IMPULSIVITY AND ITS RELATIONSHIP TO PERSISTENCE DURING AN EGO-DEPLETED STATE

THESIS

Presented to the Graduate Council of
Texas State University-San Marcos
in Partial Fulfillment
of the Requirements

for the Degree

Master of ARTS

by

Heather Danielle Edwards, B.A.

San Marcos, Texas
May 2009

ACKNOWLEDGMENTS

This work would not have been possible without the support, assistance, and expertise of my thesis committee. I offer my deep gratitude to my chair, Dr. Randall Osborne, for his impeccable organization and keen ability to provide a "big picture" perspective. I also offer my sincere appreciation to Dr. Joseph Etherton for his editing ability and immense familiarity with the literature pertinent to my study. Finally, I offer my heartfelt thanks to Dr. Maria Czyzewska for her methodological expertise and critical assistance in running my statistical analyses. Each member generously contributed invaluable time, knowledge, and guidance to assure the successful completion of my thesis. Words cannot effectively convey my sheer gratitude for their kindness and encouragement throughout the past two years.

I also wish to express my fondness and gratitude to my beloved family and friends. I offer my deepest appreciation to my mother and father, Sheryl and Jim Edwards – my lifelong heroes and fans. They have provided me with endless love, support, and guidance; not to mention, a sincere interest in reading everything I have ever written since grade school! Last, but not least, I wish to thank my best friend and boyfriend, Kevin Bunch, for his patience, support, devotion, and understanding. He has been my cheerleader, rock, and the reason I have maintained my sanity throughout the duration of my studies. It is to my parents and him that I dedicate this work.

This manuscript was submitted on March 23, 2009.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

ABSTRACT

IMPULSIVITY AND ITS RELATIONSHIP TO PERSISTENCE

DURING AN EGO-DEPLETED STATE

by

Heather Danielle Edwards, B.S.

Texas State University-San Marcos

May 2009

SUPERVISING PROFESSOR: RANDALL OSBORNE

The power to control or override one's thoughts, emotions, urges, and behavior is a central function of the self and a fundamental key to success in life (Baumeister, Vohs, & Tice, 2007). This ability enables individuals to resist temptation, delay gratification, and to persist at demanding tasks. Research conducted by Baumeister and colleagues (1998) has demonstrated that any act of self-control results in the depletion of a limited resource akin to energy. Furthermore, once in a depleted state, individuals have difficulty persisting at subsequent tasks requiring self-control. These findings raise questions about individual differences in self-regulatory ability. This study examines the relationship between self-regulation and impulsivity. More specifically, the purpose was to observe how impulsiveness scores relate to persistence on a spatial cognitive task during an ego-depleted state.

I. INTRODUCTION

Over the past few decades, the term *self-regulation* has become increasing more common throughout psychological literature. Self-regulation (or self-control) refers to "the ability to control or override one's thoughts, emotions, urges, and behavior" (Gailliot, et al., 2007, p. 325). It is this ability that enables people to follow social rules and norms and to resist behaving in impulsive manners. Self-regulation is therefore a central function of the self and a fundamental key to success in life. The ability to exert a high degree of self-regulatory control has been associated with greater achievement, both socially and academically (Muraven, Baumeister, & Tice, 1999). Good self-control has been linked to "healthier interpersonal relationships, greater popularity, better mental health, more effective coping skills, reduced aggression, and superior academic performance, as well as less susceptibility to drug and alcohol abuse, criminality, and eating disorders" (Gailliot, et al., 2007, p. 325). According to Baumeister, Vohs, and Tice (2007), poor self-control has been associated with various behavioral and impulse-control problems, such as "overeating, alcohol and drug abuse, crime and violence, overspending, sexually impulsive behavior, unwanted pregnancy, and smoking" (p. 351). It may also be connected to "emotional problems, school underachievement, lack of persistence, various failures at task performance, relationship problems and dissolution, and more" (Baumeister et al., 2007, p. 351).

Ego Depletion

According to the strength model of self-regulation, the ability to self-regulate relies on a limited energy or strength. Just as a muscle becomes tired with repeated exertions, the ability to self-regulate becomes weaker with repetitive use (Baumeister, Vohs, & Tice, 2007). The term *ego depletion* refers to "the state of diminished resources following exertion of self-control (or other tasks that might deplete the same resource)" (Baumeister, et al., 2007, p. 352). Several studies have indicated that any acts of self-control can cause ego depletion, resulting in subsequent poorer performance even on dissimilar self-control tasks.

Baumeister, Bratslavsky, Muraven, and Tice (1998) conducted a series of four experiments demonstrating that choice, active response, self-regulation, and other volitional acts may all draw on a common inner resource. In the first experiment, participants were instructed to eat radishes instead of tempting chocolates. Participants who forced themselves to eat radishes and resist chocolates subsequently gave up more readily on unsolvable puzzles than participants who did not have to exert self-control over eating. In the second experiment, Baumeister and colleagues (1998) investigated the effects of emotion suppression on self-regulation. A group of participants were asked to watch an emotionally evocative videotape and stifle any emotional reaction they might have. Both positive (humorous) and negative (sad and distressing) stimuli were used. Participants in the suppress-emotion condition performed significantly worse than participants in the no-regulation condition in terms of number of anagrams correctly solved. Thus, it appears that affect regulation is one important sphere of self-regulation. In the third experiment, participants were instructed to make a counterattitudinal speech

