

# On The Status of Chumash Sibilant Harmony

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[Chumash sibilant harmony, perhaps the strongest example of a feature-changing harmony rule, has been dismissed by Russell (1993) and Bird (1995), proponents of declarative approaches to phonology, as a ‘phonetic process’. This characterization does not stand up to analysis. Chumash sibilant harmony is indeed a phonological rule and must be dealt with by phonological theory.]

## 1. Introduction

Chumash sibilant harmony has figured with some prominence in work on phonological theory as an example of a relatively rare type of harmony (Shaw 1991) and especially because it is one of the few known instances of a demonstrably feature-changing symmetric harmony rule (Poser 1982, Avery & Rice 1989, Kiparsky 1993, Poser 1993), which is problematic for unification-based theories of phonology, in which underlying information cannot be deleted. Chumash sibilant harmony moreover demonstrates the need to decompose feature-changing rules into delinking or feature-deletion and spreading operations, since the Chumash facts can only be accounted for if another rule, Pre-Coronal Palatalization, intervenes (Poser 1982, 1993). Its status as a phonological rule has however been denied by proponents of declarative approaches to phonology (Russell 1993, Bird 1995), for which such a rule is problematic, on the grounds that it is not a phonological rule but a ‘phonetic process’.

I begin by summarizing the phenomena in question, based on the discussion of Ineseño Chumash by Poser (1982, 1993), which in turn is based on Applegate (1972)’s study of the field notes of John Peabody Harrington. Sibilant Harmony causes all sibilants (including affricates) to agree in palatality with the rightmost sibilant in the word.<sup>1</sup> (1) illustrates the fact that the third person subject prefix surfaces as [s] when no other sibilant follows. But when the past tense suffix /waf/ is added as in (2), /s/ becomes /ʃ/.

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<sup>1</sup> The literature varies as to whether the basic distinction between /s/ and /ʃ/ is between dental/alveolar or palatal or between apical and laminal. Poser (1982) treated the distinction as between alveolar/dental and palatal and therefore as between [+ant] and [-ant] in featural terms. Lieber (1987:147) and Poser (1993) treat it as a distinction between [-dist] and [+dist], that is, as a distinction between apical and laminal. I here follow the primary sources in using palatal symbols. It is however more likely than not, as discussed in section 4.1.1, that laminality is the relevant feature.

- (1) hasxintila / ha + s + xintila/ his gentile  
 (2) haʃxintilawaf /ha + s + xintila + waf/ his former gentile

Sibilant Harmony also causes underlying /f/ to surface as /s/. (6) shows that the dual subject prefix is underlyingly /if/ since that is the form in which it appears when no other sibilant follows. In (7), where the rightmost sibilant is /s/, the dual prefix harmonizes and surfaces as /s/.

- (3) piʃananʔ/p + iʃ + al + nanʔ/ don't you two go  
 (4) sishuleqpeyus /s + iʃ + sili + uluaqpey + us/ they two want to follow it

A second rule, Pre-Coronal Palatalization (PCP), interacts with Sibilant Harmony. This rule, stated in (5), makes a sibilant palatal when it immediately precedes one of the non-strident coronals /t/, /l/, or /n/. The operation of the rule is illustrated by the examples in (6). In each case the third person subject prefix /s/ (apical) becomes [ʃ] (palatal) before a non-strident coronal.

- (5) Pre-Coronal Palatalization (PCP)

[+cor, +stri] ⇒ [-ant] / \_\_\_\_ [+cor, -stri]

- (6) Examples of Pre-Coronal Palatalization (PCP)

ʃnanʔ	/s + nanʔ/	he goes
ʃtepuʔ	/s + tepuʔ/	he gambles
ʃloxitʔ	/s + loxitʔ/	he surpasses me

Pre-Coronal Palatalization creates a systematic class of exceptions to the generalization that all sibilants in a word agree in palatality with the rightmost. Sibilants whose palatality is determined by PCP are opaque to Sibilant Harmony. In (7a) we see that the /f/ created by PCP fails to harmonize with the /s/ of /us/. In (7b) not only does the /f/ created by PCP fail to harmonize with the two /s/s of /sisin/, but it serves as a trigger with respect to the /s/ that precedes it.

