Moving beyond innate features: a unified account of natural and unnatural classes

Since the mid 20th century, distinctive features have been widely assumed to be part of Universal Grammar. While the theory of innate features predicts that a small set of distinctive features can describe most if not all natural classes, this prediction has never been explicitly tested. The usefulness of distinctive features in phonological analysis is clear from decades of research, but demonstrating that features are innate and universal rather than learned and language-specific requires a different kind of evidence. This paper presents the results of the first large-scale crosslinguistic survey of natural classes. Based on data from 561 languages, the survey reveals that unnatural classes are widespread: among 6078 unique classes of sounds which are targets or triggers of phonological processes, 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 more than 72% of the classes, and over 24% are not characterizable in any of the theories. While other theories are able to account for specific subsets of these classes, none is able to predict the wide range of classes which actually occur and recur.

Even so, many approaches to innate features allow for the existence of unnatural classes as idiosyncrasies or historical oddities. However, it is shown in this paper that there is no objective way to partition classes into natural and idiosyncratic categories. Many apparently unnatural classes recur in multiple languages, and ranking classes according to frequency results in a bell-like distribution which slopes gently from the common classes which are easily described in phonetic terms and easily characterized in traditional phonetically-defined features, all the way down to the rare classes which occur only once in the survey. Not only is there no visible boundary between the natural and the unnatural, the two are interleaved, with some of the most common unnatural classes being more frequent than most natural classes, and with the vast majority of the natural classes which are predicted by combining distinctive features completely unattested. While many unnatural classes are describable as the union of two natural classes, the most common of the classes which can be analyzed in this way are composed of phonetically-similar segments, but analyzable only as the union of classes which are very rare on their own, casting doubt on the idea that they are simply the result of the cooccurrence of classes predicted by the theory.

Even without these findings, there are many reasons to be suspicious of the idea that distinctive features are innate. Humans have been evolving (separate from other primates) for a relatively short time. For all distinctive features, including the uncommon ones, to have emerged in the human genome, humans must have been exposed to contrasts motivating all of them at some time before the life of a common ancestor of all modern humans who have all these features (all humans). This includes the distinctive features for sign languages, which appear to use entirely different phonological features and feature organization (e.g., Brentari 1998, Corina and Sagey 1989, Sandler 1989), even though deafness is generally not hereditary. All of this evidence, along with the survey results, point to the conclusion that the distinctive features used in language are learned rather than innate.

Many different types of explanation are available to account for all the ways in which sounds may be grouped together. As is shown, sounds may be grouped together as a result of their shared participation in a sound change, and sounds with high frequency may also be grouped together in phonological patterns. Many groupings can be attributed to phonetically-based generalizations, and it is seen that the segments which are the most fickle in their patterning crosslinguistically are those whose phonetic cues are the most ambiguous, regardless of the features traditionally used to define them. These sources predict that classes will tend to involve phonetically similar segments, and the use of phonetically-defined distinctive features is only one way of describing classes of phonetically similar segments. While these types of explanations are often invoked to account for “idiosyncratic” unnatural classes, it is shown that they are even better at accounting for “natural” classes, and the result is a unified account of what were previously considered to be natural and unnatural classes.
References