under high- or low-choice conditions. The results from this study revealed that taking responsibility for a counterattitudinal behavior seems to consume a resource of the self, leaving participants with less strength to persist at unsolvable puzzles. The forth experiment contrasted active versus passive responding. A group of participants were given a task to induce ego depletion, while another group did not undergo ego depletion. Both groups were then shown a very boring movie and given a temptation to stop watching it. For half of the participants, quitting was passive; whereas, the other half of participants were required to perform an active response to stop the movie. This study found that participants were less inclined to make active responses following ego depletion. Thus, depleted participants appeared more prone to continue doing what was easiest, as if carried along by inertia. The overall results of the four experiments exhibit various carryovers between impulse control, thought control, emotion control, and task performance; indicating that these four main spheres of self-regulation all share the same resource (Baumeister et al., 1998).

Impulsivity

The research conducted by Baumeister and colleagues (1998) demonstrated that any act of self-control results in the depletion of a limited resource akin to energy. Furthermore, once in a depleted state, individuals have difficulty persisting at subsequent tasks requiring self-control. These findings raise questions about individual differences in self-regulatory ability. Researchers are beginning to explore how personality is reflected in self-regulation (Hoyle, 2006). One personality trait that appears to play a large role in self regulation is impulsivity. "Impulsivity is the tendency to act without thought or planning" (Hoyle, 2006, p. 1510). Impulsive behavior often accomplishes

immediate objectives at the cost of long-term aspirations, frequently resulting in negative consequences (Spinella, 2004). Individuals who are highly impulsive are susceptible to a multitude of high-risk behaviors marked by poor self-control (Hoyle, 2006). Impulsive behavior has a strong neurobiological signature and has been linked to several mental disorders, including bipolar disorder, depression, attention deficit hyperactive disorder (ADHD), borderline personality disorder, antisocial personality disorder, bulimia, kleptomania, drug addiction, and conduct disorder" (Spinella, 2004).

As a wide-ranging personality trait, impulsivity can potentially affect many aspects of life (Spinella, 2004). For instance, impulsivity in children has been linked to lower academic grades and achievement scores (Spinella, 2004). Duckworth and Seligman (2006) examined gender differences in academic performance. Their investigation found that girls tend to outperform boys on report card grades partly because they possess higher levels of self-discipline. Self-discipline was assessed using delay of gratification measures, self-report ratings, teacher ratings, and parent ratings (Duckworth and Seligman, 2006). Thus, it appears that low measures of impulsivity help sustain self-regulatory processes; thereby contributing to better school performance.

In addition to academic performance, impulsivity has been associated with higher levels of aggression and greater drug cravings in substance abusers. Crawley and Martin (2006) investigated impulsive-aggression in a sample of undergraduate female participants. In comparison to other groups, impulsive-aggressive women were more physically aggressive and more likely to fight or argue. They scored significantly higher than all other groups on psychopathic personality measures. In addition, these women were more likely to have faced charges as a result of antisocial activity, were more

sexually active, and were more likely to report drug problems (Crawley and Martin, 2006).

In a study conducted by Allen, Moeller, Rhoades, and Cherek (1998), impulsiveness in participants with a history of drug-dependence (DRUG+) was compared to participants with no history of drug use (DRUG-). Results from this study indicated that participants in the DRUG+ group had a higher tendency toward impulsivity than participants in the DRUG- group. When given the choice between a smaller immediate reward and a larger but delayed reward, DRUG+ participants were less able to tolerate longer delays for the larger reward (Allen et al., 1998). Thus, high impulsiveness appears to weaken the ability to resist temptation and exert self-control.

Present Study

As previously mentioned, past research has linked impulsivity to poor self-control. Based on these findings, the purpose of this study was to investigate the relationship between impulsivity and persistence during a state of ego depletion. The study required impulsiveness assessment, and included two separate ego-depletion conditions (with corresponding control conditions): one involving emotion suppression, and the other involving task performance. Since Baumeister and colleagues (1998) found that any acts of self-control can cause ego depletion, these two particular tasks were chosen due to their ease of administration. In addition, they were selected because they both require self-control, which is deficient in impulsive individuals. It was decided to use two ego-depletion conditions, as opposed to a single condition, in order to increase the generalizability of the results.

Participants in the emotion suppression ego-depletion condition watched a humorous video clip while suppressing their emotional reactions. Baumeister et al. (1998) demonstrated that stifling emotional reactions to humorous and sad video clips is ego depleting. The results from their research revealed no differences as a function of ego depletion condition in how the movie was perceived by participants (Baumeister et al., 1998). The use of a humorous video as opposed to a sad video was selected based on prior research indicating that the experience of and the desire to enhance positive affect is a powerful motive in the development and maintenance of many potentially problematic behaviors associated with impulsivity (Abramowitz & Berenbaum, 2007).

Participants in the task performance ego-depletion condition performed a letter search task, in which they were instructed to cross out instances of the letter *e* in a text based on a set of criteria. Prior research conducted by Baumeister et al. (1998) found this task required more concentration, thus using more ego strength compared to participants assigned to a control condition.