- (7) Examples of the Opacity of /f/ Derived by PCP

- (a) ʃtiyepus /s + ti + yep + us/ he tells him  
 (b) ʃiʃlusisin /s + iʃ + lu + sisin/ they two are gone awry

## 2. The Chumashan Languages

The Chumashan languages have traditionally been referred to as dialects of a single language. However, in recent years, as knowledge has improved, specialists have come to regard Chumashan as a family consisting of six languages: Obispeño, Purisimeño, Ineseño, Barbareño, Ventureño, and Island (Klar 1977, Mithun 1999:389), a position already taken by Beeler (1970).

Although records of Chumashan languages date back to the mid-18th century, the early materials are of poor phonetic quality and generally consist of short

wordlists. Our knowledge of the family is due in large part to the work of John Peabody Harrington (1884-1961), a prolific fieldworker with an excellent ear who began the study of Chumash in 1913 and continued to work on Chumash until shortly before his death in 1961. Harrington spoke at least one variety of Chumash and corresponded in Chumash with Chumash speakers. After his retirement in 1954 he worked almost daily with Mary Yee, the last speaker of Barbareño. Harrington wrote only one paper on Chumashan linguistics, Harrington (1974), but he left thousands of pages of field notes, now in the Smithsonian Institution and available on microfilm. Applegate (1972)'s grammar of Ineseño, based on Harrington's field notes, is the only complete grammar of a Chumashan language. A group led by Marianne Mithun at the University of California at Santa Barbara has studied a portion of Harrington's voluminous Barbareño notes, resulting in publications including Ono (1996), Mithun (1998), and Wash (2001).

In interpreting Harrington's work, it is important to understand that although he was apparently a talented language-learner and had an excellent ear, he was not a modern linguist. He lacked many of the concepts and distinctions that linguists of the past half-century have developed. Indeed, he never accepted the phoneme. He held 19th century notions of linguistic development, as can be seen in his reference (1974:2) to Chumash as possessing "other less advanced structural features". Although he was clearly capable of analyzing words into morphemes and recognized and stated phonological rules of a sort, he wrote very little by way of linguistic analysis; his heritage consists primarily of hundreds of thousands of pages of field notes. There is no sign in his work of any attention to syntactic structure.

The only other modern fieldwork of any extent on a Chumashan language was the work of Madison Beeler, all conducted with the last speaker of Barbareño, Mary Yee. This work formed the basis for the brief description of sibilant harmony in Barbareño in Beeler (1970). With the death of Mrs. Yee in 1965, the Chumashan languages became extinct.

### 3. Russell's and Bird's Objections

Russell (1993:147) begins by quoting excerpts from Harrington (1974):

But in actual practice the raising or lowering [to *s* or *š* is largely only partial and frequently does not occur at all. Intermediate sounds between *s* and *š*, here written *ş*, arise by such imperfect assimilation or by a lowering of sounds before *t*, *l* . . . The assimilation is moreover less thorough with some speakers than with others. Especially in slow speech and when detached words are furnished it is apt to be absent.

The assimilation is as a rule retrogressive. Progressive assimilation is rare and never extends far. The probable reason for this backward direction is that the phonetically strongest sibilants of Chumashan are the final sibilants . . .

It is interesting in the light of general phonetics that *š* is much more thorough and far-reaching in its working of assimilation than is *s*. Just as in language growth in general it is supposed that *s* more often becomes *š* than vice versa,

just as a drunken man may allow his *s*'s to lapse into *š*'s but does not *s*-ize his *š*'s, so also here in Chumashan it seems that *š* has more power to pull *s* down than to raise *š* up.

It should be noted that the harmony rarely extends further back than through a single word and that the article *si-*, when it has this form, seems especially resistant to assimilation.

Russell (1993:147) then comments as follows:

In this passage, almost every characteristic of Poser's rule is brought into doubt. If the rule created new segments like any other assimilation rule, we should expect their new identities to be clearly the same as the trigger; instead, we often find articulations intermediate between *s* and *š*, often enough that Harrington felt the need to devise the symbols *ṣ̌* and *č̣* to transcribe them. Formally, there is symmetry between the *s* → *š* process and the *š* → *s* process; in reality, one direction is preferred to the other. The stated domain of the rule is the word, but there are frequent cases where the domain is smaller, and some cases where the domain is larger. The stated direction of the rule is right-to-left; but there is a limited tendency for left-to-right assimilation as well. Instead of applying wherever its structural interpretation is met, like other phonological rules (e.g. Hungarian vowel harmony), it occurs more often in fast speech and can be suppressed entirely in careful speech.

