

Many researchers have posited a relationship between speech perception and phonology. Optimality Theory (Prince & Smolensky 1993) has allowed functionally-motivated constraints to be more easily incorporated into phonology, and while perceptual accounts of phonological phenomena have become more prevalent, there has been a shortage of experimental evidence to support them. This paper seeks to help fill that gap by providing evidence from a perception experiment involving a deletion process in Turkish, showing that perception influences phonology, and that phonology also influences perception.

Kohler (1990) hypothesizes that sounds which are less perceptible are more likely to be altered than more salient sounds, i.e., that the tendency to reduce articulatory movements is countered by perceptual and social constraints (see also Hura, *et al.* 1992, Steriade 1997, 2001a,b). For example, Steriade (1997) finds that voicing neutralization is more common in positions where there are fewer cues to voicing. Hume and Johnson (2001) claim that a variety of external factors, including perception, interact with the cognitive symbolic representation of a language's sound system, with the external factors both influencing and being influenced by the phonology. In this paper, experimental evidence is presented to support these claims.

The phonology of Turkish is fertile testing ground because Turkish /h/ is often deleted in fast speech (Lewis 1967, Sezer 1986), but only in a specific set of segmental contexts which defy traditional explanation. For example, /h/ is optionally deleted before and after voiceless fricatives (*tahsil* ~ *ta:sil* 'education' and *safha* ~ *safa* 'step'), but it is only deleted *before* sonorant consonants (*fihris* ~ *fi:rist* 'index', but *merhum*, \**merum* 'the late'), and only *after* voiceless stops (*ethem* ~ *etem* proper name, but *sahte*, \**sa:te* 'counterfeit').

It is shown in this paper that the environments where /h/ deletes in Turkish are environments where lower perceptibility is expected, drawing on syntagmatic contrast, temporal asymmetries in the auditory system (Bladon 1986, Wright 1996), and the perceptual superiority of CV transitions over VC transitions (Fujimura *et al.* 1978, Ohala 1992). /h/ has three main segment-internal cues to its presence: aperiodic noise in and above the F2 region, lack of a strong F1 resonance, and lack of voicing. The perceptibility of /h/ is influenced by its context, specifically by how the acoustic characteristics of nearby sounds enhance or mask these cues.

A crosslinguistic perception experiment reveals that /h/ is in fact less perceptible in the environments where it deletes, and further that language background has a significant impact on speech perception. The results show that Turkish /h/ deletion occurs in environments where not only Turkish but also Arabic, English, and French listeners have difficulty perceiving /h/, indicating that /h/ deletion in Turkish corresponds to a more universal perceptual pattern and therefore that speech perception influences phonology. The native languages of the subjects in the study represent a wide range of possible distributions of /h/, and several ways in which the patterns of perceptibility of the other three languages differ from Turkish and from each other show that language-specific phonological and phonetic details also influence speech perception.

The experiment results demonstrate the bidirectional relationship between speech perception and phonology. Further, although the question remains whether the domain of perception's influence is limited to diachrony (Newmeyer 2001 *inter alia*) or whether the influence of perception is active in the synchronic grammar (Steriade 1997 *et seq.*), this account of Turkish /h/ deletion leads directly to an empirical means of testing the predictions of these conflicting theoretical assumptions.