Neutralization of Epenthetic / Underlying [t] Contrast in Nasal-Fricative Clusters

In this paper, I present results from a production experiment that shows complete neutralization of underlying and epenthetic [t] in Southern California English [ns]-[nts] clusters (occurring in word pairs such as prince-prints). As this contrast has been previously described as incomplete, this experiment provides evidence that incomplete neutralization may be a transitional phase rather than a stable and functional state as has been previously claimed.

In some varieties of English, there is epenthesis of [t] in [ns] clusters. This creates a possible neutralization with [nts] clusters where the [t] is underlying. Port and Fourakis (1986) results showed a difference both in closure duration and presence of burst but Yoo and Blankenship (2003) find no difference in closure duration. In a production experiment that elicited words in a naturalistic phrase and varied word frequency and familiarity, Arvaniti (2006) confirmed the neutralization between underlying and epenthetic [t]s. The goal of the experiment that I present here is to show that even in slower, more careful speech, subjects cannot produce a contrast between epenthetic and underlying [t]s.

Methodology: The experiment tested speaker ability to produce a contrast between epenthetic and underlying stops in three minimal pairs of words (prince-prints, mince-mints, quince-quints) and in three different speech conditions; a naturalistic phrase ("Jane met the prince, but didn't like him"), lab speech ("I will say prince a few more times") and a forced contrast ("I said prince not prints").

There were 6 native speakers of Southern Californian English aged 18-25. The stimuli were presented in a PowerPoint presentation and responses were recorded digitally. The naturalistic phrase and the lab speech stimuli were interspersed with an equal number of fillers. For the naturalistic phrase, subjects were encouraged to speak naturally. For the lab speech, they were asked to speak more carefully and for the forced contrast, they were asked to produce the underlined word in such a way that although the researcher was sitting with his back to the screen, he would know which word was being produced. A Praat script was used to automatically extract the following durations from the hand annotated waveforms: word, vowel, nasal, closure, burst, [s], and [nts] sequence.

Results: Where [t] closure occurred, closure duration for epenthetic [t] for all conditions and underlying [t] for lab speech and natural conditions are not statistically different (repeated measures ANOVA p > .03). However, the length of closure for the underlying [t] in the forced contrast condition was significantly longer (repeated measures ANOVA p > .01). Neither the epenthetic/underlying contrast nor the speech style affected the duration of the burst. These results show that the only area where the neutralization of epenthetic and underlying [t] in these nasal-fricative clusters may be incomplete is in the forced contrast with underlying [t] reflected in the spelling. However, as the closure duration is not shorter in the epenthetic environment for forced contrast, this may well be simply an effect of orthography.

Conclusion: Based on previous findings that showed the neutralization of [t] in nasal-fricative clusters is incomplete, this data tends to show that incomplete neutralization may well be a transitional state and that research on the functionality of incomplete neutralization needs to be re-evaluated over time.