In short, sibilant harmony has all of the characteristics of a phonetic effect of fast speech and none of the characteristics of a rule of the lexical phonology. It has more to do with the reason I can't say "She sells sea shells by the seashore" quickly than with the reason I can't say "cat+z".

Bird (1995:106)'s discussion is as follows:

According to Harrington's study of a dialect of Chumash (Harrington 1974), there is ample evidence that the assimilation is usually incomplete, and that it is dependent upon speech rate. Moreover, Harrington found that the assimilation is not symmetric, since *f* triggers a greater amount of harmony than *s*. Accordingly, Chumash would appear to have the same status as the syllable-final devoicing . . . , namely that of a phonetic process.

The properties that Russell and Bird take to indicate that CSH is a phonetic rule may be summarized as follows:

### **Intermediate Output**

CSH sometimes generates output that is phonetically intermediate between [s] and [ʃ]. [Russell and Bird]

### **Asymmetry**

/ʃ/ is more likely to trigger harmony in /s/ than conversely. [Russell and Bird]

### **Bidirectionality**

CSH applies both right-to-left and left-to-right. [Russell]

### **Variable Domain**

The domain of CSH is not exactly the word. The domain may be smaller or larger. [Russell]

### **Variable Application**

CSH does not apply whenever its structural description is met. [Russell and Bird]

### **Sensitivity to Rate of Speech**

CSH applies more frequently in fast speech. [Russell and Bird]

In order to evaluate these claims, it is necessary to have a clear idea of what we mean by such terms as “phonological rule” and “phonetic process”. I take “phonological rule” to describe any operation on a phonological representation, whether purely phonologically conditioned or subject to morphological constraints and lexical exceptions, and regardless of whether it merges one classical phoneme with two. It thus potentially includes both morphophonemic and allophonic rules, and both lexical and postlexical rules. The characteristic property of phonological rules is that they manipulate only distinctive features, that is, features that are distinctive in some language. I take “phonetic rule” to describe systematic operations that map phonological representations onto phonetic substance. Phonetic rules may be universal, but they may also be language-particular. The characteristic property of phonetic rules is that they manipulate continuously valued parameters and/or features that are discretely valued but non-distinctive. I prefer the term “phonetic rule” to “phonetic process” because the latter is often used with the implication of naturalness or universality and because it is sometimes used in such a way as to include not only systematic phenomena but speech errors and other such sporadic and unsystematic phenomena.

Although there has been and continues to be a good deal of disagreement as to the extent to which language-particular phonetic rules exist and what other properties are correlated with the phonological/phonetic distinction, the basic distinction here is that of Chomsky and Halle (1968:295-298) as well as the bulk of subsequent work.

From both types of rule I distinguish a third category of non-systematic errors. Although production errors may share some properties with rules, it is far from clear in general how they are related to rules or whether indeed they form a homogeneous class.

## **4. Response to Russell and Bird**

The most remarkable fact about Russell’s and Bird’s arguments is that they are based entirely on a different language. Harrington’s paper describes Ventureño Chumash, whereas the variety discussed by Poser (1982) and that has figured in the theoretical literature is Ineseño, as described by Applegate (1972) on the basis of

Harrington’s field notes. Neither cites Applegate’s dissertation, nor does either cite Beeler (1970), at the time the only other description of Chumash sibilant harmony by someone with firsthand knowledge of the language, even though it is cited by Haas and Beeler in their editorial introduction to Harrington (1974). That Ventureño is a distinct variety of Chumash should be clear not only from its name but from Haas and Beeler’s editorial comments. Referring to the final section of Harrington’s paper, which is devoted to diminutive/depreciative sound symbolism, Haas and Beeler say (p.2): “The sound symbolism in Ventureño sibilants which Harrington describes appears to be unique within Chumash.”

Strictly speaking, therefore, there is no reason to take Harrington’s comments on Ventureño to have any relevance to the analysis of Ineseño that figures in the theoretical literature, and since Russell’s and Bird’s objections are based entirely on Harrington’s description of Ventureño, we may also dismiss them as beside the point. However, it is worth examining their objections in detail to see to what extent they would be valid if the facts of Ineseño were like Ventureño.

