Stroop methodology: attentional bias in alcohol drinkers

ASSIGN BUSTER

This study is on attentional bias in alcohol drinkers. In this experiment undertaken the main objective is to find out whether alcohol drinkers are likely to allocate their attention to alcohol-related words, because if our attention is owed to the alcohol-related content, or if our memory processes becomes occupied, the researcher should identify a delay in reaction when the participants are naming the colour of an alcohol-related word when presented. The study therefore hypotheses that moderate alcohol drinkers are likely to allocate their attention to alcohol-related words. For this study, there were 170 participants in total, all aged 18years plus. The Stroop task method was used on the computer (PC). The gathered results were entered into the computer (PC) to calculate descriptive and inferential statics, so the results could be seen visually and statistically. The results show there is significance to the prediction that attentional bias will influence our memory processes in relation to alcohol drinkers.

Introduction

Attentional Bias refers to the term not allowing one to examine all possible outcomes when judging about an association. Previous research stems from the famous “ Stroop effect” that was discovered in 1930 by J. Ridley Stroop. This was an experimental effect in which he discovered that the individual’s cognitive processing ability was very powerful. In other words ‘ The Stroop effect (Stroop, 1935) is a prime example of the human failure to attend selectively to a particular aspect of a complex stimulus’ (Algom, D., Chajut, E., & Lev, S. (2004). Since most researchers are interested in finding out things, the logical next step would be to develop further on and ask whether this actual delay in reaction time is due to moderate drinkers compared to

light drinkers. In order to test the effectiveness of this Stroop effect, one uses the colour words example. By this, we mean words that are written using same coloured ink i. e. red written in red ink, and words written in different coloured ink i. e. red written in blue. The participants are asked to read the words and not the colour. This sounds easier to do than it actually is. In this study the methodology and the affects of the Stroop test will be critically evaluated. To achieve this, previous research and literature will be drawn upon.

A study of Duka and Townshend (2001) demonstrated attentional bias associated with alcohol cues: differences between heavy and occasional social drinkers, they used a dot probe (alcohol-related pictures and words) and questionnaires, and the aim was to examine whether non-dependent heavy drinkers would differ in their selective attention towards alcohol-related stimuli compared to social drinkers, the results showed attentional bias amongst the heavy drinkers in relation to alcohol-related stimuli, scores in factors such as sociability and sexuality shown to also be high, but low on personality and persistence. A further study of Duka and Townshend (2004) demonstrated the priming effect of alcohol pre-load on attentional bias to alcohol-related stimuli; they used a dot probe and questionnaires, and the aim of this study was to examine whether attentional bias towards alcohol-related stimuli wound increase after priming with either one or two doses of alcohol/placebo, the results on mood ratings showed dose dependent increased in positive mood radar after alcohol pre-load, and in the dot probe task, all participants showed attentional bias towards the alcohol-related stimuli, and the neutral bias was only positive at low alcohol dosage.

A study of Sharma, Albery, and Cook (2001) demonstrated selective attentional bias to alcohol-related stimuli in problem drinkers and non-problem drinkers; they used a modified Stroop task (computerized), the State-Trait Anxiety Inventory in order to measure Anxiety, the Alcohol Use Disorders Identification Test (AUDIT) to allow scoring (high or low), the participants were divided into three groups: local community alcohol service (CAS), student volunteers who were divided into two control groups, the aim of this study was to examine whether patient of problem drinkers selectively attend to alcohol-related stimuli compare to the two control groups of non-problem drinkers, the results indicate significance amongst the CAS group in longer reaction times in responding to colour of alcohol-related words compared to neutral words, with reduced interference for the high AUDIT group, therefore significant; in the low AUDIT group no significance was found. Additionally, no evidence is provided in the interference habituated amongst the three groups.

A study of Stetter, Ackermann, Scherer, Schmid, Straube, and Mann (1994) demonstrated whether alcoholics develop an information processing bias towards disease-related stimuli, the results indicated an increase of error amongst alcoholics when presented with the disease-related stimuli compared to the neutral conditions, and controls. A further study Stetter, Ackemann, Bizer, Straube, and Mann (1995) by testing their hypothesis that alcoholics develop a disease-related attentional bias, with 40 male alcohol-dependent, and 40 male healthy, and used the Stroop colour-naming task, the results showed alcoholic inpatients performed significantly poorer than the control group under the critical experimental condition (colour-naming of

disease-related words), as compared with the non-critical condition (colour-naming of neutral words; p = 0. 03), no effects were found on the reaction times.

A study of Johnsen, Laberg, Cox, Vaksdal, and Hugdahl, (1994) conducted in Norway demonstrated attentional bias in the processing of alcohol-related words on alcoholic subjects, using the Stroop colour and word test, the results indicate the alcoholics respond slowly on all categories, more so on alcohol-related words compared to the control group, and both groups responded slowly to colour interfering words than neutral words, the findings suggests that the alcoholic subjects allocated their attention to alcohol-related words, therefore allowing their cognitive processes take over making it impossible to ignore the alcohol-related words.

Method

Participants

The participants were recruited the students at London South Bank University. There will be 170 participants in total, 34 males (17-moderate and 14-light drinkers) and 139 females (68 – moderate and 71-light drinkers), and all the participants were adults aged 18years plus.

Apparatus

All participants were asked to complete the tasks on a computer (PC), and the same apparatus was used to store data, and later analyse the data collected.

Design

The Stroop task method is used and the two-way ANOVA test will be used to analyse data (2 X 2 Mixed – subject design). There are two independent variables i) Group (light vs. moderate alcohol drinkers) ii) Word Type (neutral vs. alcohol-related words), and the dependent variable is the reaction time to identifying the colour the word is presented in. In order to verify differences that may occur, the between group and within group will be looked at in more depth.

