NASALIZATION IN MIXTEC LANGUAGES

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1. Introduction. This article presents and argues for a new analysis of nasalization in Mixtec phonology.[1] This analysis accounts for several previously unexplained facts regarding the distribution of certain consonants. The claim is that nasalization in Mixtec is an autosegmental morpheme-level feature which links to the right edge of a morpheme and spreads to adjacent sonorants.[2] As a result, the usual inventory of segments in Mixtec languages is drastically revised.

[1] This analysis is presented somewhat informally. I do not argue whether the feature [nasal] is privative or not, although I assume that it is in Mixtec. I also ignore formal issues relating to underspecification and the organization of features; important as these are, this article is not oriented to exploring the possible contributions of the Mixtec facts to their development.

I thank Burt Bascom, Doris Bartholomew, Hank Bradley, John and Margaret Daly, Terrence Kaufman, Eugene Loos, Priscilla Small, Chuck Speck, Loren Trigo, Jim Watters, and anonymous reviewers for their comments on earlier drafts of this paper. None is to blame for the inadequacies that remain, nor do any of the above necessarily agree with the conclusions. The analysis developed out of an S.I.L. workshop held in Tucson in the spring of 1988. The input of three teams, Larry and Mary Harris, Sue Hugghins and Inga McKendry, and John and Judith Williams, was important in arriving at this analysis, which was incorporated into presentations by Hugghins and McKendry, and Williams and Williams at a linguistics symposium held in Tucson in May 1987. This analysis was presented at a session of the Twenty-seventh Conference on American Indian Languages, concurrent with the annual meeting of the American Anthropological Association, held in Phoenix, Arizona in November 1988. Comments and questions from participants in that conference were helpful. It was also presented at seminars in 1990 at the Universidad Nacional Autónoma de México, the Universidad de Sonora, and the University of Texas at Arlington. The analysis also underlies the presentation of Mixtec mood and aspect given by Bickford and Marlett (1988).

Mixtec languages, together with Trique and Cuicatec, belong to the Mixtecan branch of the Otomanguean stock. According to Bradley and Hollenbach (1988:1), there are approximately twenty mutually unintelligible varieties of Mixtec spoken by 250,000 speakers, primarily in the western half of the state of Oaxaca, Mexico. I generally use the term "Mixtec language" or "variety of Mixtec" in this article (rather than "dialect") to refer to these.

[2] The evidence presented below deals primarily with monomorphemic words. The analysis of other words supports the claim that nasality is a morpheme-level feature (perhaps only relevant for lexical morphemes) that spreads across the word, but the morphological analysis of Mixtec "words" raises questions that are tangential here. Some morphemes which are commonly written as prefixes in Mixtec languages may perhaps be best analyzed as auxiliary verbs, proclitics, etc. One's attention is best focused on the two-syllable word (often referred

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2. The proposal. The locus of nasalization is predictable in Mixtec. Nasalization occurs on the right edge of a morpheme and may spread leftward under conditions that are specified below. Since the locus is predictable, morphemes need only indicate that a morpheme is either [+nasal] or not.[3] The association rule is:

(1) Associate the feature [+nasal] to the right edge of the morpheme.

Nasalization spreads leftward in Mixtec until it encounters an obstruent (although in some varieties, discussed in **5** below, even an obstruent does not block it).[4]

(2) Nasal Spreading (iterative, right to left):
A segment adjacent to a nasalized segment becomes nasalized.
Obstruents cannot be nasalized.

This analysis accounts for the quasi-surface patterns below which are typical Mixtec patterns:[5]

(3) *t* = any obstruent
a = any oral vowel; *ã* = any nasalized vowel
y = any oral sonorant; *ñ* = any nasalized sonorant

Attested Oral Words	Attested Nasal Words	Unattested Words[6]
tata	*tatã*	*tãta tãtã*
yaya taya yata	*yatã*	*yãtã tãyã tãya*
	tãñã ñãñã	*ñãtã taña ñãta*
		ñãya yañã ñaya
taa yaa	*tãã ñãã*	*yãã ñaa*

to as a "couplet") in Mixtec since words that are more than two syllables are almost invariably clearly not monomorphemic.