Russell and Bird might have been warned that something was amiss if they had consulted any of the other work on CSH, all of which treats it as a phonological rule. Haas and Beeler (1974:2) commented on Harrington’s paper:

The data it presents amply support the conclusions reached by one of the present editors. . . on Chumash sibilant harmony, from the analysis of the contiguous and closely related dialect of Santa Barbara.

They refer to Beeler (1970), a description of sibilant harmony in Barbareño by someone who worked directly with Mary Yee and had also examined Harrington’s field notes, which characterizes CSH as a regular phonological rule.

Applegate (1972) who worked with Harrington’s field notes, describes morpheme-internal harmony as exceptionless (pp.34-35):

The strident spirants and affricates within a morpheme are all from either the dental set /s c/ or the palatal set /š č/, without exception. There is a corresponding sibilant harmony rule.

and sibilant harmony as regular (p.118):

The sibilant harmony rule governs the cooccurrence of dental and palatal spirants and affricates within the word by a process of retrogressive assimilation. All sibilants are either dental /s c/ or palatal /š č/, as determined by the last sibilant in the word.

Applegate was aware of Harrington’s description of Ventureño but saw no inconsistency.<sup>2</sup>

## 4.1. Evaluation of Russell’s and Bird’s Arguments

I begin by considering whether the properties cited by Russell and Bird are in fact evidence that CSH is a phonetic rule.

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<sup>2</sup> Although Harrington’s paper was not published until 1974, it was actually written in 1928 and submitted to the Smithsonian Institution. Applegate cites the manuscript, BAE no.3057.

### 4.1.1. Intermediate Output

The production of output intermediate between [s] and [ʃ] is not in and of itself diagnostic of a phonetic rule. For this to be evidence of a phonetic rule, it must be the case that the intermediate value or values can only be represented by means of a continuously valued parameter or by a discrete parameter at least one of whose values is never distinctive. Neither Russell nor Bird even attempts to make such a case, nor does anything in Harrington’s paper support it. From Harrington’s description, it seems clear that his [s] is apical alveolar and that his [ʃ] is a laminal that may be grossly characterized as “palatal”. It is not clear whether his [ʃ] is a true palatal or post-alveolar. Possible “intermediate” values at recognized points of articulation, representable by distinctive features, therefore include (Ladefoged and Maddieson 1996): laminal alveolar, apical retroflex post-alveolar, and sub-apical retroflex palatal as well as post-alveolar laminal, if the canonical [ʃ] is a true palatal [ç]. For instance, it might well be, as suggested by Lieber (1987), that the feature distinguishing /s/ from /ʃ/ is [laminal]. Since on this hypothesis there is no point of articulation distinction in the coronal region, the laminal counterpart of apico-alveolar [s] could be realized as anything from a lamino-alveolar to a true palatal.

Indeed, the hypothesis that the point of articulation of the laminal fricative was variable might explain the surprising amount of variation between [s] and [ʃ] in Harrington’s transcription of the same word noted by Applegate (1972:12):

... judging from Harrington’s numerous alternative transcriptions (e.g. ʔoq<sup>h</sup>os’ ~ ʔoq<sup>h</sup>os’ ‘sea otter’), the distinction between the two sets /s c/ and /š č/ is not always an easy one to make.

It is implausible that such an excellent phonetician as Harrington should have had difficulty distinguishing an apico-alveolar from a true palatal or even a post-palatal, but if the laminal was sometimes realized merely as a laminal alveolar, he could easily have failed frequently to distinguish them. If this is correct, the intermediate values noted by Harrington are not the result of incomplete assimilation but rather the result of intrinsic variability in the realization of /ʃ/.

There is little further information available in the literature. Applegate does not even mention /s/ or any sort of intermediate value, although he comments at some length (pp. 16-21) on subphonemic details written by Harrington. Marianne Mithun, who has worked with Harrington’s Barbareño notes and has listened to tapes of Mrs. Yee reports (personal communication, May 2004) that the sibilants written [s] in Harrington’s notes sound to her like slightly backer variants of [s].

