



A Hemispheric Emotion Stroop Task

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Introduction

- The standard Stroop task pairs color names with congruent or incongruent ink colors. Decisions about ink color are faster for congruent than for incongruent pairs (Stroop effect).
- A common account of the Stroop effect is that processing color names is faster and more automatic than processing ink color. The former interferes with the latter.
- We developed a lateralized Stroop task that paired colors or emotion names with emotional expressions and required nonverbal responses.
- Questions:**
 - Does the faster task or the more automatic task affect the slower (speed account) or less automatic one (automaticity account), resulting in a larger Stroop effect?
 - Is there a hemispheric difference in the emotion Stroop given right hemisphere specialization for emotions?

Experiments

Participants were right-handed UCLA undergraduates, half male and half female.

Experiment 1: Colors - Cartoons

- (n = 26) (Figure 1.1, Table 1, Figure 2)
- Stimuli:** Lateralized cartoon faces (happy, angry) paired with color backgrounds (yellow, red).
 - Tasks:** Identify the color of the stimulus or the emotion of the stimulus.
 - Response:** Bimanual two-choice button presses.
- Participants rated their familiarity with the associations "happy-yellow" and "angry-red."
- Results:**
 - Color identification was not faster than emotion identification.
 - There was a significant correlation between the difference in speed of the two tasks and the size of the Stroop effect in the emotion task (speed effect).
 - Familiarity did not correlate with the Stroop effect.
 - Discussion:**
 - Speed model is supported.
 - Automaticity model is not supported.

Figure 1.1

Congruent stimuli



Happy - yellow

Angry - red

Incongruent stimuli



Angry - yellow

Happy - red

Figure 1.2

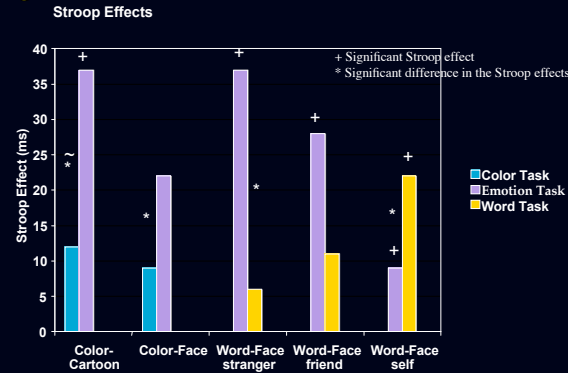
Incongruent stimuli



Angry - yellow

Happy - red

Figure 2



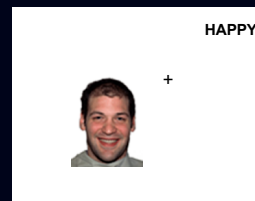
Experiment 2: Colors - Stranger's Face

- (n = 36) (Figure 1.1, Table 1, Figure 2)
- Stimuli:** Cartoon faces were replaced with pictures of real faces.
 - Discussion:** Real faces did not increase the Stroop effect, and the automaticity account is not supported for that reason.

Experiment 3: Words - Stranger's Face

- (n = 29) (Figure 1.2, Table 1, Figure 2)
- Rationale:** Replace the **association** between the two dimensions with **identity**.
 - Stimuli:**
 - Same faces as in Experiment 2.
 - Replace the background color by the name of the emotion, printed next to the face.
 - Results:** The Stroop effect was largest.

Figure 1.3



Experiment 4: Words - Friend's Face

- (n = 102) (Figure 1.3, Table 1, Figure 2)
- Rationale:** Replace the stranger's face with a friend's face.
 - Results:**
 - No task effect.
 - Speed effect in the face task, not in the word task.
 - Greater Stroop effect in the right hemisphere.

Experiment 5: Words - Self Face

- (n = 98) (Figure 1.3, Table 1, Figure 2)
- Rationale:** Replace the friend's face with participant's own face.
 - Results:**
 - No task effect.
 - Speed effect in both the face task and the word task.

Table 1

Experiment	Stroop Effects	Speed Effect	Automaticity Effect	Visual Field Effect
1	12, 37 ms	-, +	-	-
2	9, 22 ms	-, -	-	-
3	47, 6 ms	+, -	N/A	-
4	28, 11 ms	+, -	N/A	+
5	9, 22 ms	+, +	N/A	-

Conclusions

- The color-emotion Stroop tasks exhibited a significant but modest Stroop effect.
- The "speed account" of the Stroop effect is generally supported.
- The "automaticity account" of the Stroop effect is not supported.
- The two hemispheres have similar Stroop effects for cartoons, stranger's faces, and self faces, but there is right hemisphere specialization for Stroop effects with friend's faces.
- A non-verbal Stroop can be useful for measuring executive attention in pre-literate children, illiterate populations, or in cases where language use must be avoided.

References

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- Weekes, N.Y. & Zaidel, E. (1996). The effects of procedural variations on lateralized Stroop effects. *Brain and Cognition*, *31*, 308-330.