Analyses which posit morpheme-level nasalization include Hyman (1982) for Gokana, Lunt (1973) for Guaraní, and Kaye (1971) for Desano.

A separate issue relating to nasalization, which I do not discuss in this paper, is the interaction of these facts and the second-person familiar enclitic pronoun in Coatzospan and Silacayoapan Mixtec (Pike and Small 1974 and North and Shields 1977), which consists only of the feature [+nasal].

[3] An examination of the 188 reconstructed Proto-Mixtec words which appear in Josserand (1983) reveals that about two-fifths of them are nasal morphemes, and three-fifths are oral. A very rough count of the words in Dyk and Stoudt (1965) suggests that perhaps two-thirds of the roots are oral.

[4] Under this analysis, obstruents in Mixtec are almost always voiceless. Therefore, as one reviewer has suggested, one might refer to the feature [–voice] as relevant to the block of the spread of nasalization. The only potential problem with this suggestion is the fact that Coatzospan Mixtec has a voiced obstruent (*ð*) which, like other obstruents, blocks the application of the spread of nasalization lexically. Therefore, I continue to refer to the sonorant/obstruent distinction.

[5] Some of these patterns are mentioned in the literature on different Mixtec languages.

[6] See the discussion of nasalized vowels contiguous to nasal consonants in **3**.

The analysis accounts for the nonexistence of the forms listed above for the following reasons:

(4) Nasalization occurs on the right edge and spreads to the left. Therefore, a sonorant in the first syllable cannot be nasalized unless there are nasalized sonorants in the second syllable. This accounts for **tãta *ñãta *tãya *ñãya *ñaya *ñaa.*

Nasalization spreads to adjacent sonorants. Therefore, nasalized sonorants cannot be adjacent to oral sonorants. This accounts for **tãyã *tãya *taña *ñaya *yañã *ñãya *yãã *ñaa.*

Nasalization spread is blocked by obstruents. Therefore, the sonorants(s) of the first syllable cannot be nasalized if an obstruent consonant begins the second syllable. This accounts for **tãtã *yãtã *ñãtã *ñãta.*

Examples of attested oral words from Atatlahuca Mixtec (Alexander 1980) include the following (written in an intermediate level of representation): (*tata* pattern) *sučі* 'boy', *kɨtɨ* 'animal', *šiko* 'sells', *kuka* 'rich'; (*yaya* pattern) *yawu* 'hole', *weyɨ* 'below', *yuyu* 'dew, drop'; (*taya* pattern) *sawa* 'half, some', *kɨwɨ* 'day', *teyɨ* 'very, much'; (*yata* pattern) *yɨkɨ* 'bone', *witu* 'beam', *yata* 'back'; (*taa* pattern) *tee* 'man', *kaa* 'metal', *sɨɨ* 'happy'; (*yaa* pattern) *yaa* 'song', *yuu* 'rock', *yoo* 'month'.

Examples of attested nasal words from Atatlahuca Mixtec include: (*tatã* pattern) *kʷixĩ* 'white', *šitĩ* 'nose', *čɨkɨ̃* 'prickly pear fruit'; (*yatã* pattern) *witã* 'today', *yatĩ* 'near', *yɨkɨ̃* 'squash'; (*tãñã* pattern) *šĩnĩ* 'head', *tɨ̃ñɨ̃* 'mouse', *kɨ̃mɨ̃* 'star', *kɨ̃nɨ̃* 'pig', *xĩnĩ* 'knows'; (*ñãñã* pattern) *nãnĩ* 'long (pl.)', *nĩnũ* 'above', *mãnĩ* 'only'; (*tãã* pattern) *kũũ* 'four', *šĩĩ* 'side', *kʷãã* 'yellow'; (*ñãã* pattern) *ñɨ̃ɨ̃* 'salt', *nũũ* 'face', *mãã* 'self, precisely'.