After undergoing ego depletion, participants performed a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting their pencil. Unbeknownst to the participants, the test figure was impossible to solve. The dependent measure was the amount of time spent persisting at this task. It was hypothesized that more impulsive participants would not persist at this cognitively demanding task after undergoing ego depletion as long as participants who were less impulsive. Since, impulsivity has also been linked to high-risk behaviors characterized by poor self-control, it was also hypothesized that greater impulsivity would be

associated with increased unhealthy lifestyle habits, such as greater alcohol consumption, nicotine and drug use, and binge eating behaviors.

II. METHOD

Participants

One hundred and twenty students were recruited from introductory psychology courses at Texas State University-San Marcos. Eighty-two of the 120 students recruited participated. Four conditions (2 ego-depletion conditions and 2 control conditions) were formed by random assignment: 21 participants in the emotion suppression ego-depletion condition and 21 participants in the corresponding control (suppression no-depletion) condition; 20 participants in the task performance ego-depletion condition and 20 participants in the corresponding control (performance no-depletion) condition. All participants were compensated for their participation in the study by receiving extra credit in their psychology course. Students were informed that their participation was entirely voluntary and they would not suffer any consequences if they chose not to participate. Confidentiality was maintained among all participants, and they were given the opportunity to receive a brief summary of the results upon completion of the study.

Stimuli

A demographic questionnaire was used to assess participants' gender, age, major, credit hours, class status (freshman, sophomore, junior, or senior), and GPA (Appendix A).

Impulsivity was assessed using the Barratt Impulsiveness Scale - Version 11 (BIS-11 Patton, Stanford, and Barrat, 1995) (Appendix B). The BIS-11 is a 30 item self-

report questionnaire which measures general impulsiveness and which has been used extensively for research into the correlates of impulsivity within both normal and pathological behavior and has demonstrated excellent psychometric properties (Patton et al., 1995). Responses are made on a four-point Likert scale ranging from *rarely/never* to *almost always/always*. A total score is obtained by reversing items 1, 7, 8, 9, 10, 12, 13, 15, 20, 29, and 30, then summing scores for all items. The higher the summed score, the higher the level of impulsiveness. Stanford, Greve, Boudreaux, Mathias, and Brumbelow (1996) reported a Cronbach's coefficient alpha of 0.80 for a sample of university students. Patton et al. (1995) reported that factor analysis of the BIS-11 produced three sub-factors: attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness, which intercorrelated .46 - .53. Attentional impulsiveness is defined as "an inability to focus attention or concentrate" (http://impulsivity.org/BIS-11/history-and-development-of-the-bis); motor impulsiveness is defined as "acting without thinking" (Patton et al., 1995); and non-planning impulsiveness is described as "a 'present orientation' or a lack of 'futuring'" (Patton et al., 1995). Patton et al. (1995) interpreted these data as indicating a hierarchical model of impulsivity whereby the three sub-factors are subsumed by a general impulsivity factor.

Lifestyle habits were measured using the Student Health and Lifestyle Questionnaire (Engs, 1992) (Appendix C). The Student Health and Lifestyle Questionnaire is a self-report questionnaire designed to assess students' health problems and lifestyle behaviors. Engs and Aldo-Benson (1995) reported a test-retest reliability coefficient of .89 for a sample of university students. In addition, Cronbach's Alpha measurement of homogeneity for the items indicated a reliability coefficient of .70 for the

instrument (Engs & Aldo-Benson, 1995). Questions regarding medical-related problems were omitted since they do not pertain to the focus of this study. The questionnaire was revised to only assess participants' health-related behaviors and emotional wellbeing. The instrument was divided into three sections, thus providing three separate health scores: (1) a positive health behavior score - representing the amount of exercise during the past month; (2) a negative emotional health score - representing the amount of stress, anger, and depression experienced during the past month; and (3) a negative health behavior score - representing the amount of alcohol consumption, tobacco and marijuana use, and binge eating and purging behaviors during the past month. These health behaviors were selected for assessment since many of them have been associated with impulsivity (Hair & Hampson, 2006). Based on coding instructions designed for the instrument, loading values were assigned to responses assessing behaviors over the past month. Loading values were as follows: "everyday" = 7, "two to three times a week" = 3.5, "once a week" = 1, "at least once a month but less than once a week" = .25, and "not at all" = 0. These loading values were multiplied by the amount of time performing the behavior or the amount of consumption per event (depending on the type of behavior addressed). Thus, an individual who drank beer two to three times a week, and consumed 2 cans of beer at one sitting would receive a beer score of 7 (3.5 times 2 = 7). The products of the results for each behavior were summed to give a total score for the three health categories. Since participants' responses were widely dispersed within the three categories, scores were divided into deciles to provide better distinction between scores.

A letter search task (Appendix D) and a humorous video clip were used to induce ego depletion. The letter search task required participants to cross off selected instances

of the letter *e* based on a series of rules. The humorous video clip consisted of a short segment of a comic performance by Brian Regan

The literature selected for the letter search task and reading task consisted of three online articles from Psi Chi magazine (Appleby, 2007; DeWalt, 2007; Cox, Cullen, & Buskist, 2007) (Appendex E).

An unsolvable spatial cognitive task (Appendix F) was used as a persistence measure. The amount of time participants spent working on this task was measured using a stopwatch. Persistence time was analyzed in seconds as well as approximated minutes. Conversion from seconds to minutes was as follows: 30 to 90 seconds = 1 minute, 91 to 150 seconds = 2 minutes, 151 to 210 seconds = 3 minutes, and so on.

