UC Merced

Title
Separating the Effects of Duration and Neighborhood Density in Nonword Repetition Latency

Permalink

Journal

ISSN

Authors
Lipinski, John
Gupta, Prahlad

Publication Date
2003

Separating the Effects of Duration and Neighborhood Density in Nonword Repetition Latency

John Lipinski (john-lipinski@uiowa.edu)
Department of Psychology, University of Iowa
Iowa City, IA 52242 USA

Prahlad Gupta (prahlad-gupta@uiowa.edu)
Department of Psychology, University of Iowa
Iowa City, IA 52242 USA

Introduction

One of the most interesting results in the study of neighborhood effects on nonword repetition has been Vitevitch & Luce's (1998) finding that increased neighborhood density has a facilitatory effect on nonword repetition latency. However, analysis of the stimuli used by Vitevitch and Luce (1998) reveals a mean stimulus duration difference of 16 ms that may have contributed to the observed difference. Experiment 1 presents a replication of the basic response latency effect and Experiment 2 presents a reduction of the effect to nonsignificance after controlling for stimulus duration differences through stimulus extension and compression.

Experiment 1

Method

Fifteen undergraduates from the University of Iowa participated in this experiment. Stimuli consisted of 240 consonant-vowel-consonant (CVC) spoken nonwords used by Vitevitch and Luce (1998). Half of these stimuli were classified as high neighborhood density nonwords. The other half consisted of low neighborhood density nonwords. Twelve items were selected out for the purposes of practice and were not included in the final analyses. Individuals were instructed to repeat the auditorily presented nonwords as quickly but as accurately as possible.

Results

A significant mean difference in repetition latency between the high ($\underline{M}$=951.98, $\underline{SD}$=68.27) and low ($\underline{M}$=970.89, $\underline{SD}$=72.48) density stimuli was obtained for both subject $\underline{F}_1(1,14)$=25.67,$\underline{p}$=.0002, and item analyses, $\underline{F}_2(1,226)$=5.19, $\underline{p}$=.02. Repetition accuracy was 74% for the high density stimuli and 82.3% for the low density stimuli, $\underline{F}(1,14)$=8.86, $\underline{p}$=.01.

Experiment 2

Method

Fifteen undergraduates from the University of Iowa participated in this experiment The stimuli were created by expanding or compressing the durations of the stimuli used by Vitevitch and Luce (1998) and in Experiment 1. To match the high density and low density sets for duration, we first calculated the mean stimulus duration separately for the high density and low density sets, obtaining mean durations of 690ms ($\underline{SD}$ = 89.9) and 706ms ($\underline{SD}$ = 67.99), respectively. The average of these means provided a target mean duration of 698 ms. The durations of stimuli in each of the high and low density sets were digitally modified so as to achieve this mean duration without altering pitch. The mean modification in stimulus duration was 5.7% for high density stimuli and 5.2% for low density stimuli. These modifications yielded a final mean duration of 698 ms for both the high and low neighborhood density nonword sets. Participants were instructed to repeat auditorily presented nonwords as quickly but as accurately as possible.

Results

A same-different control experiment with 20 participants showed equivalent proportions of "Same" responses, thus indicating no appreciable distortion of the stimuli as a results of the stimulus duration manipulation. The mean difference between the high ($\underline{M}$=974.42, $\underline{SD}$=56.04) and low ($\underline{M}$=980.58, $\underline{SD}$=52.38) density stimuli was 6.16 ms and was not significant by subjects, $\underline{F}_1(1,14)$=2.01, $\underline{p}$=.18, or by item, $\underline{F}_2(1,226)$=.36, $\underline{p}$=.55. Repetition accuracy was 72.3% for the high density stimuli and 82% for the low density stimuli, $\underline{F}(1,14)$=18.49, $\underline{p}$<.001.

Discussion

Although Experiment 1 replicated Vitevich & Luce's (1998) latency advantage for high density, this advantage disappeared when mean duration was controlled in Experiment 2. This suggests that the previously reported results may have arisen from durational differences rather than from differences in neighborhood density.

Acknowledgments

References

Vitevitch, M.S. & Luce, P.A. (1998). When words compete: Levels of processing in perception of spoken words. Psychological Science, 9, 325-329.