3. The details. Although the proposal sketched above gives the essence of the analysis, there are various details that can be added to make the phonetic facts clearer and perhaps to give some idea of why this analysis has not been proposed earlier.[7] The following discussion centers on the phonetic realization of the sonorant consonants and the effects of low-level nasalization rules on some vowels. I give the proposed underlying forms written informally, using *w* to represent the labial sonorant, *n* to represent the coronal sonorant, *y* to represent the palatal sonorant, and ^{N} to represent morpheme-level nasalization.

First, in many varieties of Mixtec, the sonorants vary in pronunciation depending on whether they are oral or nasalized, and other factors. The labial

[7] The lack of any significant amount of morphology in Mixtec means that there is little, if any, morpheme alternation evidence to point the analyst to the claims made here, unlike in languages such as Desano (Kaye 1971).

sonorant is [m] if it is nasalized or preconsonantal, and usually [β] if oral. In some languages the oral variant may be [w], depending on the following vowel. It is reportedly [b] in Chalcatongo Mixtec (Macaulay 1985), and sometimes [b] in San Miguel el Grande Mixtec (Pike 1944:115). Silacayoapan Mixtec examples: *waʔa* [βaʔa] 'good', *waʔa*^{N} [mãʔã] 'raccoon', *xawa* [haβa] 'half', *kiwi*^{N} [kĩmĩ] 'star', *xaʔwa*^{N} [hãʔmã] 'clothes', *nawa*^{N} [nãmã] 'soap', *liwi* [liβi] 'pretty', *wali* [βali] 'small (pl.)', *wiši* [βiši] 'cold', *wixi* [βihi] 'sweet'.[8]

There are two coronal sonorants, a lateral one and a nonlateral one. The lateral one is always phonetically oral, apparently, and in native words is limited to phonologically oral contexts. The nonlateral coronal is [n] if it is nasalized,[9] and typically [n^d] if oral and prevocalic. In Nuyóo Mixtec (Larry Harris, personal communication), it is [n] even if oral. I take these facts to indicate that the coronal sonorant is assigned the default value [+nasal] in all Mixtec languages (by a late rule), but the feature which yields the oral release is assigned only by dialect-specific rules. Silacayoapan Mixtec examples: *lala* [lala] 'urine', *laʔwa* [laʔβa] 'frog', *naʔa* [n^{d}aʔa] 'hand', *naʔa*^{N} [nãʔã] 'come!', *yunu*^{N} [ñũnũ] 'hammock', *tina*^{N} [tĩnã] 'dog', *una*^{N} [unã] 'eight', *naʔyi* [n^{d}aʔži] 'mud'.

The palatal sonorant is [ñ] or [ỹ] if nasalized, and [ž] if oral. In some languages the oral variant may be [y] under certain conditions, and in Coatzospan Mixtec it is often phonetically voiceless (Pike and Small 1974). Silayacoapan Mixtec examples: *yaʔa* [žaʔa] 'child', *yaʔa*^{N} [ñãʔã] 'lady', *yuyu*^{N} [ñũñũ] 'honey', *yiwi* [žiβi] 'people', *kayi* [kaži] 'cough'.

Second, nasalized vowels which are contiguous to nasalized sonorants are generally articulated with only light nasalization. Otherwise they are heavily nasalized. This degree of nasalization difference has not been indicated in the representations given here, but it is widely reported for Mixtec.[10] There is, of course, no contrast between oral and nasalized vowels when the vowel is contiguous to a sonorant.[11]

[8] The Silacayoapan Mixtec examples are taken from North and Shields (1977). I follow Bradley (1965) and Josserand (1983) in viewing the so-called glottal stop of Mixtec as a feature of the vowel nucleus in Mixtec and not as a true consonant. The glottal stop is therefore essentially ignored in the discussion that follows.

