, maps 1631-1632). In the case of [h] resulting from SA or representing /x/, voicing of intervocalic consonants is not a synchronic option elsewhere in Spanish, and nothing suggests voicing as a likely means of avoiding OCP effects in a [...hVh...] sequence. What does occur is a pan-Hispanic process: complete deletion of a consonant and its accompanying skeletal slot. The alternative is retention of /s/ as a sibilant, i.e. inhibition of SA.

[11] Such a constraint probably does not exist, at least in its strongest form. It is possible, for example, for three tones to associate to a single vowel (cf. the Lomongo example in Goldsmith 1976; arguably similar configurations occur in Yoruba and perhaps other languages). Whether or not a triple specification is possible for a consonantal or vocalic feature is an empirical question which goes beyond the scope of the present inquiry.

[12] As proposed, for example, by Archangeli (1984), Pulleyblank (1986) and others, redundancy rules apply as late as possible in a derivation, either at the end of the derivation or at the first point in the derivation where some reference is made to the default value. Although association of [h] to an adjacent vowel, as in (2), attaches a [-voice] specification to the vowel, there is nothing which *requires* that a corresponding [+voice] value be present in order for this attachment to take place; I therefore conclude that the default [+voice] value associated with the vowel has not yet been added.

[13] The preceding argument has been based on the premise that redundancy rules can attach the value [+voice] to the laryngeal node of a vowel already linked to a [-voice] value (representing the effects of [h]), providing that no association lines will be crossed in the process. This means in effect that [+voice] will be added on the 'side' of the laryngeal node opposite the linkage to [-voice], which in turn is linked to a preceding/following segment. On the other hand, if the analysis is carried out under the assumption that the linking of [-voice] to the laryngeal node of a vowel in itself triggers the prior application of the redundancy rule specifying vowels as [+voice] (interpreting this as an instance of the 'redundancy rule ordering principle' of Pulleyblank 1986), then a structure like (5) will not arise. It is unlikely that the latter interpretation is valid, however, since linkage of the [-voice] autosegment representing [h] to an adjacent vowel does not require *any* previous laryngeal specification of the vowel, hence does not crucially refer to any given value of [voice] for the vowel.

[14] Cf. Zamora Vicente (1943: 21-24) for a careful description of one such dialect.

[15] Rodríguez-Castellano and Palacio (1948: 574) offer a demonstration that this does not happen, at least in the dialect they studied.

[16] In some 'conservative' dialects of northern Spain, word-final /d/ may be realized as [ð], while final /θ/ is pronounced [θ]. Since /s/-reduction does not occur in such dialects, it is possible that [voice] is indeed licensed by the coda. Alternatively, since the contrast is observed only word-finally, it may be possible to postulate a secondary licenser (as per Goldsmith 1990: 123), if final /-d/ can be analyzed as a separate morpheme or 'word marker' (cf. Harris 1985). In any event, these data do not bear directly on the present analysis.

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