

Phonetic naturalness and unnaturalness in Japanese loanword phonology

This paper addresses a general question of phonetic naturalness in phonology, and argues that phonetic naturalness and phonetic unnaturalness co-reside within a single grammar. In Japanese loanword phonology, only voiced geminates, but not voiced singletons, can devoice to dissimilate from another voiced obstruent (e.g. /doggu/ → [dokku] ‘dog’ vs. /dagu/ → *[daku] ‘Doug’). To express this generalization, I propose within Optimality Theory (Prince and Smolensky 2004) that the faithfulness constraint for voicing is split into two constraints, Faith(+voi)_{Singleton} and Faith(+voi)_{Geminate}, and they are ranked as Faith(+voi)_{Singleton} » Faith(+voi)_{Geminate}. I show by way of experimentation that the ranking Faith(+voi)_{Singleton} » Faith(+voi)_{Geminate} derives from different perceptibility of voicing in singletons and geminates: voicing in geminates is less perceptible, and hence easier to neutralize in phonology. In other words, the ranking Faith(+voi)_{Singleton} » Faith(+voi)_{Geminate} has its basis in its perceptibility i.e. it is phonetically natural (Kawahara 2006).

The devoicing of voiced geminates arises due to OCP(+voi), a constraint against two voiced obstruents. The constraint OCP(+voi) is a phonetically unnatural constraint, divorced from its original phonetic motivation. Ohala (1993) suggests that dissimilation takes place when cues of a feature spread through coarticulation—given two occurrences of such a feature, listeners hypercorrect and posit only one feature rather than two. Under Ohala’s theory of dissimilation, however, voicing should not dissimilate because it does not have spread cues. I argue in fact that OCP(+voi) is a case where a phonological pattern is rendered phonetically unnatural due to a sound change (Hyman 1977). OCP(+voi) in Modern Japanese originated as OCP(prenasal) in Old Japanese, and the prenasalization involved spread cues (Takayama 1992). Therefore OCP(prenasal) is a phonetically natural constraint, which became phonetically unnatural when the prenasalization contrast became a voicing contrast.

In Japanese loanword phonology, OCP(+voi) interacts with the ranking Faith(+voi)_{Singleton} » Faith(+voi)_{Geminate}, causing devoicing of geminates, but not singletons. The interaction suggests that phonetic naturalness (the ranking Faith(+voi)_{Singleton} » Faith(+voi)_{Gem}) and phonetic unnaturalness (OCP(+voi)) co-reside within a single grammar. I thus conclude that phonological restrictions can be liberated from their original phonetic motivations due to a sound change as is the case for OCP(+voi), but they still interact with phonetically-grounded constraints.

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