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Life Experience in Selective Attention

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This correlational study investigated the role of substance use and experience in selective attention using a modified Stroop color-naming task. Thirty-three individuals completed Adult Substance Use Surveys and a computer-generated Stroop task modified by substituting drug words for color names. The prediction was that level of life disruption would interrupt task performance such that those scoring higher on disruption would display slower reaction times. Results revealed life disruption to be significantly correlated with reaction time. Those scoring highest on the disruption measure exhibited slower Stroop reaction times than those with lower disruption scores. These results suggest that treatment interventions targeting automatic mental processes in thought modification might be a helpful approach in substance related therapies.

Selective attention can be thought of as an ability to select the information in our environment to which we will attend. In this sense, it would appear that our ability to attend is subject to conscious control. In defining attention, Hunt and Ellis (1999) state that attention is the selective focus on an environment, without becoming distracted, despite outside events. In other words, attention through focus allows concentration to filter distractions. If these conclusions are accurate, then an individual should be able to focus on a task, without becoming distracted, for an unlimited period of time. In reality, however, few if any of us would be able to reach this level of concentration. We all, at one time or another, have found ourselves unable to concentrate despite our efforts to do so. From this we can reason that cognitive functioning is not nearly as simplistic as it seems because some mental processes have the power to override conscious intent. If focus can be interrupted despite our conscious intent, then unconscious mental processes must also guide attention.

Evidence supporting the influence of unconscious processes in selective attention can be found through an analysis of the traditional Stroop task. In this task, for example, participants are asked to report the color of color-named words that are printed in various colors. They are not asked to read the list of color names, but simply to report on the “colors” of those names. Consistent with what would be expected if unconscious processes influence selective attention, participants engaged in this task are slower to color name words that are printed in ink inconsistent with word name (Hunt & Ellis, 1999). The point of this explanation is to demonstrate that unconscious processes have the ability to override conscious intent and to interrupt selective attention. So, when the word “orange” is printed in orange ink, participants respond faster than when the word “orange” is printed in green ink. The Stroop effect, according to Hunt and Ellis (1999), occurs as a function of the incongruity between color name and word color. It is believed that participants respond in this way because the unconscious process (i.e.,
reading) automatically interferes with the conscious intent of color naming. Recall that participants were not told to read the words, but merely to report color.

The above example not only yields evidence that unconscious processes occur automatically, but may also suggest that these processes are contextually driven. For example, when "orange" is printed in orange ink, the word "orange" means the same thing as the color orange (i.e., the mental representation of word and color match). However when the word "orange" is printed in green ink, there is a mismatch between word name and word color. In other words, orange and green have different mental representations and thus create a struggle between what the word means and how the word looks. This being the case, the tendency is to process what is seen semantically. In an experiment investigating the contextually driven processes using the traditional Stroop task, Besner and Stoltz (1999) found that when only one letter of the word was colored, participants were faster to color name words in color congruent and incongruent conditions, than in the same conditions when the entire word was printed in color. Besner and Stoltz demonstrated that the Stroop effect could be significantly reduced by eliminating context from word presentation. In this case performance varied as a function of the degree of meaning the participant was able to extract from the word. When the entire word was colored the Stroop effect occurred (i.e., participants took longer to color name words because they were driven by context), but when only one letter was colored, the Stroop effect appeared significantly less often; thus there was no context in which to interpret the letter and participants responded faster.

In a practical application of these concepts, Cooper and Fairburn (1992) used a modified version of the Stroop task to determine whether individuals suffering from eating disorders would be subject to the Stroop effect, when the words presented were associated with eating and body image. Not surprisingly, they found that compared to normal dieters, those suffering from eating disorders took significantly longer to report word color when the printed words were associated with body shape and eating behavior. Thus, individuals sensitive to words associated with eating and body image performed in a way that mimicked the Stroop effect when word color was inconsistent with word name (Cooper & Fairburn, 1992). Recall that the Stroop effect occurs as a function of the incongruity between word name and word color. In this sense, the eating disordered individuals took longer to name colored words associated with eating behavior because these words were reflective of their own concerns. Their unconscious preoccupation with thoughts invoked by the words caused hesitation when color reporting and, thus, a longer reaction time. Furthermore, in an earlier experiment, Cooper and Fairburn (1991) tested their thought preoccupation hypothesis and found that compared to non-dieting controls, individuals suffering from eating disorders were preoccupied by more "negative" thoughts surrounding "eating, weight, and shape" related behaviors. Again, the point to be made here is that the longer reaction time when color reporting is reflective of the degree of subjective meaning derived from the words presented.

