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Semantic richness modulates early word processing within left-lateralized visual brain areas and enhances repetition priming

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Abstract: Repetition priming has been shown to be modulated by prior knowledge about structural regularities (Stark & McClelland, 2000). Here, we examined influences of higher-level semantic knowledge, more specifically the richness of semantic representations, on repetition priming. The EEG was recorded while twenty-four participants performed a visual lexical decision task on 160 words and 160 pseudowords. Within the word stimuli, we orthogonally manipulated two measures of semantic richness, namely the number of semantic features (McRae et al., 2005) and free associations (Nelson et al., 2004); the whole stimulus set was presented twice. The number of semantic features modulated the amplitude of the posterior N2 component over left occipito-temporal areas. This effect arose only about 30 ms after the onset of lexicality effects on left-lateralized N170 amplitudes, presumably reflecting visual word form processing within the fusiform gyrus. Thus, word form and meaning are accessed in rapid succession within left-lateralized visual brain regions. Repetition priming was consistently enhanced for words with many semantic features in both performance and ERP data, suggesting a role for feature-based semantic richness in word repetition priming.