



# ASSIMILATION, AMBIGUITY, AND THE FEATURE PARSING PROBLEM

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## ABSTRACT

Productive phonological processes including English coronal place assimilation appear to neutralize some lexical contrasts, and thus pose problems for spoken word recognition. The current work explores two questions: (1) can strong spontaneous assimilation create lexical ambiguity, and (2) how do listeners resolve potential lexical ambiguity. Two form priming experiments explored lexical activation created by strongly assimilated, potentially ambiguous prime items. In the first experiment listeners showed selective priming for the item corresponding to the underlying form of the probe item despite its surface similarity to another word. The second experiment replicated the first, but with post-assimilation context replaced by silence. The loss of this context lead to parallel access of items corresponding to both the underlying and apparent surface forms of the prime. It is suggested that assimilated coronals simultaneously encode coronal and non-coronal place and that listeners disambiguate conflicting place cues by associating coronality with the final segment of the assimilated item, and non-coronality with the subsequent segment.

## 1. INTRODUCTION

Rule governed phonological modification is typically viewed as an impediment to spoken word recognition. Processes such as assimilation appear to neutralize lexically significant phonetic contrasts. For example, the coronal /t/ in the English word *right* may assimilate the labial place of the subsequent segment in the phrase *right berries*. This produces a segment that appears to be the labial [p], potentially creating confusion between the words *right* and *ripe*. The neutralization of this place contrast might generally be expected to create a great deal of confusion for listeners. The potential for neutralization has inspired several researchers to propose mechanisms that might allow listeners to discover the underlying coronality of the final segment in *right* [1,2,3,4,5].

While English coronal place assimilation is generally characterized by phonologists as a discrete neutralizing change in the value of the place feature, there is reason to believe that listeners do not hear it this way. A range of articulatory, acoustic and perceptual data suggests that place assimilated segments simultaneously display characteristics of their underlying coronal place of articulation, and the place of the following segment [3,4,5,6,7,8,9]. This new characterization changes the computational problem faced by the listener. Rather than having to cope with the loss of place information, listeners may have to cope with an overabundance of weak,

potentially ambiguous or conflicting place information. Both characterizations might be expected to lead to lexical ambiguity, but each places different constraints on the form of potential mechanisms for resolving ambiguity. If a contrast is completely lost it cannot be reconstructed reliably through phonological or phonetic inference. For example, [raip] could correspond to either *right* or *ripe* if followed by a labial. However, if assimilation creates an amalgam of place information that can only be derived through the assimilation of an underlying coronal by a subsequent non-coronal, inference or basic perceptual mechanisms may allow listeners to reconstruct both the underlying place of the assimilated segment, and the place of the subsequent segment. Evidence already exists that suggests that listeners anticipate the place values of segments that provide a context for assimilation [1,3].

This paper will explore the question of whether English coronal place assimilation can create lexical ambiguity for listeners, and will explore the possible mechanisms that might allow listeners to ultimately disambiguate them.

Experiment 1 will explore the question of whether English coronal place assimilation can create lexical ambiguity. The cross-modal form priming paradigm was employed to examine the pattern of lexical activation caused by the presentation of strongly assimilated items whose surface forms approximate other items. Priming was used to determine if listeners activate the word corresponding to the surface form, the underlying form, or both items.

## 2. EXPERIMENT 1

### 2.1 Method

**Materials.** Ninety-three familiar monosyllabic words which ended in coronal segments and had neighbors differing only in the place of articulation of the final segment were selected as potential prime items. These items were placed in sentential contexts in which the following word began with a stop consonant that shared the place of articulation of the items non-coronal neighbor. For example, *right* ends with the coronal segment /t/, and has the neighbor *ripe* that ends in the labial segment /p/. The word *right* was therefore placed in a context in which the next segment was the labial /b/ (e.g. *This time she tried to use the right berries for her pie*). This context was calculated to induce labial assimilation of the /t/ and produce a word that sounded like *ripe*. Care was taken to construct contexts in which either interpretation (*right* or *ripe*) was contextually appropriate. An experimentally naïve speaker selected for the pronounced tendency towards robust