The Potency of Auditory Distractors: More Than Just Attention Capture?

Danielle A. Lutfi-Proctor & Emily M. Elliott

Introduction

Stroop (1935; Expt. 2)
- XXXX
- XXXX
- XXXX
- Brown
- Purple
- Red

- Slower RTs to name the color ink if paired with a conflicting color word.

Cross-Modal (CM) Stroop

See a stimulus:
Hear a stimulus:

- Name the color of the visual stimulus (Cowan & Barron, 1987)

Stroop Asymmetry

One hallmark of the Stroop effect is the Stroop asymmetry. Essentially, words interfere with color naming to varying degrees across different stimulus onset asynchronies (SOAs), but colors never interfere with word reading.

Cross-Modal Stroop Asymmetry

Roelofs (2005) conducted an examining the asymmetry of this cross-modal Stroop task and concluded the same asymmetry is displayed as in classic Stroop.

The Present Study

Is this cross-modal Stroop paradigm due to the same mechanisms as the classic Stroop task? If not is it due to pure semantic interference, or attention capture?

Hypotheses

Stroop mechanisms (broadly defined as dimension strength conflict):

- Signs of the distractor serving as a warning cue when presented first.
- Exaggerated interference effects when the distractor is presented around response time (distractor second).
- May also display semantic effects as attended items can be semantically analyzed (Lachter et al., 2004).

Attention Capture

In all experiments participants named the color of the ink or repeated an auditory color words for a 2 (Task) x 3 (SOA) x 4 (Trial Type) within-subjects design.

Experiments

Experiment 1

Experiment 2

Experiment 3

Results

SOA

• Sound First SOA
• Simultaneous SOA
• Square First SOA

• Visual Targets
• Auditory Targets

Baseline

• It takes longer to repeat a word than name a color.
• Both visual and auditory distractors can serve as a warning cue if presented first, but visual distractors seem to be less likely to do so.
• Color squares appear to aid color word repeating, even if incongruent.
• Adding written words does not appear to impact visual color naming if always the same, but does impact auditory color word repeating.
• Having the written word and visual color mismatch on incongruent trials had a dramatic impact on visual targets but not auditory ones.
• A sound presented right before visual color naming dramatically harms performance, but not always because of its semantic content.

Conclusions

• The classic Stroop asymmetry was not found, suggesting the Stroop dimensional imbalance theories cannot explain this cross-modal Stroop effect.
• Auditory and visual targets did not display identical patterns of results suggesting that pure semantic interference is not responsible for the effect.
• There was evidence of attention capture as suggested by the warning-cue-like effects and the harm of a distractor being presented during response giving.

Therefore, this cross-modal Stroop effect is driven by a number of factors and cannot be explained by any current theories without at least some modification to them.

References


dlutfi1@lsu.edu; eelliott@lsu.edu