

Marginal contrast, categorical allophony, and the Contrastivist Hypothesis

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Recent work in phonology has reinvigorated debates on the classic issue of the relationship between phonemic contrast, representational feature specifications, and phonological activity. The Contrastivist Hypothesis (Hall 2007, Dresher 2009) states that only contrastive values of a feature are visible to phonological computation. On the other hand, Nevins (2010) argues that phonological processes can be parametrized to refer to marked but non-contrastive feature values. At stake is whether phonological representations of segments are constrained by the inventories within which they occur, or to what extent representations can be determined by principles external to the fact of language-specific phonemic opposition.

Nevins (2010: 214) cites Huave, a language isolate of Mexico, as problematic for the Contrastivist Hypothesis: Huave vowels in the San Francisco del Mar dialect must be specified for [+round] due to a process of labial dissimilation (Kim 2008), yet [+round] is not contrastive within the 5-vowel inventory /i e a o u/. However, Dresher (2011) reanalyzes such cases with the Successive Division Algorithm, arguing that contrast is defined not by minimal phonemic distinction, but by the structure of oppositions within the inventory. Under this analysis, [+round] *is* contrastive on an adequately nuanced analysis of the Huave vowel system, and the Contrastivist Hypothesis still holds.

In this paper, I claim that Huave in fact represents a third type of possibility: that the set of phonologically active features can include non-contrastive features (in this case [+round]) whose presence in representations is nevertheless still motivated system-internally, specifically by their role in categorical allophony. This entails two arguments: first, that categorical allophony exists in Huave and must be represented in the phonology; and second, that [+round] is the feature distinguishing the allophones.

The relevant phenomenon involves a case of “sub-allophony” among diphthongs within an allophonic monophthong-diphthong alternation. In San Francisco del Mar Huave, underlying /i/ surfaces unchanged only in open syllables (1a) or before a palatalized coda consonant (1b).

- (1) a. /pi/ → [pi] ‘chicken’ b. /ɲic/ → [ɲic] ‘palm (tree)’

Before plain (i.e. non-palatalized) coda consonants, /i/ diphthongizes to [jə] or [jɜ]. The distribution of these diphthongs is allophonic: [jɜ] appears before fricatives (2a-c), and [jə] appears before all other plain codas (2d-f). That these are phonological diphthongs, as opposed to coarticulatory artifacts, is suggested by the robust presence of two steady states in the diphthongs’ formant trajectories.

- (2) a. /ciht/ → [cjɜht] ‘road’ d. /cicim/ → [cicjəm] ‘beans’
b. /kis/ → [kjɜs] ‘dog’ e. /a-cits/ → [acjɜts] ‘think’, 3sg.
c. /a-ciϕ/ → [acjɜϕ] ‘eat’, 3pl. f. /cik/ → [cjək] ‘hill’

Based on original field data, I argue that the [jə]/[jɜ] alternation – despite being noncontrastive – belongs to phonological computation and is not a matter of phonetic implementation. Acoustic analysis of 50 diphthong tokens before plosives, nasals, and fricatives from one speaker reveals no overlap in F1 values of [ɜ] and [ə]: before bilabials, all pre-fricative F1 values are under 430Hz, while pre-plosive and pre-nasal F1 values overlap significantly and are all over 430Hz; before coronals, a similar clean break obtains at 450Hz.

Importantly, while there are plausible diachronic motivations for pre-fricative vowel raising, I argue that neither aerodynamic nor acoustic factors can account for the categorical nature of the synchronic pattern, nor do they explain phonological constraints on its occurrence. In particular, acoustic analysis (n=31) of the phonetically similar vowel [o] shows no evidence of raising before fricatives.

Crucially, pre-fricative raising overapplies in the context of /h/-deletion before sonorant codas (3). Here the process cannot be phonetically conditioned, since the phonetic conditions are not present; acoustic evidence again confirms the patterning of these vowels with pre-fricative tokens. Huave thus presents a notable case of opaque allophony.

- (3) a. /pih-t/ → [pjʂht] ‘lie down’, 3sg. completive diminutive
 b. /pih-m/ → [pjʂm] ‘lie down’, 3sg. subordinate diminutive

Thus it appears that diphthongization creates vocalic elements, namely [ə] and [ʂ], that are not present in the Huave phonemic inventory but must still have unique feature specifications since they arise in the phonological component. The proposed representations make some correct predictions regarding the behavior of these vowels, and eliminate an apparent instance of underapplication opacity.

Following Kim (2008), [ə] is analyzed as receiving [+back] from the following consonant, but possessing no other features. Here I propose that pre-fricative raising to [ʂ] is represented with the addition of a [+high] feature. Neither [ə] nor [ʂ] ever acquires [+round], despite the frequency of rounded realizations phonetically similar to [o] and [u]. The lack of [+round] correctly predicts the underapplication of labial dissimilation with diphthongs without the need for an opaque rule ordering where dissimilation precedes diphthongization; such an ordering is also independently problematic for morphophonological reasons.

The analysis gives rise to a situation in which [u] is [+back], [+high], and [+round], while [ʂ] is [+back] and [+high]. On this analysis the feature [+round] is needed to distinguish these two vocalic elements, whose distinct phonological behavior is shown by the underapplication of dissimilation with [ʂ]. However, despite the derived contrast in (3b), Nevins’s (2010:70) strict definition of contrast is not met because [ʂ] occurs only as the second half of a diphthong and not as a stand-alone vocalic nucleus.

Consequently, [+round] is best regarded as necessary for distinguishing allophones rather than phonemes: in a sense it is motivated by contrast, and hence available for phonological manipulation, but the overall argument is that previous notions of the system-internal motivation of feature specifications and potential for phonological activity have been too narrow. The Huave case suggests, first of all and contrary to recent trends, that not all cases of allophony reduce upon experimental observation to phonology-external mechanisms; and secondly and relatedly, that the phonological representation of non-contrastive yet categorically distinct entities must be taken seriously, with consequences for phonological theory.

References

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