### 4.1.2. Asymmetry

It is not clear why asymmetry should be diagnostic of phonetic rules; most phonological rules change features only in one direction. The sort of asymmetry claimed for CSH differs from this only in not being all-or-nothing. In any case, the empirical basis for this argument is questionable. Applegate does not consider the probability of change to be greater in one direction than in the other, nor does Beeler. Harrington’s statement was apparently based purely on his subjective impression. He does not report any statistical analysis or show any sign of having taken into account the phonological context.

It is likely that Harrington’s impression is the fact that hardly any suffixes contain alveolars, while prefixes containing sibilants contain predominantly alveolars. This skewed distribution of underlying sibilants together with the right-to-left direction of the harmony results in the change of alveolar to palatal being more common than that of palatal to alveolar. This was noted by Applegate (1972:118-119):

With the exception of -us ‘third singular object,’... the sibilants in suffixes are all palatal... so that the direction of sibilant harmony from suffixes is prevaillingly toward palatalization... Examples of sibilant harmony working from stems into prefixes show a more even distribution of dental assimilation... and palatal assimilation.

This skewed distribution is easily seen in Harrington’s paper on Ventureño. Near the beginning of the paper (p.3), Harrington lists common affixes containing sibilants. He lists a total of seven suffixes (-tʃiʃ, -tʃiʃi, etc.reflexive, -waʃ past tense, -ʔiwaʃ depreciative, -š, -č perfective, -š passive, -iʔiʃ instrumental nominalizer, -itʃ denominal verb/adjective formant ) all of which contain palatals. Of the six prefixes listed ( si- article, ts- third person singular subject, tʃiʃ third person dual subject,<sup>3</sup> tsi- third person plural definite subject, tsam- third person indefinite plural subject, and ts- (required by certain nouns when possessed) ) five contain /s/. Even if we add one suffix not listed here by Harrington, but easily recognizable in the forms cited in his paper, the third person object suffix /-us/, the skew is clear. By a margin of seven to one, the suffixes are palatal whereas by a margin of five to one, the prefixes are alveolar. Furthermore, certain of these affixes are very common. Harrington himself points out (p.3) that the third person singular subject prefix is the most common. Beeler (1970:16) gives a very similar list of the more frequent affixes. Of the six suffixes, all but one are palatal. Of the seven prefixes, five are alveolar.

Another fact that would give rise to the impression that palatals are more likely to assimilate alveolars than alveolars are palatals is the opacity of those /ʃ/ created by Pre-Coronal Palatalization. Whereas these /ʃ/ are opaque, there are no opaque /s/s. Since there is no good evidence for asymmetry and in any case it is not diagnostic, this argument may be dismissed.

### 4.1.3. Bidirectionality

Nothing in existing theory of the organization of the phonology makes bidirectionality diagnostic of phonetic rules. Insofar as CSH applies sometimes in one direction and sometimes in the other, under unknown conditions, this is a puzzle, but it is not evidence that CSH is a phonetic rule.

In any case, it is far from clear to what extent CSH is bidirectional. Harrington writes (1974:5):

The assimilation is as a rule retrogressive. Progressive assimilation is rare and never extends far.

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<sup>3</sup> If other Chumashan languages are any guide, this is probably complex, consisting of /ts/ ‘third person subject’ and /iʃ/ ‘dual’.

On the following page, Harrington repeats his statement that progressive assimilation is rare “Changes by forward-looking influence are rare.” and gives a single example:

(8) hefaʔatʰaxatʃʔan tʃʰil ʔisqolokʰi ‘This man has a belt.’

where, according to Harrington (the word is not otherwise known) /tʃʰil/ results from the application of SH to /tsʰil/. If so, this sentence is doubly peculiar, in that SH must have crossed not one but two word boundaries. Applegate (1972) describes SH as exclusively retrogressive in Ineseño, as does Beeler (1970) in Barbareño. The evidence for progressive SH thus consists of a single anomalous example in Ventureño together with Harrington’s statement that it is “rare”, with no such phenomenon noted in either Ineseño or Barbareño. Since the evidence for bidirectionality is minimal and the phenomenon is in any case not diagnostic, this argument may be dismissed.

