Studies of interference in serial verbal reactions

Business

When Stroop introduced his “ Studies of interference in serial verbal reactions” in 1935, he indicated that in experimental psychology circles such studies had already been carried out on a large scale for decades. The “ Stroop” effect can be defined as a pattern of interference that produces a delay in response to a given stimulus because of an association somehow made between that stimulus and another possible response. The ability to manipulate stimuli in a laboratory situation has given rise to the discovery of several forms of Stroop effects. However, the effect most generally considered “ Stroop” is the phenomenon of the interference that exists between color and printed words.

If, for example, a person is given a list of words printed in conflicting colors (that is, if the word “ green” is printed in the color yellow) and asked to name the colors, the word (which names a different color) usually interferes with the naming of that color (Hintzman et al., 1972; Stroop, 1935). This interference of the word upon the color occurs to a much more significant degree than that of the color upon the naming of the word (1935). Methods of explaining these interference phenomena have been as varied as the phenomena themselves. When considering the effect of alternate color names upon the naming of a color, experimenters have theorized that interference occurs because all the responses involved come upon the “ tip of the tongue” and get in each others way in a manner that produces a delay (Hintzmann et al., 1972).

Other theorists have posed the idea that the large effect that word names have upon color naming results from the greater amount of practice that people have had with reading (Lund, 1927, cited in Stroop, 1935; Hintzmann

et al., 1972). Few people have practiced color naming as much as they have practiced reading. In fact, Stroop’s study has managed to demonstrate that practicing the naming of colors can not only increase the reaction time in translating colors to words, but also increase the interference of an alternate color upon the naming of a word (that is, subjects start experiencing a greater delay in naming of the word “ red” if printed in the color green after practicing color naming.)Hintzmann et al., (1972) was also instrumental in introducing the condition of congruency, in which for one group the color names used matched the color in which the name was printed.

The idea behind this is that if the word itself is does produce and interference in the participant’s ability to name a color, then the use of a word that does name the color should remove the interference or even enhance the subject’s ability to name the color. In fact, the experiment done by Hintzmann et al. does support the enhancement idea, in that subjects were able to name colors faster once the words also represented the name of the color in question. Windes (1968) adapted the idea of the Stroop effect to numbers and counting. He designed a research program that involved subjects’ counting a series of symbols aloud and took note of the speeds with which they were able to perform this task.

These speeds were then compared with how fast they were able to count a series of numbers ranging from zero (0) to three (3). Windes was able to identify a similar pattern of interference, in that the numerals or digits being counted interfered with the actual counting, especially when both variables were incongruent. Subjects were able to count non-numerical symbols more quickly and accurately than they were able to count numerals. Other

researchers have done similar experiments based on this one. In 1971, Fox et al was able to show that participants performed counting tasks more slowly when the symbols being counted were numeric. Pavese and Umiltà (1999) demonstrated that participants were slower at judging the number of items in a row when the numbers were larger than five.

This inaccuracy became increasingly pronounced once the number of items to be counted increased from five (5) to nine (9), and even more so when these items were represented as conflicting numerals. Flowers et al., (1979) were able to demonstrate that interference also occurs if words being counted represented the verbal form of numerals. Therefore, participants performed more slowly when counting (four, four, four) as three (3) than when counting (cat, cat, cat). The current research sought to find out to what extent these explanations given for the Stroop Effect might be considered universal.

Would counting and number naming, for example, produce a similar interference upon each other as have been seen by other experiments done with color-word and state-city associations? The ordinary person has likely not had as much practice naming series' of numbers as he or she has had with reading words. Therefore, the effect of practice should not be as great a factor in any experiment done using counting and numbers. This experiment involved the use of a series of symbols and numbers and engaged the participants in counting both the number of symbols in each line of a series as well as counting the number of numbers in each row of a series. The tasks involved in this experiment were reading or counting of a series of digits or symbols as quickly and as accurately as possible. The digits and symbols

were placed within a single column. Participants were expected to begin at the top of the column and then systematically move down with speed and accuracy; that is, quickly and without skipping any items.

Participants did this with three different columns printed on three different pages. The first task involved naming at total of 32 numbers as fast and accurately as possible. The second task involved the count a number of symbols (+s) aloud (32 total), while the third task involved the counting of a number of digits (32 total). The experiment expects to determine whether or not using numbers as symbols interferes with counting or with the articulation of a conflicting number produced by counting. It will go further to determine what takes place when the number of symbols being counted matches the numeral represented by the symbols (for e.

g. three 3’s). The experiment will also attempt to gauge the extent to which these things occur. Rationale: If the time taken to count digits is longer than that taken to count the symbols, then it can be surmised that some kind of interference has taken place. Also, if the time taken to count a series of numbers that matches with the number of times each is represented is shorter, then congruency produces an enhancing or facilitative effect on counting.

However, if the time taken to count both digits and + symbols is equal or comparable, then one can say that no significant interference takes place between numerals (digits) and counting. Hypothesis One: The task of counting digits will take longer than the task of counting + symbols.

Hypothesis Two: The use of numerals that are congruent with the number produced by counting will increase the speed of counting.