Procedure

This study was a between group comparison with impulsivity as a covariate. Participants were randomly assigned to one of four conditions: the emotion suppression ego-depletion condition and corresponding control (suppression no-depletion) condition, and the task performance ego-depletion condition and corresponding control (performance no-depletion) condition. Scripts were created to assure consistent administration of procedures for all conditions. Two scripts were created per condition since the BIS-11 administration was counterbalanced to control for order effects. This yielded a total of eight scripts: (1) emotion suppression ego-depletion condition with BIS-11 administration at the beginning of the experiment (Appendix G); (2) emotion suppression ego-depletion condition with BIS-11 administration at the end of the experiment (Appendix H); (3) control (suppression no-depletion) condition with BIS-11 administration at the beginning of the experiment (Appendix I); (4) control (suppression

no-depletion) condition with BIS-11 administration at the end of the experiment (Appendix J); (5) task performance ego-depletion condition with BIS-11 administration at the beginning of the experiment (Appendix K); (6) task performance ego-depletion condition with BIS-11 administration at the end of the experiment (Appendix L); (7) control (performance no-depletion) condition with BIS-11 administration at the beginning of the experiment (Appendix M); (8) control (performance no-depletion) condition with BIS-11 administration at the end of the experiment (Appendix N).

The experimenter gave an overview of the procedures and provided a cover story. Depending on the assigned condition, participants received one of two cover stories. Participants in the emotion suppression ego-depletion condition and corresponding control (suppression no-depletion) condition were told that the purpose of the study was to see which personality traits would make people more responsive to experiencing emotions. Participants in the task performance ego-depletion condition and corresponding control (performance no-depletion) condition were told that the purpose of the study was to see how cognitive activities affect performance.

After providing an overview of the procedures and cover story, the researcher presented one of two consent forms (depending on condition). One consent form was designed for the emotion suppression ego-depletion condition and corresponding control (suppression no-depletion) condition (Appendix O), while the other consent form was designed for the task performance ego-depletion condition and corresponding control (performance no-depletion) condition (Appendix P).

For the remaining tasks, the researcher provided detailed instructions, then exited the room while participants completed each task. Participants were instructed to ring a

bell on the table once they had completed a task, upon which the researcher returned to the room. In addition, the researcher instructed participants to place completed questionnaires in an envelope on the table. These steps were taken to protect the study from potential response bias due to the sensitive nature of some of the questions.

After securing informed consent, participants completed the demographic questionnaire and the BIS-11. To control for order effects, dispensation of the BIS-11 was counterbalanced: half of the participants from each condition was administered the scale at the beginning of the experiment, while the other half from each condition was administered the scale at the end of the experiment.

The emotion suppression ego-depletion condition involved an emotion-suppression task in which participants viewed 10-minutes of a comic performance by Brian Regan while trying to conceal and suppress any emotional reactions. Baumeister et al. (1998) demonstrated that stifling emotional reactions to humorous and sad video clips is ego depleting. The results from their research revealed no differences as a function of ego depletion condition in how the movie was perceived by participants (Baumeister et al., 1998). The use of a humorous video as opposed to a sad video was selected because prior research has indicated that the experience of and the desire to enhance positive affect (i.e., seek euphoria) is a powerful motive in the development and maintenance of many potentially problematic behaviors associated with impulsivity (Abramowitz & Berenbaum, 2007). To make this condition more stressful, participants were told they would be videotaped while watching the film.

Participants in the corresponding control (suppression no-depletion) condition viewed the same humorous 10-minute video and were instructed to let their emotions flow, without any attempt to hide or deny their feelings.

The task performance ego-depletion condition involved a letter search task in which participants were given a typewritten packet of text and told to cross off selected instances of the letter *e*. The task was made quite difficult, requiring participants to consult multiple rules and monitor their decisions carefully. The literature selected for the packet consisted of three online articles from Psi Chi magazine. Participants were given 10 minutes to perform the task.

Participants in the corresponding control (performance no-depletion) condition were given the same typewritten packet of text. These articles were selected for their impassive subject matter, so as not to elicit an emotional response from the reader. Participants were instructed to simply read the articles for 10 minutes.

After performing their initial tasks, participants in each condition were given a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting their pencil. Participants were told that they could take as much time and as many trials as they wanted. They were also told that if they wished to stop before finishing (i.e., solve the puzzle), they could inform the researcher by ringing a bell. Unbeknownst to the participants, the test figure was impossible to solve. The amount of time spent on this persistence task was measured and documented. A cutoff time of 30 minutes was established prior to the initiation of the study. This cutoff time was created to ensure that participation took no longer than 60 minutes, as stated on the consent forms.

The final task required participants to complete a revised version of the Student Health and Lifestyle Questionnaire, assessing participants' exercise habits, stress and depression levels, alcohol consumption, tobacco and marijuana use, and binge eating behaviors. In addition, the participants that did not complete the BIS-11 at the beginning of the study completed the assessment at this time.

Upon completion of the procedures, participants were given an initial debriefing depending on condition. One initial debriefing was designed for the emotion suppression ego-depletion condition and corresponding control (suppression no-depletion) condition (Appendix Q), while the other initial debriefing was designed for the task performance ego-depletion condition and corresponding control (performance no-depletion) condition (Appendix R). All participants were told that the details of the study could not be revealed until all data had been gathered and analyzed. This decision was made in order to protect the integrity of the study.