#### 4.1.4. Variable Application

I am not aware of any current theory on which variable application is diagnostic of phonetic rules. Indeed, there is an extensive sociolinguistic literature on variable rules, many of which appear to be true phonological rules. A classic example is coronal (t/d) deletion in English, which is known from numerous studies summarized by Labov (in press) to be conditioned in part morphologically. To be precise, deletion is most likely in monomorphemic clusters, more likely in semi-weak derivational clusters, and least likely in regular past tense forms. Guy (1991) pointed out that the probabilities of retention in the semi-weak derivational clusters and regular past tense forms are the square and cube respectively of that of the monomorphemic case, a phenomenon whose only known explanation is that the rule is a lexical rule applicable at all levels. It potentially applies to monomorphemic clusters alone on the root cycle, to monomorphemic clusters and semi-weak derivational clusters at Level I, and to all three types at Level II. If coronal deletion is a lexical rule, *a fortiori* it is a phonological rule.

In any case, it is far from clear whether CSH exhibits the high degree of variability claimed by Harrington. Applegate (1972) does not regard CSH as so variable. He writes (Applegate 1972:119-emphasis mine):

Sibilant harmony operates even across long stretches of intervening syllables devoid of sibilants... but **occasional** exceptions to the rule appear in the corpus, particularly across longer words **or where the predental palatalization rule operates.**

Exceptions are only “occasional”, and many of these are not true exceptions but result from the regular interaction of sibilant harmony with Pre-Coronal Palatalization.

Several factors may have led Harrington to overestimate the failure of CSH to apply. First, as we have already noted, Harrington had difficulty distinguishing /s/ from /ʃ/. Second, since CSH applies only within words, Harrington may have considered that it failed to apply in some cases because he mistakenly took the word to be larger than it really is. Applegate (1972:5) noted:

... I have been more liberal in the use of word boundaries than Harrington, who tended to write much of the phrase fused as a single unit.

Whenever a sibilant was separated from a harmony trigger by a word boundary that Harrington did not recognize, he would have perceived failure of CSH to apply.

Even the limited variability noted by Applegate is very likely due to extrinsic causes. Variable application of originally invariable rules has been noted as a characteristic of language death. In their catalogue of ‘Change Processes in Dying Languages’, Campbell and Muntzel (1989:189) include ‘Development of Variability’. They say:

Obligatory rules may come to apply optionally... For example, American Finnish speakers sometimes fail to apply the consonant gradation rules. Thus, in Standard Finnish *t* gradates to *d* in closed syllables, e.g. *äiti* ‘mother’, *äidille* ‘for mother’: but frequently *äitille* is the form in American Finnish (Campbell 1980). In Ocuilteco, the native rule voicing stops after nasals fails to apply sometimes in the language of nonperfect speakers, producing free variations (e.g. *nd* alternating with *nt*; see Muntzel 1982a). In Cuisnahuat Pipil the formerly obligatory rule of final devoicing of sonorants... has become optional, resulting in free variation between, for example, final [l] and [ʎ].

That language death was responsible for the variability observed in the later speakers of Barbareño was suggested by Beeler (1970:17):

From the time Chumash records commence, and extending through the nineteenth century, what prevailed was the effort to afford its words that measure of phonological uniformity which derived from the principle of sibilant harmony. It was, that is, one of the phonological markers of the unit I have called the word, similar, I suppose, to vowel harmony in the Turkic languages. As the language approached extinction, this principle came into conflict with another: inflectional morphemes, since they have unitary function, ought to be expressed by unitary phonemes or phoneme sequences - in effect, resistance to allomorphy. In its last speakers the language, in this segment of its structure, was in a condition of disequilibrium.

Beeler (1970:17) pointed out that Harrington’s earliest recording of Barbareño contained no exceptions to CSH:

His [Harrington’s] recording of Juan Juste in 1913, of about three hundred items, contains about forty words with two or more sibilants each; among these there is recorded no single instance of cooccurrence of blade and apical sibilants within the word unit.

Applegate (1972:75) seconded this suggestion as an explanation for the variability observed in Ineseño:

... as Beeler noted with his Barbareño informant... there was a certain resistance to allomorphy among the last speakers of the language.

There is yet another factor that may be relevant. Because Harrington worked on Barbareño for almost fifty years and his sources included both Mary Yee’s mother and her grandmother, Mithun (1998) was able to study the variability in Barbareño SH over time. What she found was that there was little if any variability with Harrington’s oldest informants, somewhat more with Mary Yee’s mother, and a large increase with Mary Yee. She shows that in addition to the effects of language death, the large percentage of cases in which CSH did not apply in Mrs. Yee’s speech is due to her awareness of the morphological structure of words and the distinction between underlying and surface forms. In effect, Mrs. Yee frequently produced forms in which Sibilant Harmony had not applied because she was producing underlying forms. It is by no means impossible that something similar took place with Harrington’s Ineseño informants.

