

The emergence of (un)natural classes

Innate feature theory predicts that a small set of distinctive features can describe most if not all classes of segments which participate in phonological alternations. Since the mid 20th century, distinctive features have been widely assumed to be part of Universal Grammar, but this prediction has never explicitly been tested. Drawing on evidence from the first large-scale survey of natural and unnatural classes, this talk argues that natural class behavior and distinctive features are epiphenomena of independently-motivated phonetic, cognitive, and social factors. These factors are manifested on the small scale in language use and language acquisition, and on the large scale in language change. In this account, Emergent Feature Theory (EFT), natural and unnatural classes receive the same explanation, that they enter synchronic grammar as a result of sequences of diachronic changes. Some sequences (resulting in “natural” classes) are more common than others. It is shown that apart from this, there is little motivation for a natural/unnatural distinction.

A survey of phonologically active classes in 561 languages (those with grammars in a large university library) reveals that unnatural classes are widespread. 6078 unique classes of sounds which are targets or triggers of phonological processes are analyzed in three popular feature theories (*Preliminaries*, Jakobson, Fant, & Halle 1954; *SPE*, Chomsky & Halle 1968; and Unified Feature Theory, Clements & Hume 1995). No single theory is able to characterize (i.e. represent with a conjunction of features) more than 72% of the classes, and over 24% are not characterizable in *any* of the theories. While some approaches to innate features allow for unnatural classes as idiosyncrasies, it is shown that there is no objective way to partition classes into natural and idiosyncratic categories. Ranking classes by crosslinguistic frequency of occurrence reveals no sign of a drop-off between natural and unnatural classes, and further reveals that natural and unnatural classes are interleaved. A potential caveat, the idea that unnatural classes are composed of smaller natural classes, is ruled out by a feature analysis of unnatural classes, which tend to have phonetic similarities but tend not to be built out of commonly-occurring natural classes, as would be predicted.

EFT accounts for natural class behavior in terms of independently-motivated external factors (including audition, attention, aerodynamics, coordination, categorization, and social identity) which shape sound patterns in predictable ways. While it is argued that all groupings of segments which pattern together are arbitrary, some classes are favored by these factors, and therefore are more likely to recur, to be interpreted by linguists as “natural”, and to have features created for them. Two specific mechanisms by which natural classes emerge are:

1. **Sound change**, whereby a set of segments may be targeted for their phonetic properties (e.g. nasals and vowels emerging as classes in vowel nasalization)
2. **Generalization**, whereby a learner may misinterpret a sound pattern as applying to the wrong set of segments, which is likely to be a phonetically-coherent set

In EFT, phonetic similarity, rather than a set of phonetically-defined features, predicts likely classes. Because of this, EFT is able to account for another phenomenon which innate features are ill-equipped to handle: segments which are ambivalent in their phonological patterning (e.g., /l/, which patterns as [+continuant] in some languages and as [-continuant] in others). It is shown that EFT correctly predicts that ambivalent segments will be those which are phonetically ambiguous with respect to a given opposition, and therefore are able to be involved in generalizations originating from segments at either pole. Finally, a very rudimentary model of phonetic similarity which is rooted in experimental data rather than phonetic features is shown to predict attested classes at least as accurately as the innate feature theories.

All of these findings lead to the conclusion that innate features are unnecessary. Moving beyond innate features opens up previously obscured synchronic and diachronic sources of explanation and areas of investigation. Happily, many of the insights which have resulted from 40+ years of research in distinctive features can nonetheless be maintained and recast in terms of emergent features.

References

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