Once data collection was completed, and it was confirmed that no additional participants would be needed, a final debriefing was emailed to participants, informing them of the study's true purpose, the use of deception, and an explanation of why deception was required (Appendex S).

III. RESULTS

It was hypothesized that impulsive participants would persist less in attempts to solve an unsolvable puzzle while ego depleted. Since impulsivity has also been linked to high-risk behaviors characterized by poor self-control, it was also hypothesized that impulsiveness would be associated with unhealthy lifestyle habits, such as greater alcohol consumption, nicotine and drug use, and binge eating behaviors.

An alpha level of .05 was used for all statistical tests. In order to determine if the study replicated the findings of Baumeister and colleagues (1998), a one-factor ANOVA for independent groups was conducted to test for differences in persistence time (in seconds) between the four conditions: (1) the emotion suppression ego-depletion condition; (2) the corresponding control (suppression no-depletion) condition; (3) the task performance ego-depletion condition; and (4) the corresponding control (performance no-depletion) condition. The analysis found no statistically significant differences in persistence time (in seconds) between the emotion suppression ego-depletion condition (M=748.52, SD=462.09), the corresponding control (suppression no-depletion) condition (M=682.48, SD=406.19), the task performance ego-depletion condition (M=662.10, SD=369.58), and the corresponding control (performance no-depletion) condition (M=690.30, SD=280.62), $F(3,78)=.19$, $p=.90$. The same analysis was repeated on the persistence time results converted from seconds to minutes. The purpose of the conversion was to reduce an error variance in the persistence time assessment that could

have been inflated by using scale with precision to seconds. This repeated analysis confirmed the previous finding of no statistically significant differences in persistence time (in minutes) between the emotion suppression ego-depletion condition (M=12.38, SD=7.66), the corresponding control (suppression no-depletion) condition (M=11.43, SD=6.85), the task performance ego-depletion condition (M=11.00, SD=6.24), and the corresponding control (performance no-depletion) condition (M=11.45, SD=4.64), $F(3,78)=.17$, $p=.92$. Results from this analysis showed no difference in outcomes if the persistence time variable was assessed in seconds or minutes. For this reason, the remaining analyses used only the seconds unit scale.

The next step of the analysis examined whether impulsiveness had an effect on persistence time. Total impulsiveness scores were quartiled in order to identify subgroups of participants differing in the impulsiveness trait. A two-factor ANOVA 4 (experimental condition) x 4 (total impulsiveness quartiles) was conducted to test effects of manipulation (condition) and trait disposition (impulsiveness) as potential predictors of differences in persistence. The results of the analysis found no statistically significant effects for condition, ($F(3,66)=.29$, $p=.83$) or total impulsiveness ($F(3,66)=1.74$, $p=.17$). Interaction between factors was also not significant, ($F(9,66)=.46$, $p=.90$).

Although comparisons between groups formed based on a compound index of total impulsiveness did not reveal any statistically significant differences in persistence time, analyses were repeated on groups identified on impulsiveness subscales to determine if specific dimensions of impulsiveness (attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness) affected persistence time. Three separate two-factor ANOVAs 4 (experimental condition) x 4 (consecutive impulsiveness

subscale quartiles) were conducted to test effects of manipulation (condition) and trait disposition (attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness) as potential predictors of differences in persistence (see Table 1). The results revealed a statistically significant main effect for non-planning impulsiveness ($F(3,66)=3.66$, $p=.02$, *partial* $\eta^2 = .14$). Follow-up tests were conducted to evaluate pairwise differences among the means using a Fisher's LSD test. The results of these tests, as well as the means and standard deviations for each of the groups, are reported in Table 2. According to the results of the post-hoc analysis, participants in the first non-planning impulsiveness quartile ($M=878.33$, $SE=72.41$) persisted longer than participants in the second ($M=575.36$, $SE=89.41$), $p=.03$, third ($M=734.91$, $SE=85.84$), $p=.04$, and fourth ($M=560.35$, $SE=83.11$), $p<.01$ non-planning impulsiveness quartiles. There was also a trend for interaction between factors, ($F(9,66)=1.84$, $p=.08$). However, this trend does not appear to be meaningful based on examination of the data. All in all, these results suggest the importance of non-planning impulsiveness in persistence time.

A Pearson correlation analysis was conducted to investigate relationships between persistence time and impulsiveness restricted to participants in the experimental conditions (emotion suppression ego-depletion condition and task performance ego-depletion condition). Results from the analysis did not find a statistically significant correlation between persistence time and impulsivity ($r=-.20$, $p=.21$, $n=41$).

A Pearson correlation analysis was also conducted to explore relationships between total impulsiveness, attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness; persistence time; and positive health behaviors, negative emotional health, and negative health behaviors. Results from the analysis found

statistically significant negative correlations between positive health behaviors and total impulsiveness (r=-.34, p<.01, n=82), attentional impulsiveness (r=-.29, p=.01, n=82), motor impulsiveness (r=-.26, p=.02, n=82), and non-planning impulsiveness (r=-.26, p=.02, n=82). A statistically significant positive correlation was found between negative emotional health and attentional impulsiveness (r=.29, p=.01, n=82). Results from the analysis also found statistically significant positive correlations between negative health behaviors and total impulsiveness (r=.22, p=.05, n=82) and attentional impulsiveness (r=.27, p=.02, n=82). Statistically significant negative correlations were found between persistence time and negative emotional health (r=-.23, p=.04, r=82) and non-planning impulsiveness (r=-.25, p=.02, n=82). The analysis also revealed intercorrelations between impulsiveness scales. No other statistically significant correlations were found between variables (see Table 2).