In sum, variable application is not diagnostic of phonetic rules. In any case, CSH was not nearly as variable as Harrington’s discussion suggests. Indeed, insofar as we can abstract away from the effects of language death and the elicitation situation, CSH may not have been variable at all.

#### **4.1.5. Sensitivity to Rate of Speech**

While some phonetic rules are sensitive to rate of speech, it is far from established that all rules sensitive to rate of speech are phonetic rules. In any case, it is doubtful that CSH is a fast speech rule. The claim that CSH is sensitive to rate of speech is founded entirely on Harrington (1972:5)’s statement that:

Especially in slow speech and when detached words are furnished it is apt to be absent.

This is not a description of a fast speech rule. Rather, it is a description of a rule failing to apply in careful speech. Fast speech and casual speech have often been conflated (Kaisse 1985:8-9). Indeed, to my knowledge, a systematic distinction between fast speech and casual speech was first made by Hasegawa (1979). Whereas it is possible that fast speech rules may all be phonetic rules, casual speech rules are not necessarily phonetic (Kaisse 1985). Indeed, Hasegawa (1979) argued convincingly that the casual speech rules that she discussed were all lexical. Note, moreover, that “when detached words are furnished” is precisely the context in which a speaker resistant to allomorphy or desirous of exhibiting the morphological structure of words is likely to fail to apply a rule. There is no hint in Applegate (1972), Beeler (1970), or Mithun (1998) that CSH is a fast speech rule. On balance, it is doubtful that CSH was a fast speech rule.

#### **4.1.6. Variable Domain**

I am not aware of any approach to the organization of the phonology on which variability of domain is diagnostic of phonetic rules, so even if the facts are as Russell suggests, this is not an argument. In any case, it is far from clear that there is any significant variability in the domain of CSH. Harrington explicitly says that cases of application across word boundary are rare. In a section devoted to the assimilation of /s/ to /ʃ/, Harrington (1974:6) says: “. . . the assimilation rarely extends back further than through one word. . .”. He gives no examples. In the

following section, devoted to the assimilation of /ʃ/ to /s/ he writes (Harrington 1974:6 - emphasis mine): “The change to *s* **never** goes back into the preceding word.” In other words, harmony across word boundary is in the one case “rare” and in the other occurs not at all. For all we know, the rare cases to which Harrington refers are errors.

The cases in which the domain of CSH appears to be smaller than the word are probably illusory. Insofar as application of CSH is variable, in many cases failure to apply will produce the appearance that the domain is smaller than the word. Furthermore, the fact that Harrington took words to be larger than they really are, discussed above, would produce the illusion that CSH was applying within a smaller domain than the word. Applegate (1972) does not describe the domain of CSH in Ineseño as variable.

## 4.2. CSH Is not a Tongue-Twister Error

It is not entirely clear how Russell intends his statement (1993:147) that CSH has more in common with the reason he cannot say “She sells sea shells by the seashore” quickly than with the reason he cannot say “cat+z”. If taken seriously, he means to claim that CSH is not even a phonetic rule but rather a speech error of the sort that occurs in tongue-twisters. This suggestion would appear to be based on the following passage in Harrington (1974:5), not cited by Russell:

It is as if we should say in English “shistersh showy shash” instead of “sister’s showy sash”; “sifts switses” instead of “shifts switches.”

Reasons for this harmony are not difficult to discern. Everyone knows how hard it is to make the rapidly alternating adjustments in a sentence such as “she sells seashells” and how awkward the changing sibilants sound in such a sequence.

Although one can see how a superficial reading might suggest that Harrington actually meant to characterize CSH as a tongue-twister error, it is unlikely that this is what Harrington meant. At best Harrington’s comparison is ambiguous as to what features he considers comparable: the phonetic character of the assimilation or the nature of the phenomenon? In context, however, it seems clear that Harrington’s intention was to compare the phonetic character of the assimilation and the possible motivation for the it, not the nature of the phenomenon. Although Harrington did not have modern notions of “phonological rule” and “phonetic process”, he surely did distinguish between systematic linguistic phenomena and sporadic errors. From his description, it is clear that he viewed CSH as a systematic linguistic phenomenon.

