

Internal evidence, external evidence, and phonetically-based phonology

Stefan A. Frisch
University of South Florida

As connections between the cognitive sciences are developed, there is a natural tendency to attempt to apply the views and methodology from one branch to another branch in search of new insights into old problems. For example, studies of the psychology of language (aka psycholinguistics) have used behavioral experiments to explore speech perception, speech production, and the organization of the mental lexicon. Behavioral experiments have also been used to explore the linguistic competence or grammar of the speakers of a language. These experiments have often found that subjects' intuitions about their language are more complex and detailed than would be expected from a linguistically-based model of their grammar (i.e. the rules and constraints created by linguists based on their investigation of the patterns of the language). The use of tools from a second area of cognitive science, computer/information science, has resolved this apparent mismatch. When linguistic patterns are analyzed using large lexical or text corpora, the patterns themselves are found to be as detailed and complex as the judgments provided by native speakers.

This talk will present examples from two cross-linguistic studies of consonant combination using internal and external evidence. It has long been known that combinations of consonants, for example in consonant clusters, are restricted in various ways cross-linguistically. One such restriction is sonority sequencing. Sonority is a property of consonants roughly corresponding to the degree of opening of the vocal tract to produce the consonant. Stops have low sonority, while liquids and glides have high sonority. There is a cross-linguistic preference for consonant combinations with large sonority differences (e.g. /dr/ stop and liquid), and for the sonority of the cluster to rise toward the vowel nucleus of the syllable (e.g. "dry" not "rdy"). This talk will present the findings from a cross-linguistic corpus study of consonant clusters that shows consonant combination patterns have quantitative regularities (i.e. gradience) that are unexpected in traditional grammatical analyses.

Another restriction on consonant combination has been observed in the patterns of lexical roots in the Semitic languages (and elsewhere). There are long-distance restrictions on consonant repetition within stems in which combinations of similar homorganic consonants are avoided. Once again, corpus analysis shows that similarity avoidance patterns are gradient. In addition, the gradient patterns are reflected in the well-formedness judgments of experiment participants.

The gradience of internal evidence (when studied with corpus techniques) suggests that the phonological restrictions on consonant combination in these studies have phonetic bases in speech perception and speech production. Both sonority sequencing and similarity avoidance enhance distinctiveness for speech perception, and simplify speech production. The fact that native speaker judgments reflect the gradient language patterns suggests that (part of) the phonological grammar is emergent, meaning it is derived from direct abstraction over lexical patterns. While these views are (or once were) considered controversial, careful consideration reveals that these findings are compatible with a variety of positions on other core issues in linguistics, such as the rules vs. constraints approach and the innateness of linguistic competence.