THE CITY UNIVERSITY OF NEW YORK
Abstract

Semantic Attention: Effects of Modality, Lexicality and Semantic Content

by

David Britton

advisor: Robert Melara, Ph. D.

Since the discovery of the Stroop Effect in 1935 questions about the role of language vs. non-lexical stimuli in selective attention remain. Early researchers attributed the powerful distracting influence shown in the Stroop task, naming the color in which a spelled word is printed when incongruent with the color name the word spells, to an automaticity of language that gives it privileged access to meaning, but many others since have shown various ways to reduce or even reverse this distracting effect of an incongruent word. This study addresses this by using EEG to record neural activity along with reaction time and accuracy in a temporal flanker selective attention paradigm that uses all combinations of visual and auditory modalities with word and non-word lexicality as both flanking distractors and as targets, manipulating attention using semantically congruent and incongruent trials, thus controlling for the effects of modality, lexicality and semantic congruence on the selective attention task of ignoring the flankers and discriminating the target. We found that in addition to strong main effects of each of these factors, many complex two and three-way interaction effects shifted the effects of each factor depending on the levels of the other factors. We confirmed that the condition of semantic incongruence disrupts attention, shown by reduced performance accuracy and indexed by stronger peak of the N2 ERP between 250 and 310 ms after the target stimulus presentation. We found no support for the hypothesis that words have privileged automaticity, since stimulus lexicality, whether the distractor or target was a word or non-word, did not have a significant main effect on response accuracy. We found that the sensory modality of the distracting and target stimuli , whether auditory or visual, had complex interactions with their word or non-word lexicality that

influenced the disrupting effects of semantic incongruence on attention. We propose a model based on 2 well-established frameworks in the neuroscience of attention, that of multiple networks governing 3 stages of attention processing, and parallel multi-modal sensory processing being bottlenecked by sequential language processing, to interpret these interacting effects on attention.