



How Low Can You Go: Spatial Frequency Sensitivity in Pure Alexia

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R. STARRFELT, S. NIELSEN, T. HABEKOST & T. ANDERSEN. How Low Can You Go: Spatial Frequency Sensitivity in Pure Alexia. Objective: Pure alexia is a seemingly selective deficit in reading, following focal lesions to the posterior left hemisphere. The hallmark feature of pure alexia is a word length effect in single word reading, where reaction times may increase with hundreds of milliseconds per additional letter in a word. Other language functions, including writing, are intact. It has been suggested that pure alexia is caused by a general deficit in visual processing, one that affects reading disproportionately compared to other visual stimuli. The most concrete hypothesis to date suggests that pure alexia is caused by a lack of sensitivity to particular spatial frequencies (e.g., Fiset et al., 2006), and that this results in the characteristic word length effect, as well as effects of letter confusability on reading times.

Participants and Methods: We have tested this hypothesis in a patient with pure alexia (LK). LK shows significant effects of word length and letter confusability on reaction times in single word reading, while her writing and other language skills are intact. In two experiments, we investigate LK's performance with simple patterns of different spatial frequency (Gabor patches), and compare this to normal controls.

Results: We find that both in a detection and a classification paradigm, LK shows normal sensitivity for all spatial frequencies. **Conclusions:** On this basis we conclude that neither the word length effect, nor the effect of letter confusability on reading times, can be explained by a lack of sensitivity to particular spatial frequencies. Thus, the explanation for the reading performance of patients with pure alexia is likely to be found at a higher level of processing.

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