Similarly, Mogg, Matthews, and Weinman (1989) examined the role of selective processing in anxiety states. Mogg et al., also using a modified version of the Stroop task, demonstrated that anxious individuals exhibited delayed reaction when color-naming words associated with anxiety states. To the extent that their concerns caused distress and possibly negative affect, the anxious individuals were significantly slower when performing the task than normal controls, not sharing these concerns.

The present study suggests that if, indeed, selective attention is guided by context as demonstrated in eating and anxiety disordered individuals, then individuals preoccupied with thoughts about illicit drug use or drug-seeking behavior should exhibit a Stroop effect when color-naming words associated with these concerns. To test this idea, participants were evaluated relative to the degree of drug involvement and level of life disruption experienced as a result of substance use. The Adult Substance Use Survey (ASUS) Wanberg (1994) was the instrument used to measure participants' drug-related life experience. Each participant was timed in each of three
conditions. First, they were timed on the traditional Stroop task displaying color name words presented in congruent and incongruent forms. Next, they were timed in the target condition that presented colored words associated with substance use and drug seeking behavior. Finally, responses were timed on a list of neutral, unrelated colored words. As level of life disruption was not, by the present experiment, considered to be gender specific, there were no expectations of differences between the performance of males and females. The prediction was that compared to individuals having experienced low levels of life disruption due to substance use, those having experienced a high degree of disruption resulting from addictive behavior, would display significantly slower reaction times when performing a modified version of the Stroop task.

METHOD

Participants
Thirty-three individuals, 24 males and 9 females, participated in the study. Eighteen participants were volunteers taken from the Introductory Psychology Student Research Pool. This group received one course credit toward the fulfillment of a class requirement for their participation. The remaining 15 volunteers were solicited from a non-intensive, outpatient treatment agency in which the experimenter worked. Agency participants were clients of other therapists and unrelated to the experimenter. The clients were thanked for their participation.

Materials
A shortened version of the ASUS (questions 1-31 and the first two summary profiles) was used to measure substance involvement and life disruption. Question 11, referring to tobacco use, was omitted from the test. Demographic information was not collected and the participant's experience relative to the past three months was not requested. A Power-Point slide program, designed by the experimenter, was used to perform the modified Stroop task. Participants were allowed to proceed through the task at their own rate by clicking the mouse. The experimenter guided the practice set in an effort to ensure understanding of the task. The first three slides summarized the verbal instruction procedure and the next eight slides presented a practice trial. The practice trial, in traditional Stroop form, presented four color names (orange, brown, green, blue) displayed in color congruent and incongruent word forms. The first timed trial presented the traditional Stroop task for a total of 16 slide presentations. Next, slides were shown in the modified form consisting of 16, colored words related to drugs and drug seeking behavior (see Appendix B for a list of target words). The last set of slides contained 16 colored, neutral words (see Appendix for a list of unrelated words). An insertion slide signaling the end of the word set was placed between each of the three word groups. A standard stopwatch and two standard instruction procedures, one for the written portion and one for the slide program, were used. A list of support groups, help line numbers and meeting times were also distributed.

Procedure

A consent form disclosing the nature of the study was distributed. Specifically, participants were informed that they would be asked to answer questions about their experiences, if any, with alcohol or other drugs. The experimenter assured participants that any answers provided would remain confidential. Due to the sensitive nature of questions asked, participants were instructed to not write their names on the surveys and were reassured that their right to privacy would be protected. Participants were run, one at a time, by one experimenter. At the onset of the study, the experimenter read a standard instruction procedure detailing the kinds of information requested. For example, participants were informed that some questions asked for the number of times a particular drug had been used, while other questions asked about the consequences experienced when using. The participant was then asked to complete the ASUS. Scores for drug involvement ranged from "0" low, to "40" high. Scores for life disruption ranged from "0" low, to "77" high. Upon completion of the survey, the participant received verbal instruction on the color-naming task.

In order to accurately time performance, the participant was instructed to name, aloud, the color of the printed word. Next, and as a part of the slide presentation, the participant received a written summary of
the verbal instruction and one practice trial to become familiar with the task. The participant was able to guide the pace of the presentation by clicking the mouse. The experimenter guided the practice trial to assist participants in their understanding of task requirements. Prior to the first timed trial, the participant was given an opportunity to ask for clarification of instructions. The participant was then asked to refrain from talking or asking questions until after the task ended. Timing of each trial began after the first word color was named and ended after the last color name was called. Times were recorded between each trial set when the insertion slide appeared. The first timed trial presented the participant with the traditional Stroop task in color congruent and incongruent forms. In the second timed trial the participant was shown the colored target words, and in the last timed trial the colored neutral words were presented. The participant was then provided with the debriefing measure and the list of support groups. Finally, the participant received a brief counseling during which he or she was informed that the experimenter worked as a drug and alcohol counselor. The participant was then given time to address any questions or concerns.

