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Stroop interference with Sesame Street Characters

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Abstract

The Stroop task is a robust task, making it a useful assessment of automatic processing, it is also associated with reading ability. This limits the utility of the Stroop task to children with a sufficient reading level. Non-word Stroop tasks may be alternatives for non-readers or beginning readers. For example, Prevor and Diamond (2005) showed that Stroop interference could be obtained using pictures (e.g., heart, frog). This study explored using Sesame Street characters to create Stroop interference. Elmo, Kermit, and Cookie Monster were shown in red, green, and blue to first through fourth grade students. RTs for color incongruent trials were close to 100 msec slower than color congruent trials indicating Stroop interference (d = .96). Therefore, this modified version of the Stroop appears to be an acceptable picture-based measure of automatic processing in elementary age students.

Introduction

The Stroop task is a robust task, making it a useful assessment of automatic processing, associated with reading ability. In fact, MacLeod (1991) noted that “[v]irtually everyone who can read shows a robust Stroop effect from an early age.” Research suggests that interference tends to increase until approximately a third-grade reading level, around 7 to 9 years of age (Armengol, 2002; Braet, Noppe, Wagemans, & de Beeck, 2011; Comalli, Wapner, & Werner, 1962; Everatt, Bradshaw, & Hibbard, 1999; Faccioli, Peru, Rubini, & Tassinari, 2008; Fournier, Mazzarella, Riccardo, & Fingeret, 1975; Rand, Wapner, Werner, & McFarland, 1963; Wright, 2014). However, this limits the utility of the Stroop task to children with a sufficient reading level. Therefore, is it possible to find Stroop (or Stroop-like) interference without using words? Prevor and Diamond (2005), for example, showed that Stroop interference could be obtained using colors and pictures (e.g., heart, frog). This study similarly examines whether Stroop-like interference can be obtained using colors and characters (e.g., Muppets) commonly associated with particular colors. It was anticipated that characters presented in incongruent colors would result in longer RTs for color naming.

Method

Participants
Participants were 16 elementary school students. Four of the participants were removed due to excessive errors (1) or refusing to complete all the experimental trials (3). The remaining 12 participants (7 boys) had a mean age of 8.5.

Design
Three characters (i.e., Elmo, Kermit, and Cookie Monster) were randomly presented in their typical colors (i.e., red, green, and blue) and in each of the two incongruent colors for a total of 90 trials (30 congruent and 60 incongruent).

Procedure
Participants were instructed to identify the color of each character with a key press using a number pad (1 = red, 2 = green, 3 = blue). Thirty trials were given to practice the number coding. After completing the practice trials, participants completed the 90 experimental trials.

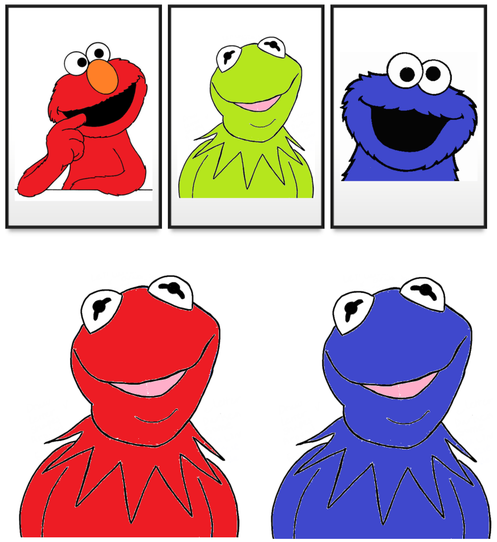

Figure 1. The top panel shows that images presented during instructions. The bottom figures show the incongruent color-pictures for Kermit the Frog.

Results & Discussion

Mean RTs for the congruent trials was 1675.07 msec (SD = 452.95) and 1769.20 msec(SD = 494.43) for the incongruent trials. The difference was statistically significant (t(11) = 3.31, p < .003, d = .96).

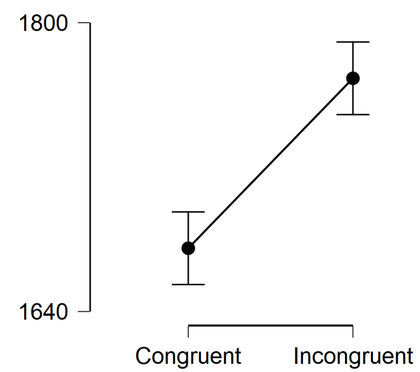

Figure 2. Difference between mean RTs for congruent and incongruent conditions (±1 SE).

This finding indicates that Stroop-like interference can be obtained without using words. Instead of creating interference between a color and a word (or a picture and a word), Stroop inference can be found by creating a conflict with a known color association. The importance of this finding is that Stroop interference can be assessed without the confounding factor of reading ability. Implications of this finding are significant both theoretically and practically. Theoretically, finding interference with color associated items is consistent with the different strength pathways of the parallel distributing processing model of Stroop interference (Cohen, Dunbar, & McClelland, 1990). On a practical level, attentional issues are often present with learning disabilities. In a study of poor and normal readers, Wang and Gathercole (2015) found that poor readers exhibited greater interference on a color-word Stroop task. However, when using a non-verbal spatial version of a Stroop task, they found that poor and normal readers show similar levels of interference. They concluded that differences on the Stroop task across readers is due to reading difficulties and not due to underlying differences in interference processing. Thus, combining verbal and non-verbal (or word and non-word) Stroop tasks may also have diagnostic value.

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