Using Backward Masking to Study Lexical Competition In the Interactive Activation Model of Word Recognition

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Overview

Backward masking with human subjects is used to test a fundamental processing commitment of the Interactive Activation model of word recognition (McClelland & Rummelhart, 1981), direct competition between lexical representations. The model's performance in a simulation of backward masking is not compatible with that of human subjects.

Introduction

In several studies, Ohnesorge & Theios (1996) have shown that the phenomenon of backward masking is influenced by the processing demand of the masking stimulus, and is not simply the result of low level interactions between the features of the target and masking stimulus. In those studies, subjects were asked to identify words that had been masked by other words. In a typical experiment the masking sets were words that were either high or low in printed frequency. The featural similarity between the sets of high and low frequency masks was closely controlled, as was the degree of similarity of each set to the set of target stimuli. The results of these studies reveal that high frequency masking words are much less effectivethan low frequency masking words, $\underline{\varepsilon}$ = .64. We conclude that this result is consistent with a model in which lexical elements share capacity, but do not directly compete with each other.

In the current investigation we asked whether the Interactive Activation model of word recognition (McClelland & Rummelhart 1981) produces the same pattern of results as human subjects. This is an important question because direct competition between lexical items IS a fundamental assumption of this model. We present the results from two studies, one with humans and one with the simulation, in which we concurrently manipulate the printed word frequency and orthographic neighborhood size of the masking words.

Results and Conclusion

The IA model produces a pattern of results opposite that of human observers, In the simulation High frequency masks drove target activation down more quickly than did Low frequency masks, consistent with direct competition but not capacity sharing.

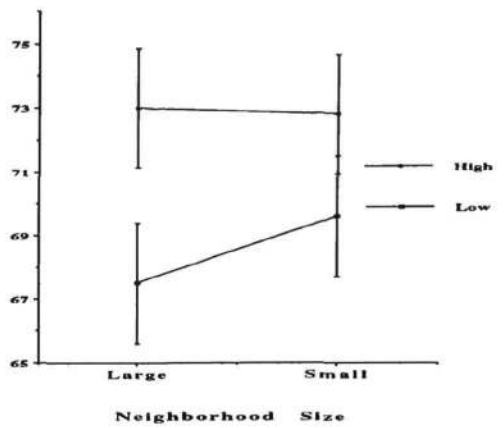

Figure 1: Target recognition Human Observers

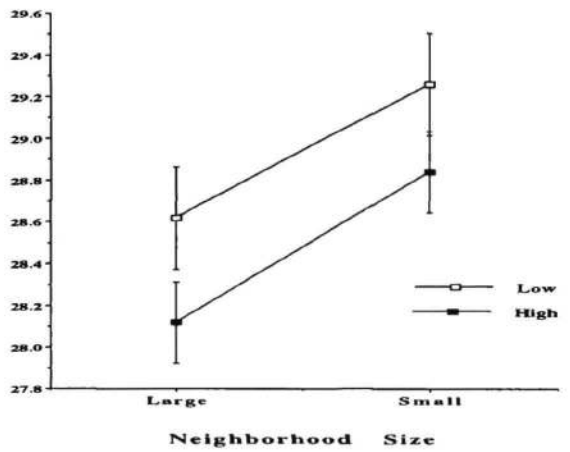

Figure 2: Processing Cycle during which the activation of the target was driven below zero. IA model

References

McClelland, J., L., & Rumelhart, D., E. (1989). Explorations in Parallel distributed Processing.The MIT Press. Cambridge, MA.

Ohnesorge, C., & Theios, J. 1996. Backward Masking Reflects the Processing Demand of the Masking Stimulus. *Proceedings of the 18th Annual Meeting of the Cognitive Science Society.*