[9] The nasal stop with an oral release has always been analyzed previously as either a prenasalized stop or a sequence of two stops. I transcribe it here as per the present analysis.

[10] Pike and Small (1974:129) state clearly that the degree of nasalization on a vowel after a nasal consonant is the same as the nasalization on a vowel after an oral consonant in Coatzospan Mixtec.

An examination of the literature shows that there is a great deal of variation in the degree of nasalization which is perceived on nasalized vowels in certain contexts (such as after nasal consonants such as [m], in unstressed syllables, etc.). Even vowel quality is important in some languages.

[11] It has often been pointed out that there is no contrast between oral and nasal vowels following nasal consonants. But it is also true that there is no contrast in the position preceding nasal consonants.

Third, in a few varieties of Mixtec, the coronal obstruent *t* is pronounced with a nasal transition before a nasalized vowel.[12] The obstruent nevertheless still blocks the spread of word-level nasalization. In some languages *t* is phonetically [t^n] before nasal vowels, as in Ñumí Mixtec (Gittlen and Marlett 1985:177): *yutu*^{N} [žut^{n}ũ] 'tree'.[13] In some others it is [N^n], a voiceless nasal with a voiced nasal transition to the following vowel, as in Atatlahuca Mixtec (Ruth Mary Alexander, personal communication) *yutu*^{N} [žuN^{n}ũ] 'tree', *wita*^{N} [βiN^{n}ã] 'today'; or even [n], as in San Miguel el Grande Mixtec *yutu*^{N} [žunũ] 'tree', *wita*^{N} [βinã] 'today'.[14]

Fourth, it has been reported for at least some varieties of Mixtec that a vowel preceding [n^d] is also slightly nasalized, as in Silayacoapan Mixtec *uno* [ũn^{d}o] 'fat'. This nasalization does not spread to a preceding sonorant consonant in languages such as Silacayoapan Mixtec, *towi?na* [toβĩ?n^{d}a] 'nopal cactus' (rather than *[tõmĩ?n^{d}a]). However, in other languages, it does spread to the preceding consonant, as in Coatzospan Mixtec [mĩ?n^{d}e] 'prickly pear'. I view this nasalization as due to a late rule that applies after the coronal sonorant receives default nasalization unrelated to the morpheme-level nasalization.

Fifth, in some languages nasalization spreads to the left through the obstruents *x* (light velar articulation) and *ð* to the vowel of a preceding syllable. This low-level process also does not nasalize the onset of that syllable. Examples include Coatzospan Mixtec *wiði*^{N} [βĩðĩ] 'sweet' (Pike and Small 1974) and San Miguel el Grande Mixtec *wixi*^{N} [βĩhĩ] 'cold'.

4. Further evidence. Once we change our view of [β]/[ž]/[n^d], from seeing them as fricatives and stop, to seeing them as the phonetic realiza-

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Previous analysts have been divided over how to analyze the lightly nasalized vowels. Josserand (1983:190, 234) suggests that (practical) orthography considerations may have affected some analysts' decisions to view the vowel after a nasal consonant as phonemically oral rather than phonemically nasal. I believe, however, that it is more likely due to the close attention to the phonetics of the words in question.

[12] This was pointed out to me several years ago by John Daly.

[13] This is also true of Peñoles Mixtec (Daly and Daly 1977) and Acatlán Mixtec (Pike and Wistrand 1974).

[14] The realization [n] of *t* in San Miguel el Grande Mixtec is limited to the unstressed second syllable onset.