In any case, whatever Harrington may have intended, there is good evidence that CSH does not in fact belong in the same category as tongue-twister errors. First and foremost, tongue-twisters produce **errors**. Regardless of how much difficulty any individual may have with a particular tongue-twister, everyone agrees that when assimilation occurs that is a mistake and that the correct pronunciation is that without the assimilation. In the case of CSH, on the other hand, the assimilation is the correct output. There is not the slightest indication in any of the sources that the application of CSH is construed as an error. Even in those cases in which

variability is observed (discussed in greater detail below), the application of CSH is acceptable.<sup>4</sup>

Second, tongue-twister errors are sporadic. They occur only occasionally, when the speaker’s control is poor, and in configurations in which rapid and repeated switching between two closely related sounds is required, or where parallelism primes the speaker to repeat the previous member of the pair. This contrasts with the systematicity of CSH.

Third, tongue-twister errors are characterized by locality. What makes a tongue-twister difficult to pronounce is the fact that closely related sounds occur in close proximity. This is why “She sells seashells by the seashore” is a tongue-twister, but “He sells gemstones, butterflies, and seashells” is not. In contrast, Chumash sibilant harmony operates over arbitrary distances within the word. Applegate (1972:119) explicitly states “Sibilant harmony operates even across long stretches of intervening syllables devoid of syllables” and gives as his example (8), in which the assimilation takes place across a stretch of five syllables.

(9) kšuk’ilimekekeč /k+su+k’ili = mekeken =š/ ‘I straighten myself up’

Fourth, although sibilant harmony is unbounded within the word, it operates only within words, as noted in all of the primary sources, including Harrington (1974:6). In tongue-twister errors, the segment affected and the trigger are commonly found in separate words. I conclude that CSH is not properly compared to tongue-twister errors.

### 4.3. Evidence That CSH is a Phonological Rule

The interaction of CSH with Pre-Coronal Palatalization described above, in which CSH must be decomposed into a feature delinking or deletion operation and a spreading operation, between which PCP intervenes, is evidence that CSH is a phonological rule. Furthermore, as we have seen, the details of the interaction of CSH and PCP are explained only by the account given involving the manipulation of discrete feature values. It is worth noting that this opacity, illustrated above for Ineseño, was observed by Harrington (1974) in Ventureño:

An s sound before t,l,n tends to become an š sound anyway . . . , thus checking the retrogressive reach of the above process. Thus huštapuʔus *he will visit him*. For hustapuʔus. (p. 6)

As remarked under **3.1** above, such an š does not assimilate to a following s. (p. 7)

This evidence of the phonological character of sibilant harmony even in Ventureño suggests that the aspects of Harrington’s commentary suggestive of a phonetic process should be taken with a grain of salt.

Applegate (1972)’s analysis provides additional evidence that sibilant harmony is a lexical phonological rule. According to Applegate’s analysis, Sibilant Harmony must be ordered before Geminate Aspiration, the rule that collapses geminate obstruents into a single aspirated consonant provided that the second consonant not

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<sup>4</sup> Beeler (1970:17) even cites his discussion of this question with Mrs. Yee.

be aspirated or glottalized. Sibilant Harmony must apply first because it feeds Geminate Aspiration (p. 122). Geminate Aspiration in turn must precede CVC Reduplication, a morphological rule that produces plurals and collectives of nouns and repetitive, intensive, or continuative forms of verbs (pp. 130-137). This latter ordering is however optional, since there are cases in which CVC Reduplication feeds Geminate Aspiration.

## 5. Conclusion

Ineseño Chumash sibilant harmony has been claimed by Russell (1993) and Bird (1995) to be a ‘phonetic process’ rather than a phonological rule on the basis of the description of Ventureño Chumash by Harrington (1974). However, the aspects of Ventureño Chumash on which their objections are based are not known to be true of Ineseño Chumash, so these critiques are irrelevant. Moreover, analysis of their objections shows that in every case the property cited is not diagnostic and/or empirically questionable. There is, furthermore, affirmative evidence that Chumash sibilant harmony is a lexical phonological rule. Chumash sibilant harmony is indeed a phonological rule and must be dealt with by phonological theory.

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