

## Lexical ambiguity and acoustic distance in discrimination

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**Abstract.** This work presents a perceptual study on how acoustic details and knowledge of the lexicon influence discrimination decisions. English-speaking listeners were less likely to identify phonologically matching items as the same when they differed in vowel duration, but differences in mean F0 did not have an effect. Although both are components of English contrasts, the results only provide evidence for attention to vowel duration as a potentially contrastive cue. Lexical ambiguity was a predictor of response time. Pairs with matching duration were identified more quickly than pairs with distinct duration, but only among lexically ambiguous items, indicating that lexical ambiguity mediates attention to acoustic detail. Lexical ambiguity also interacted with neighborhood density: Among lexically unambiguous words, the proportion of ‘same’ responses decreased with neighborhood density, but there was no effect among lexically ambiguous words. This interaction suggests that evaluating phonological similarity depends more on lexical information when the items are lexically unambiguous.

**Keywords.** lexical ambiguity; acoustic distance; auditory perception

**1. Introduction.** In perceptual tasks, how does acoustic distance in different characteristics influence discrimination and how might that interact with lexical ambiguity? Listeners can be sensitive to acoustic distance within phonological categories (Lieberman et al. 1957; Pisoni & Tash 1974), though much of the work on acoustic distance in discrimination in just a few characteristics, particularly VOT. It is unclear whether acoustic distance would have similar effects across different characteristics.

Lexical ambiguity can influence processing of words (e.g. Kellas et al. 1988; Borowsky & Masson 1996), but most studies on ambiguity effects use orthographic stimuli, leaving open questions about how lexical ambiguity influences perception of acoustic input. Sanker (2019) demonstrates differences in responses to acoustically presented pairs of lexically ambiguous words and lexically unambiguous words; some differences can be attributed to acoustic differences between homophone mates in production (cf. Guion 1995; Gahl 2008), though other differences suggest an effect of ambiguity itself in how an acoustic stimulus is evaluated.

This work presents a perceptual study on how sub-phonemic details and knowledge of the lexicon influence decisions in a discrimination task. English-speaking listeners were less likely to identify phonologically matching paired items as the same when they differed in vowel duration, but differences in mean F0 did not have an effect. Distance in duration also had an effect on response time, but only among lexically ambiguous items, suggesting that lexical ambiguity mediates attention to acoustic detail.

**1.1 PRODUCTION OF ACOUSTIC DETAIL.** Despite their matching phonological identity, homophone mates can exhibit relatively consistent phonetic differences in production due to factors such as lexical frequency (e.g. Guion 1995; Gahl 2008) and part of speech (e.g. Sorensen et al. 1978; Conwell 2017). However, differences are found most reliably in natural speech (e.g. Gahl 2008; Lohman 2017), and can disappear when words are produced outside of their

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