The source of these and other San Miguel el Grande Mixtec data is Dyk and Stoudt (1965). Since the data in that book are written in a nontechnical orthography, there is no indication of whether there is nasalization on the first vowel or not. The form [žunũ] appears to contradict the present analysis until it is recognized that the [n] here is phonologically a coronal oral stop rather than a coronal sonorant; it blocks the spread of word-level nasalization to the initial consonant, just as in its cognates. Instrumental evidence should be adduced to determine whether indeed there is complete phonetic neutralization of *t* and the coronal nonlateral sonorant before nasalized vowels in San Miguel el Grande Mixtec.

tions of sonorant consonants, a major distributional restriction becomes clear.

North and Shields (1977:26) report that in Silacayoapan Mixtec the only consonants which occur after a checked vowel are [^{n}d], [β], [ž], [m], [ñ], [n], and [l]. (What they refer to as a prenasalized stop corresponds to what I consider n^{d}.) Referring to a similar set of segments, Bradley (1965:19) states that "if the tonic syllable is checked, the onset of the posttonic syllable is limited to a consonant from Classes Vii, XIII, XIV, XV, and XVI." Pankratz and Pike (1967:288) report that "a nasal, the nasal of a prenasalized stop [they only give [^{n}d] as an example—SM], and the voiced continuants /l, v, y/ are lengthened when occurring as the second consonant in a couplet." Arana and Swadesh (1965:14) state that the only consonants which follow a glottal stop in sixteenth-century Mixtec sources are the nasals and "semiconsonants," namely, [m], [n], [ñ], [^{n}d], [y], and [β]. In each case, this group of sounds is an ad hoc class in the analyses cited, but in the present one it is simply the class of sonorants. That is, under this analysis, a clear and simple distributional correlation between sonorants and glottalized vowels in Mixtec can be stated for the first time.

5. The significant variation. In a few Mixtec languages, obstruents do not block the spread of nasalization. In these languages, of course, the surface facts are quite different. I do not present a formal analysis of these languages, but the facts are clear.[15]

For example, in Tezoatlán Mixtec (Williams and Williams 1988), words like Nuxáa Mixtec [čukũ] 'fly' do not occur; the cognates have oral final vowels. There is a systematic gap in the distribution of nasalized vowels in that a morpheme must have at least TWO nasalized segments.[16] These facts are elegantly described in an autosegmental analysis which associates a single feature [+nasal] to more than one segment. Apparently, in Tezoatlán Mixtec, if [+nasal] is not attached to more than one segment, i.e., if it does not "branch," the word is ill-formed.

In Ocotepec Mixtec, a nonbranching feature [+nasal] also does not occur, but the facts are different from Tezoatlán Mixtec. Compare the following words from Atatlahuca Mixtec (which follows the typical pattern) and Ocotepec Mixtec (both sets of data provided by Ruth Mary Alexander). (These words provide striking evidence for the analysis which

[15] Mixtec languages which appear to behave in this way include Tezoatlán Mixtec (John and Judy Williams, personal communication), Eastern Jamiltepec (Pensinger et al. 1974), Mixtepec (Pike and Ibach 1978), Silacayoapan (North and Shields 1977), as well as a few others listed in Josserand (1983).

[16] Three enclitic pronouns are the only exceptions.

claims that there is a systematic correspondence between [n^d] and [n], and [ž] and [ñ].)[17]

(5)	Atatlahuca	Ocotepec	Underlying Forms and Glosses
	suk^{w}ã	*sũk^{w}ã*	*suk^{w}a^N* 'thus'
	n^{d}ixẽ	nĩxĩ	*nixe^N, nixi^N* 'wing'
	n^{d}ixẽ	nĩxã	*nixe^N, nixa^N* 'sandal'
	žɨkɨ̃	ñĩkĩ	*yɨkɨ^N, yiki^N* 'squash'
	žuN^{n}ũ	*ñũtũ*	*yutu^N* 'tree'
	žuk^{w}ã	*ñũk^{w}ã*	*yuk^{w}a^N* 'there'
	žaN^{n}ĩ	ñãtĩ	*yati^N* 'be near'
	žaxĩ	ñãxĩ	*yaxi^N* 'gourd'
	žukũ	*ñũkũ*	*yuku^N* 'furrow'

To account for the Ocotepec data, rule (2) must be revised. One possibility would be to allow the autosegmental feature [+nasal] to spread freely to any segment, but there would be no phonetic interpretation of this feature when it combines with obstruents. This version of spreading would ensure that all sonorants in a given morpheme are either oral or nasal, regardless of the presence of obstruents.