IV. DISCUSSION

Results of the analyses did not support the hypothesis that impulsive participants would persist less in attempts to solve an unsolvable puzzle while ego depleted. The first analysis found no differences in persistence time among the ego-depleting and control conditions. This finding differs from the results of Baumeister and colleagues (1998) in which participants in ego-depletion conditions persisted less than participants in control conditions. A possible explanation for the present study's non-significant findings may be due to a methodological flaw in the dependent measure. It is possible that participants' persistence time was a result of an eagerness to complete the study, as opposed to a result of the experimental manipulation. Research conducted by Etherton and Osborne (unpublished study) supports this assumption. Their study investigated the amount of time required to recover from an ego-depleted state. In the study, participants completed an ego-depleting task and either waited 0 minutes, 10 minutes, 20 minutes, or 30 minutes before attempting to solve an unsolvable puzzle. Results from their analysis revealed a substantial increase in persistence time between participants in the 0 minutes condition and participants in the 10 minutes condition. However, persistence time sharply decreased between the 10 and 20 minute conditions, leveling off between the 20 and 30 minute conditions. These results suggest that while 10 minutes of recovery time facilitated persistence, additional waiting time may have caused participants to become

impatient and terminate the puzzle task in order to complete their participation requirements.

Results from the current study indicated that total impulsiveness, attentional impulsiveness, and motor impulsiveness had no statistical effects on persistence time. However, non-planning impulsiveness did have a statistically significant effect on persistence time, such that participants with higher non-planning impulsiveness scores spent less time attempting to solve the puzzle than participants with lower non-planning impulsiveness scores. Previous research indicates that higher scores on the non-planning impulsiveness factor denotes poorer ability to plan and think carefully, as well as less pleasure in performing challenging mental tasks (Pietrzak, Sprague, & Snyder, 2008). On the other hand, attentional impulsiveness is characterized by an inability to focus on the task at hand and the presence of thought insertions and racing thoughts, whereas motor impulsiveness is characterized by acting on the spur of the moment and living an inconsistent lifestyle (Pietrzak et al.). According to Pietrzak and colleagues, individuals with higher non-planning impulsiveness scores perform poorer on tasks of planning and impulse control, while individuals with higher attentional and motor impulsiveness scores perform poorer on tasks involving rapid response organization and action (Pietrzak et al.). Thus, the use of a spatial cognitive task (a challenging mental task, requiring careful planning) as a dependent measure may have contributed to differences in persistence time based on non-planning impulsiveness. Since this task did not involve rapid response organization and action, attentional and motor impulsiveness did not affect persistence time.

Results of the analysis did support the hypothesis that impulsiveness would be associated with unhealthy lifestyle habits. The study showed that participants with higher total impulsiveness and attentional impulsiveness scores exhibited more unhealthy lifestyle behaviors, such as greater alcohol consumption, nicotine and drug use, and binge eating behaviors. In accordance with this finding, participants with higher total impulsiveness, attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness scores also got less exercise. These findings are in line with previous research pointing to impulsiveness as a risk factor for engaging in health-risk behaviors (Stoltenberg, Batien, & Birgenheir, 2007). In regard to negative emotional health, the analysis also suggests that individuals who experience greater amounts of stress, anger, and/or depression spent less time attempting to solve the puzzle than participants with better emotional health. This finding may be due to poorer coping abilities.

A limitation of this study is that while two different ego-depletion tasks were used, only one persistence task was included. Another weakness is that the sample consisted solely of college students attending Texas State University, thus limiting the generalizability of the results. The study also lacked ecological validity due to the findings being generated in a laboratory condition. Nearby construction in the lab setting resulted in sporadically noisy conditions; thus the environment in which the study was conducted may have also influenced the results.

All in all, results from the current study point to a need for further investigation into ego-depletion theory. In terms of future research, methodological issues may be resolved by selecting a different kind of dependent measure. For instance, a performance measure may be a better indicator of ego-depletion than a persistence measure.

Evaluating how well participants perform on the letter search task, for example, could provide a more effective assessment of ego-depletion than evaluating the length of time they persist at a task. Examining performance accuracy as opposed to persistence time may help control for external factors, such as potential eagerness to complete the participation requirements in order to be dismissed from the study. Thus, by conducting a pre- and post-depletion performance assessment, researchers may obtain a more accurate measure of ego-depletion. In addition, selecting tasks that more closely resemble "real-world" behaviors could help increase ecological validity. For instance, participants could be given performance task measures that resemble administrative responsibilities, such as filing paperwork. Performance could be based on an index of total errors and efficiency of task completion.

