

Stroop matching task: role of feature selection and temporal modulation

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Abstract We conducted an event-related potential (ERP) study to investigate the electrocortical dynamics of attentional feature-based processing in the Stroop matching task. Participants in the study ($n = 37$) compared the ink color of a colored word with the meaning of a color-word in white ink. The two task stimuli were presented simultaneously or with SOAs (Stimulus Onset Asynchrony) of

400 and 1,200 ms. The Stroop matching effect was maximal during SOA-0, was reduced at SOA-400, and was inverted at SOA-1200. We focused the ERP analysis on the N1 component. Paralleling the behavioral results, the N1 amplitude was greater for congruent stimuli than incongruent stimuli during SOA-0. This difference was attenuated at SOA-400, and at SOA-1200, an inverse pattern was observed. The results provide evidence that early selection processing participated in the Stroop matching task phenomenon and also suggest that the temporal modulation of early attention is a function of task characteristics such as SOA.

Keywords Stroop · ERP · Feature attention · Matching task

Introduction

Selecting relevant aspects of the visual scene when facing multiple, conflicting stimuli features is required for the complex visual environment in which we live. The Stroop effect describes the increased time to respond to a target feature in the presence of one or more incongruent but irrelevant features. In the traditional Stroop task (Stroop 1935), a pronounced delay occurs when a word such as BLUE appears in a different ink color (e.g., red), and participants are asked to name the color while ignoring the word. There are many variations of the original Stroop task. In this study, we focused on the so-called Stroop matching task, in which congruent or incongruent Stroop stimuli were presented with either a colored patch, a sequence of colored “X”s, or another color-word printed in neutral ink (Durgin 2003; Goldfarb and Henik 2006; Luo 1999; Mascolo and Hirtle 1990; Simon and Berbaum 1988;

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