6. Some objections. The analysis outlined above is a novel one for Mixtec languages. Although it has been recognized since pioneering work by Kenneth Pike that the locus of nasalization is at the right edge of the word, this has been essentially taken as an idiosyncratic fact of individual Mixtec words, either by the distribution of nasalized vowels or the distribution of an (abstract) syllable-final nasal consonant (Pike 1944). And although it has been claimed that nasalization spreads leftward to adjacent vowels (Pike 1944), only Kaufman (1967:257–58), in a review of Dyk and Stoudt (1965), and Josserand (1983:242ff., 486) have suggested that [ñ] and [m] might be related to [ž] and [β]. However, the implications of these ideas were not developed for the synchronic analysis of Mixtec generally. In addition, the complementary distribution of [n] and [n^d] had not been noticed, nor the full range of phonotactic peculiarities of [ž]/[ñ] and [β]/[m]. Neither has there been any attempt to explicate the facts discussed in **2** and **4** above. The analysis presented here takes these ideas and observations and gives a unified account of the facts.

In this section, I examine facts which perhaps have prevented it from being proposed earlier and which might still be used as the basis for objections now. The first three types of exceptions are such that, if

[17] The expected forms for *wixi^N* 'cold' are reversed in these languages: the Atatalahuca word is [mĩxĩ] and the Ocotepec word is [βixĩ]. I do not know what is responsible for this fact.

integrated into the analysis at all, they may best be handled as lexical exceptions due to prelinking of the feature [+nasal]. In actuality, the exceptions are extremely few.

6.1. Loanwords. Loanwords exist in Mixtec languages which do not fit neatly into the analysis described above. This is not surprising. For example, San Miguel el Grande Mixtec has the word [lamũ] 'master, chief', glossed as 'amo, jefe' in Dyk and Stoudt (1965). The cooccurrence of *l* and *m* in the same root does not fit the Mixtecan pattern.

Other examples of loanwords not fitting the Mixtecan pattern include San Miguel el Grande [mẽku] 'gray' (from Mexican Spanish *meco* 'bright red color mixed with black') and San Juan Colorado Mixtec *mĩloñĩ* 'melon' (Stark, Johnson, and Lorenzo 1986).

6.2. Compounds. I have claimed that nasalization is a morpheme-level feature which spreads within the word. Compounds contain a boundary which also blocks spreading. Therefore, compound words and words which are etymologically related to compounds present superficial exceptions to the analysis given here.

Some other superficial exceptions come from the "prefixation" of a classifier, e.g., Atatlahuca Mixtec *nu^N-yuxe* [nũ-žuxe] 'pine grove' (the classifier is *nu^N*, related to *yutu^N* [žuN^{n}ũ] 'tree, wood'); Atatlahuca Mixtec *tu^N-no?o* [N^{n}ũ-n^{d}o?o] 'problem, affliction' (the classifier is *tu^N*, related to *tu?u^N* [N^{n}u?ũ] 'word' [Alexander 1980:53–54]). The Silacayoapan word *li?wa^N* [li?mã] 'scorpion' has the animal classifier *li*; compare San Miguel el Grande Mixtec *ti-su?wa^N* [tisu?mã], *li-su?wa^N* [lisu?mã] 'scorpion'. Another compound is the expression for 'people'; Atatlahuca Mixtec has *ya^N-yuu* [ñã-žuu], but this is reduced to [ñĩβi] in San Juan Mixtepec (Josserand 1983:587).

