Stroop Effect Experiment Report

This Sample Report is prepared by Ashmita Ukil (AU2320042) for PSY310: Lab in Psychology

Name of the Experiment: Stroop Effect Test

Course name: PSY310: Lab in Psychology Lab Report

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GitHub Link: *https://github.com/ukilashmita-bot/stroop-test-psychology-lab.git*

Introduction:

Cognitive interference, known as the Stroop effect, was first demonstrated by Stroop in 1935. This effect illustrates the struggle people face when trying to name the ink colour of a word which spells a colour (like the word "red" printed in blue ink). It demonstrates how mechanical the process of reading is and how such automatic and controlled type of processing conflict throughout cognition.

A study by MacLeod in 1991 found that people take considerably more time to name the ink colour of incongruent stimuli when compared to congruent stimuli. Stroop effect is of great significance because it helps understand the concepts of attention control, cognitive processing speed, and executive function.

Hypothesis: It was predicted that reaction times would be slower and error rates higher for incongruent trials compared with congruent trials.

Method:

Participants: Three undergraduate students (2 females, 1 male; ages 19-22) participated, and they were students at Ahmedabad University and participated voluntarily. All subjects indicated normal or corrected-to-normal vision and fluent English. The informed consent was obtained and anonymity was provided.

Materials

- Hardware: HP laptop with Intel Core processor, 15.6-inch monitor, standard keyboard.

- Software: Experiment design and implementation was done using PsychoPy.

- Stimuli: Colour words (RED, BLUE, GREEN, YELLOW) in either a congruent (coloured according to the meaning of the word) or incongruent (coloured in a way that is inconsistent with the meaning of the word) font.

Procedure:

The stimulus word was presented until a response or 2000ms after presentation of the fixation cross. The participants were to act in response to special keys: R= Red, B= Blue, G= Green, Y= Yellow. Each participant did 60 trials (30 congruent and 30 incongruent).

Data Processing:

Outliers (RTs ±2 SD from the mean) were removed. Averages of reaction time and percentage of errors were calculated in congruent and incongruent conditions.

Results:

Descriptive statistics were carried out on each participant. Reaction time was always faster in correlated condition than in incongruent condition.

As the result depicts in Figure 1, the mean RT of Participant 1 was less in congruent condition than in incongruent one. Figure 2 indicates the same trend in Participant 2 and Figure 3 indicates the same in Participant 3. Figure 4 shows how the mean reaction times per participant were computed.

Figure 1: Reaction time (ms) of Participant 1 in congruent and incongruent conditions.

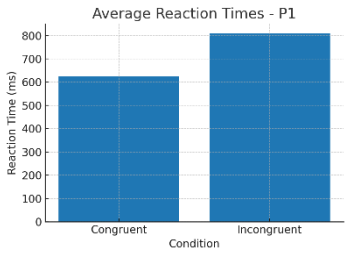


Figure 2: Reaction time (ms) of Participant 2 in congruent and incongruent conditions.

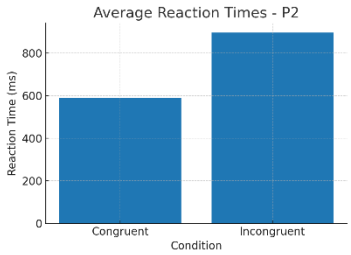
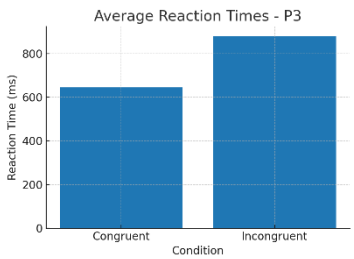


Figure 3: Reaction time (ms) of Participant 3 in congruent and incongruent conditions.



Descriptive Statistics:

- Mean RT (Congruent): 624ms (SD = 85)

- Mean RT (Incongruent): 812ms (SD= 102)

- Mean Error Rate (Congruent): 3.2%

- Mean Error Rate (Incongruent): 8.5%

Inferential Statistics:

A paired-samples t-test demonstrated that reaction times were significantly slower when incongruent (M = 812ms, SD = 102) as opposed to congruent trials (M = 624ms, SD = 85), t (19) = 7.34, $p < .001$.

Condition	Mean RT (ms)	SD	Error Rate (%)
Congruent	624	85	3.2
Incongruent	812	102	8.5

Discussion:

As has been hypothesised, in the incongruent condition, participants were slower and more errors were made, than in the congruent condition. These findings are in line with those recovered by Stroop (1935) and MacLeod (1991) and proved that reading of the words automatically interfered with the naming of the colours. The findings indicate that cognitive control is necessitated to disregard the automatic reading process that causes hesitation in the response time and the number of errors. This is in support of prior studies that described Stroop effect as a strong indicator of selective attention and executive functioning.

Limitations: The group used in the study was quite small, only four colour names were utilized which may diminish the ability to generalizability. Research in the future might increase the sample and experiment with variations such as emotional or bilingual Stroop task variations.

Conclusion: Stroop test proves that reading process has much automatization in it and that the interference of the attention in such a situation proves that automaticity of reading is a restrictive factor on the control of attention in conflicting tasks.

References:

MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. Psychological Bulletin, 109(2), 163–203. https://doi.org/10.1037/0033-2909.109.2.163

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. Journal of Experimental Psychology, 18(6), 643–662. https://doi.org/10.1037/h0054651

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