Procedure

In this study, the following was explained. Each participant was asked to follow the instructions provided on the screen. Labels were placed on the buttons on the keyboard for each subject to make their responses. There are two set type of words (alcohol-related words and neutral words). The participants were required to complete a serious of trials in responding to the colour of the ink that the word is written in (BLUE, RED, YELLOW, and GREEN) and (VODKIA, J. DANIELS, GIN, and BEER) rather than word. Part of the instruction was that they must complete each trail as quickly and accurately as possible, as their reaction time would be recorded

Results

The results of the 2 x 2 ANOVA was used to analyse the data. The effects of word type (alcohol-related words and neutral words) f = (1, 168) 140. 16, p = < 0. 002. The effects of drinking (moderate drinkers and light drinkers) f = (1, 168) 26. 68, p = < 0. 001. Both are significant. The interaction of both

conditions show significance, which suggests that moderate drinkers are slower when the words are alcohol related. f = (1, 168) 3. 91, p = < 0. 05.

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Neutral Word

Alcohol Word

Main Effect of Drinking Type

Light

840. 00 mean score

(34. 28) sd

870. 52 mean score

(28. 51) sd

855. 26 mean score

(31. 66) sd

Moderate

849. 91 mean score

(28. 86) sd

892. 67 mean score

(21. 26) sd

871. 29 mean score

(24. 73) sd

Main Effect of Word Type

845. 01 mean score

(31. 95) sd

881. 73 mean score

(27. 39) sd

Fig 1: The table below shows the mean scores, and standard deviation of the word type (alcohol-related words and neutral words), and drinking (moderate drinkers and light drinkers)

Fig 2: shows the interaction graph

Discussion

For this study the hypotheses do support, in other words significance was found. The literature of the prior studies using the Stroop paradigm with alcohol-related stimuli has a number of fundamental methodological problems. According to Sharma, Albery, and Cook (2001) the first problem identified is that the multitude of different variables that could potentially be manipulated giving a totally different set of results. It therefore becomes apparent that one needs to be very clear on exactly what the variables are and what exactly the researcher wants to achieve. Another problem identified is that of the actual format administered. Again, many issues may arise regarding the way in which the test is formatted. If the format is changed, will the result change along with it?

As more development is completed in this area of study on alcohol addiction, the researcher no doubt will see that, the variables and the modes of administration discussed above will have a huge effect on the study. For example, one set of results could construct stronger effects than others, and that the other probable central variables make no difference at all to the outcome. The researcher should also take into account that however, a task is administered to the participants is bound to have both advantages and disadvantages, and can be improved upon. This does not mean that one way is better than the other. It just means that the researcher needs to be aware of this and choose a methodology that best works for them. Choosing the correct methodology in any study therefore can be just as important as the actual study itself. What becomes apparent is that there is no particular way of carrying out a study. Either way studies will carry certain advantages and disadvantages.

One particular study related to our discussion was the single-word presentation of the Stroop stimuli. In this case, the stimuli were given in card format. One card had all the needed stimuli for alcohol -related words while the other had neutral words. The time taken by each subject to colour name the words on the first card compared to the second was recorded. In other words, recorded reaction time. This format, although used on many studies, comes with its limitations. Evidence obtained concludes that it is difficult to accurately measure the response time by the individuals and that the process evolved is very time consuming and involves a lot of calculations. In other words this type of format may be seen as being time consuming and tedious for the researcher to carry out. It’s not all bad however, the card

format can have an advantage in that it ‘ produces stronger interference effects (e. g. McNally, Amir and Lipke, 1996; Williams et al., 1996), presumably because it provides a semantic network of words in a given category’ (Sharma, et al 2001). In addition, the individual’s words recorded in terms of its reaction time are not used with any presentation mode, as each participant’s reaction times to each category of stimuli are averaged prior to statistical analysis.

Other objections to the use of card presented stimuli were that the total time measured included both correct and incorrect responses. Previous research shows that the amount of trials where errors occurred is in fact rare and equivalent for different categories of stimuli. Furthermore, studies by Stetter et al also seem to agree. His study shows that card format stimuli does not allow for the measurement of time-cause of alcohol attentional bias. For instance, with these card presentations one would not know if the strongest bias occurred for alcohol words presented earlier and then the bias attenuated. An attempt to rectify this issue was to assess participants’ habituation to the stimuli across time. This was achieved by observing how reaction times to the alcohol and neutral stimuli changed during the course of the experiment.

In relation to Johnsen et al studies, it was criticized in many aspects such as, the word types not being matched on the frequency. Additionally being assured in using two words alcohol-related words, for example ‘ liquor store’; ‘ red wine’. (Sharma, et al 2001). However, Johnsen et al stated clearly that since the studies were carried out in Norway, the words were obviously translated in Norwegian ‘ vinmonopol = liquor store’, and ‘ rodvin = red

wine', and as you can see, when translated its single words. Further criticisms were put forward to why the participants were asked to press the key response button; and call out the name of the colour. Sharma et al study contained a number of problems. Firstly, the neutral words were long to a given category (environmental features), which affects the reaction times. Secondly, the number of neutral words being associated closely to the four ink colours (e. g. blue, red, brown, green), also how these colours were closely linked to the words (e. g. blue – sky, green – grass). Also concerns were put forward on the manner of design (e. g. low, middle, and high) drinking groups. Lastly, problems occurred with the problem drinkers, who may have resolved their alcohol problems being placed amongst the heavier drinkers.

To conclude, there are two opposing thoughts with the methodology used; one that the Stroop paradigm is highly objective, valid and reliable, and the other that some are not worthy of inclusion. Many researchers are continuing to offer theoretical explanations to account for the Stroop paradigm, and still trying to make sense on how it could be adapted to be more advanced in being improved.