Table 1

Impulsiveness Subscales (Quartiles) x Conditions Factorial Analysis of Variance for Persistence Time

Source	*Df*	*F*	η_p^2	*p*
(A) Att. Imp	3	.11	.01	.96
(B) Condition	3	.46	.02	.71
A x B (interaction)	9	.83	.10	.59
Error (within groups)	66			
(A) Mot. Imp.	3	.24	.01	.87
(B) Condition	3	.09	.00	.97
A x B (interaction)	9	.51	.07	.86
Error (within groups)	66			
(A) Nonp. Imp.	3	3.66	.14	.02*
(B) Condition	3	.72	.03	.54
A x B (interaction)	9	1.84	.20	.08
Error (within groups)	66			

Note. *=$p \leq .05$

Table 2

Differences Among Non-planning Impulsiveness Quartiles on Persistence Time

Quartile	*M*	*SE*	*1*	*2*	*3*
1	878.33	72.41			
2	575.36	89.41	*		
3	734.91	85.84	*	NS	
4	560.35	83.11	*	NS	NS

Note: NS = nonsignificant difference between pairs of means, while asterisk (*) = significant using Fisher's LSD with alpha of 0.05.

Table 3

Intercorrelations Between Variables

Variable	1	2	3	4	5	6	7	8
				Participants (n=82)				
1. Tot. Imp	–	.74**	.77**	.85**	-.34**	.12	.22*	-.11
2. Att. Imp.		–	.38**	.42**	-.29**	.29**	.27*	.02
3. Mot. Imp.			–	.51**	-.26*	.03	.13	.00
4. Nonp. Imp.				–	-.26*	-.02	.13	-.25*
5. Pos. Health					–	-.08	-.07	-.13
6. Neg. Emot.						–	.12	-.23*
7. Neg. Health							–	-.10
8. Time								–

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

APPENDIX A

Demographic Questionnaire

1. Gender _____ 0 = male, 1 = female
2. Age _____
3. Major _____
4. Credit Hours _____
5. Class Status _____ (freshman, sophomore, junior, senior)
6. GPA _____

APPENDIX B

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. **For each item, circle the number that corresponds to your rating.** Do not spend too much time on any statement. Answer quickly and honestly.

1 Rarely/Never 2 Occasionally 3 Often 4 Almost Always/Always

1	I plan tasks carefully.	1	2	3	4
2	I do things without thinking.	1	2	3	4
3	I make-up my mind quickly.	1	2	3	4
4	I am happy-go-lucky.	1	2	3	4
5	I don't "pay attention."	1	2	3	4
6	I have "racing" thoughts.	1	2	3	4
7	I plan trips well ahead of time.	1	2	3	4
8	I am self controlled.	1	2	3	4
9	I concentrate easily.	1	2	3	4
10	I save regularly.	1	2	3	4
11	I "squirm" at plays or lectures.	1	2	3	4
12	I am a careful thinker.	1	2	3	4
13	I plan for job security.	1	2	3	4
14	I say things without thinking.	1	2	3	4
15	I like to think about complex problems.	1	2	3	4
16	I change jobs.	1	2	3	4
17	I act "on impulse."	1	2	3	4
18	I get easily bored when solving thought problems.	1	2	3	4
19	I act on the spur of the moment.	1	2	3	4
20	I am a steady thinker.	1	2	3	4
21	I change residences.	1	2	3	4
22	I buy things on impulse.	1	2	3	4
23	I can only think about one thing at a time.	1	2	3	4
24	I change hobbies.	1	2	3	4
25	I spend or charge more than I earn.	1	2	3	4
26	I often have extraneous thoughts when thinking.	1	2	3	4
27	I am more interested in the present than the future.	1	2	3	4
28	I am restless at the theater or lectures.	1	2	3	4
29	I like puzzles.	1	2	3	4
30	I am future oriented.	1	2	3	4

APPENDIX C

Student Health and Lifestyle Questionnaire

Lifestyle habits over the past month

1. How many times did you exercise during the past month? _____

2. When you exercised, on the average how many minutes did you engage in the exercise? _____

3. How many times did you feel "stressed out" (under stress) during the past month? _____

4. When you felt stressed out how many hours did it usually last? _____

5. How many times did you feel angry or irritated during the past month? _____

6. When you felt angry or irritated how many hours did it usually last? _____

7. Over the past month how many times did you feel depressed? _____

8. When you felt depressed how many hours did it last? _____

9. During the past month how many times did you drink beer? Please circle.

   a. every day
   b. two or three times a week
   c. once a week
   d. at least once a month but less than once a week
   e. not at all

10. When you drank beer how many average size glasses or cans did you usually consume at any one sitting? _____

11. During the past month circle how many times you drank wine or a wine cooler.

a. every day

b. two or three times a week

c. once a week

d. at least once a month but less than once a week

e. not at all

12. When you drank wine how many average size glasses or small bottles of wine coolers did you usually consume at any one sitting? _____

13. During the past month how many times did you drink a hard liquor (vodka, rum, whiskey, etc.)? Please circle.

a. every day

b. two or three times a week

c. once a week

d. at least once a month but less than once a week

e. not at all

14. When you drank liquor how many shot glasses or shots in mixed drinks did you usually consume at any one sitting? _____

15. During the past month how many days did you use tobacco? _____

16. How many cigarettes did you smoke on the days you smoked? _____

17. How many dips of chewing tobacco/snuff did you use on days you used it?

_____

18. How many days did you smoke marijuana during the past month? _____

19. How many joints did you smoke on the days you used marijuana? _____

20. How many days did you binge out on food? _____

21. On the days you binged out on food how many times did you purge (vomit or use laxative)? _____

APPENDIX D

Letter Search

For this task you will be asked to complete a letter search. The goal is to follow the instruction carefully. You will be judged on how well you follow instructions. Here are your instructions:

On the page provided, you are to cross off the letter *e* every time it appears with the following exceptions:

1. Do not cross out the *e* if it is adjacent to another vowel (e.g., friend).
2. Do not cross out the *e* if it is one letter away from another vowel (e.g., vowel).
3. Do not cross out the *e* if the word has 6 letters (e.g., there).
4. do not cross out the *e* if it is the third to last letter (e.g., customers).
5. Do not cross out the *e* if there are double letters in the word (e.g., hello).

