Responding to congruent stimuli quicker than incongruent stimuli

This experiment was conducted to prove that an individual responds to congruent stimuli quicker than they would to incongruent stimuli. The hypothesis was proven wrong when it the experiment showed that the participants responded quicker to the incongruent stimuli rather than the congruent stimuli.

The participants took part in the experiment via a computer at their disposal. The experiment involved words flashing on screen (either in the colour it described or the word conflicted between what colour it was written in and what it described) and the participant had to respond as quick as possible to the word. When the participant had finished taking part in the experiment, they were prompted to record their results and submit them to another website.

This data was then analysed by the researcher who drew up their conclusions. Firstly it was found that the significance level was reached, and secondly it was determined that individual respond quicker to incongruent stimuli proving the hypothesis wrong and the alternate hypothesis correct.

This study was created to determine if there is a correlation between the response time of people when exposed to two different types of stimuli (which are congruent and incongruent stimuli). This experiment is similar in many ways to the original experiment conducted by John Ridley Stroop in 1935.

Stroop reported in the Journal of Experimental Psychology in 1935 what is now known as the Stroop effect. Stroop’s results suggested that interference can possibly occur between the automatic process of naming a word and the

more difficult challenge of stating what colour the word is (The Stroop Task, 2010). The original Stroop effect experiment was and still is quite simple overall to carry out, it is therefore the most widely used variation of the Stroop effect experiment. A number of other variations of the experiment have been formed over time, to determine things such as the effect emotion has on interference.

The Stroop experiment is therefore a very adaptive and clinical psychological experiment that can be used to test a wide range of cognitive processes which cause can competition or conflict between them. However the Stroop effect experiment is not without its flaws. Probably the biggest problem is that it naturally assumes that after completing a certain task repeatedly (like an individual putting their socks on before their shoes) that task then becomes automatic. An automatic process can be defined as an instant response to a stimulus that requires no thought. Although this is a flaw within the Stroop experiment its usefulness and flexibility in detecting interference between many different cognitive tasks still makes it the definitive and incredibly valuable experiment where cognitive psychology is concerned.

The experiment was conducted on 24, 1st Year Arts students who had selected Psychology as part of their course in the National University of Ireland Galway.

The general hypothesis was that the participant’s reaction times would be slower overall responding to incongruent stimuli in comparison to congruent stimuli. The alternative hypothesis for this experiment determines that there

could be a large difference in the subjects' response times between the congruent and incongruent stimuli. Also the null hypothesis deems that there will be no great difference in the response times of the subjects between the congruent and incongruent stimuli.

The purpose of this experiment is to remove the assumption that repeating a certain task over and over again does not necessarily mean that the process becomes automatic; there will still be some minor level of hesitation from any individual.

Methodology

Participants: There were 24 participants in total, which comprised of 14 female participants and 10 male participants. All the participants were 1st year Arts students in N. U. I Galway, who had selected Psychology as one of their four subjects (N= Number of participants).

Apparatus: The participants were all given details of the experiment on a page with the relevant details of the experiment and links to two websites for the participants to take part in the experiment in their own time. All the data gathered was analysed and sent off to a database for a researcher to review.

Procedure: The participants logged onto the first website given to them on the information sheet through a computer (either a personal computer or a computer in the university) in their own personal time. They took part in the experiment (which involved words flashing on screen and the participants reacting as quickly as possible) and their results were then shown on screen afterward. The participants then copied down the results and logged onto

the other website (also given on the information sheet) where they had to input the results for the compatible, incompatible and control trials. The websites automatically closed down after all of the participants had completed the experiment and submitted their data.

Statistical Test: The statistical test used to analyse the obtained data was the binomial test. This test was probably the best suited statistical test for the experiment as the gathered data only had two sets of comparable data.

Results

Descriptive Statistics

The descriptive analysis of the data was carried out by the Microsoft Excel computer program. All times in this section are given in milliseconds. The data is illustrated in tabular form in Table 1 and in graphical form through a bar chart in Figure 1.

Table 1

Congruent

Incongruent

Total

21280

17625

Average

908. 875

734. 375

Standard Deviation

745. 516355

248. 7713832

Max

4010

1357

Min

367

425

Inferential Statistics

The binomial test was used to calculate the inferential statistics of the experiment. The binomial test revealed that P= 0. 032 (P= the significance level) was less than 0. 05 and therefore the results are deemed to be significant. There were seven participants who had slower incongruent reaction times in comparison to the congruent reaction times which contradicts the original hypothesis(K = Number of participants whose incongruent reaction times were slower than congruent reaction times).

Discussion

In the end the hypothesis was proven to be false and the alternate hypothesis was proven to be correct. The experiment has proven, with the majority of participants having a quicker incongruent reaction time in comparison to the congruent reaction times, that the hypothesis was right. The reason for this is that when an individual sees an error, they react quicker to the conflicting information than to the congruent data. A factor that should have been addressed is that the participants could have done the experiment anywhere and therefore, some outside distractions may have affected the outcome of the experiment. Also the gender inequality may have also had an impact on the overall result as both genders were not equally tested.