RESULTS

The relationship between life disruption scores and reaction time on the modified Stroop task was assessed. Using a Pearson Correlation, findings confirmed the hypothesis that level of life disruption due to substance use was significantly correlated with reaction time, such that those scoring higher on the disruption measure exhibited slower reaction time on the task than those with lower disruption scores, (31) = .80, < .01.

DISCUSSION

The current data support the hypothesis that level of life disruption due to substance use and related behaviors would significantly interrupt performance on a modified Stroop color-naming task. Compared to those with lower disruption scores, individuals scoring high on the disruption measure also exhibited slower reaction times.

These results imply that the contextually driven automatic processes in selective attention may not only mediate the relationship between the individual and the substance, but also be a major contributor in the maintenance of addiction. For example, the more sensitive an individual becomes to a drug's positive effects, the more time and energy he or she is likely to exert in seeking out those effects. In this sense, the amount of energy invested in drug use and drug seeking behavior can be viewed as indicative of the emphasis placed on maintaining the addiction. And, the greater the priority placed on use, the more personal meaning the experience takes on and the greater the likelihood that life disruption will occur. Once dysfunctional living is set in motion, any thought, idea, or memory related to drug activity may, automatically, "turn on" or reactivate prior maintenance behaviors. As demonstrated by Cooper and Fairburn (1992) and by Mogg et al. (1989) individual preoccupations relative to personal concerns guide selective attention and interrupt intentional thought processes. Even when the individual has the conscious intent of maintaining abstinence from alcohol or other drugs, he or she might be drawn into relapse behaviors as a result of automatic thoughts triggered by memories, words, or ideas.

In a practical application, these results may serve as a support for expanding current therapeutic frameworks. For example, if mental processes are automatic and contextually driven, then an environment, memory, or situation might act as a catalyst in guiding attention and triggering preoccupation. This being the case, treatment modalities advocating the removal of oneself from old friends and familiar environments, in the recovery process, could benefit greatly by incorporating the role of memory into treatment interventions. It may be that individuals entering the relapse cycle after lengthy periods of sobriety are driven to these behaviors through the "automaticity" of their remembered behaviors. So, while the changing of "playgrounds and playmates" has definite merit in the recovery therapies, the role of automaticity is not adequately addressed in that memory is not subject to conscious control.

Finally, it is likely that further research is warranted to investigate the role of selec-
tive attention in substance use with regard to specific drugs. As individuals in this study were not compared relative to drug of choice, it would be interesting to see whether different substance relationships would produce different attention activity. For example, marijuana, often thought to be the least addictive of all psychoactive substances, may be less subject to the selection effect than cocaine. Similarly, polysubstance users may be more sensitive to selective attention than are individuals using only one drug. Furthermore, length of use or lapse of time between use and task may be a significant factor influencing performance. It is possible that individuals with many years of abstinence from alcohol or other drugs would be less sensitive to selection than those currently in treatment. In any case, an understanding of the functional relationship between length of use and drug of choice in selective attention would be helpful in developing treatment interventions and in guiding clients through the recovery process.

REFERENCES

**APPENDIX**

**Target Word and Neutral Word Conditions**

- Words selected to represent substance use and related behaviors were formulated based on the experimenter's knowledge through working as an alcohol and drug counselor. Street names for alcohol, marijuana, cocaine, methamphetamine, and heroin were used. These drugs were selected because they represent the four most popular substance categories (i.e., sedative hypnotic, cannabis, stimulant and opiate respectively). Except for the stimulant group, two street names were selected to represent each individual drug. For example, alcohol was represented by “booze” and “wine”. Marijuana was represented by “pot” and “weed”. Since cocaine and methamphetamine are both stimulant drugs, one word was selected to represent each individual drug. For example, cocaine was represented by “rock” and methamphetamine was represented by “ice”. Heroin was represented by the words “smack” and “junk”.

- Words chosen to represent drug-seeking behavior were also based on the experimenter's prior knowledge and included the words: shoot, smoke, high, hit, run, drunk, cop, stoned.

- Neutral words were randomly selected by the experimenter and unrelated to the target behavior. Neutral words included: book, wall, tray, shirt, box, floor, chair, car, block, pen, plate, clock, light, board, card, plant.