6.3. Other exceptions. The word for 'cat' is [βilu] in many varieties of Mixtec but [mĩlu] in others. This exceptional word with a nasal in the first syllable and a nonnasal second syllable may also be due to the influence of the loanword for 'cat', which appears in other varieties of Mixtec as [mĩtu] or [mĩstu]. There are a few more examples, such as San Miguel el Grande [mĩtu] 'deer' and [mẽke] 'brain', which are still unexplained.

6.4. Prenasalized stop series? In some Mixtec languages, it has been argued that there is a prenasalized stop series, of which the segment I have been writing as *n^d* is only one.[18] If such a series truly exists, this could be a problem for the analysis proposed here. How would such a series coexist with [n^d] as the oral variant of *n*? On the other hand, the existence of consonant clusters would not conflict with the present analysis.

First, it should be pointed out that in some varieties of Mixtec the so-called prenasalized stops other than ^{n}d occur exclusively or almost exclusively in loanwords, and perhaps only rarely at that. No other putative prenasalized stop occurs in Josserand's list of Proto-Mixtec reconstructions. Since loanwords not uncommonly introduce new segments and clusters into a language, the presence of ^{m}b (or *mb*) in a Mixtec language (as in Silacayoapan Mixtec [mbaa] from Spanish *compadre* 'co-father' or in San Miguel el Grande Mixtec [rengo] from Spanish *renco* 'lame') cannot in itself indicate that ^{m}b or ^{n}g has been incorporated into the core phonology of Mixtec.

I favor an analysis which allows for consonant clusters such as *mp* [mb], *nt* [nd], *nč* [nǰ], etc. If some Mixtec language allows *n*C clusters, then one might expect to find consonants other than stops following the nasal. In fact, San Miguel el Grande Mixtec has examples such as *kanso* 'to kick'.

Phonetic facts also ostensibly support the cluster analysis over the prenasalized stop analysis. Pike (1944:115) points out that the prenasalized stops "tend to unvoice the occlusion in morpheme-medial position."

7. Conclusion. I have argued that the feature [+nasal] should be analyzed as an autosegmental morpheme-level feature in Mixtec languages. It links to the right edge of the morpheme and spreads to adjacent segments (usually only sonorants). The result is a much simpler view of the phonological system, which has helpful repercussions elsewhere in the phonology of this language family. The class of sonorants in Mixtec has been fully unmasked.

The implications of this analysis of nasalization are obviously quite significant for the descriptions of individual Mixtec languages. The segments *m*, *ñ*, *β*, *ž*, and ^{n}d should no longer appear in lists of phonemes or in underlying representations without much more careful justification.

The implications for the reconstruction of Proto-Mixtec (Longacre 1957, Mak and Longacre 1960, and Josserand 1983) and possibly Proto-Otomanguean (Rensch 1976) are also significant. Josserand's analysis anticipates some, but not all, of these implications in that she posits proto-*y* and proto-*w*, and omits *m*, *β*, *ž*, and *ñ*. Barring new evidence from other Mixtec languages, I believe that two revisions should be made. First, her proto-^{n}d should be eliminated; the reconstructed form for 'water' (an oral

[18] The most explicit argumentation is given in Stark (1947). He essentially gives one argument for the prenasalized stop analysis. He claims that "no consonant clusters except those which begin with glottal stop are permitted within any morpheme" in Mixtec (1947:28).

word) would be *nute* rather than *^{n}dute*. Second, morphemes which have the reflex [n] in prevocalic position should be reconstructed with morpheme-level nasalization; the reconstructed form for 'man's brother' must be *yeni^{N}* rather than *yeni*, for example.

This analysis also means that another language family must now be considered with respect to various important theoretical issues, including the nature and behavior of morpheme-level features, the organization of features, underspecification, the lexical vs. postlexical rule distinction, opacity, and locality.

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