PLEASE DO NOT TURN TO THE NEXT PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

APPENDIX E

Letter Search/Reading Task Article Websites

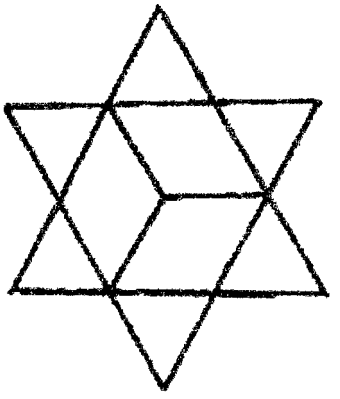
http://www.psichi.org/pubs/articles/article_646.asp

http://www.psichi.org/pubs/articles/article_663.asp

http://www.psichi.org/pubs/articles/article_667.asp

APPENDIX F

Figure Tracing Task



APPENDIX G

(1) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding as to which personality traits make people more responsive to experiencing emotions. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will watch a short video during which you will have to try not to show and not to feel any emotions. You should behave so that a person observing you would not know you were feeling anything at all. You will be videotaped while watching the film, so it is essential to try to conceal and suppress any emotional reaction.

After this step, you will complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire & Personality Questionnaire

Please complete the following questionnaires.

Video

You will now watch a short video. Try not to show and not to feel any emotions during the video. You should behave so that a person observing you would not know you were feeling anything at all. You will be videotaped while watching the film, so it is essential to try to conceal and suppress any emotional reaction.

Turn on Video Camera & Start Video

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Student Health and Lifestyle Questionnaire

Please complete the following questionnaire.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX H

(2) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding as to which personality traits make people more responsive to experiencing emotions. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will watch a short video during which you will have to try not to show and not to feel any emotions. You should behave so that a person observing you would not know you were feeling anything at all. You will be videotaped while watching the film, so it is essential to try to conceal and suppress any emotional reaction.

After this step, you will complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire

Please complete the following questionnaire.

Video

You will now watch a short video. Try not to show and not to feel any emotions during the video. You should behave so that a person observing you would not know you were feeling anything at all. You will be videotaped while watching the film, so it is essential to try to conceal and suppress any emotional reaction.

Turn on Video Camera & Start Video

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Personality Questionnaire & Student Health and Lifestyle Questionnaire

Please complete the following questionnaires.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX I

(3) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding as to which personality traits make people more responsive to experiencing emotions. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will watch a short video in which you will be asked to let your emotions flow without any attempts to hide or deny your feelings.

After this step, you will complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire & Personality Questionnaire

Please complete the following questionnaires.

Video

You will now watch a short video. While watching the video, let your emotions flow without any attempt to hide or deny your feelings.

Start Video

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Student Health and Lifestyle Questionnaire

Please complete the following questionnaire.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX J

(4) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding as to which personality traits make people more responsive to experiencing emotions. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will watch a short video in which you will be asked to let your emotions flow without any attempts to hide or deny your feelings.

After this step, you will complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire

Please complete the following questionnaire.

Video

You will now watch a short video. While watching the video, let your emotions flow without any attempt to hide or deny your feelings.

Start Video

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Personality Questionnaire & Student Health and Lifestyle Questionnaire

Please complete the following questionnaires.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX K

(5) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding of how cognitive activities affect performance on subsequent cognitive tasks. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will be given a proofreading exercise that will be graded for accuracy.

You will then complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire & Personality Questionnaire

Please complete the following questionnaires.

Give Proofreading Task

For the following task you will be asked to complete a letter search. The goal is to follow the instructions carefully. You will be judged on how well you follow instructions. You

will have 10 minutes to perform this task. Make as much progress as you can in this time.

Hand participant the Letter Search instructions.

Please read over the instructions. If you have any questions regarding the instructions, please let me know.

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Student Health and Lifestyle Questionnaire

Please complete the following questionnaire.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX L

(6) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding of how cognitive activities affect performance on subsequent cognitive tasks. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will be given a proofreading exercise that will be graded for accuracy.

You will then complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire

Please complete the following questionnaire.

Give Proofreading Task

For the following task you will be asked to complete a letter search. The goal is to follow the instructions carefully. You will be judged on how well you follow instructions. You

will have 10 minutes to perform this task. Make as much progress as you can in this time.

Hand participant the Letter Search instructions.

Please read over the instructions. If you have any questions regarding the instructions, please let me know.

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Personality Questionnaire & Student Health and Lifestyle Questionnaire

Please complete the following questionnaires.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX M

(7) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding of how cognitive activities affect performance on subsequent cognitive tasks. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will be given material to casually read.

You will then complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire & Personality Questionnaire

Please complete the following questionnaires.

Give Reading Material.

For the following task you will be asked to simply read the presented articles. You will have 10 minutes to casually read as much as you can. Please read at your own pace. You

will not be judged on the amount of material you cover or the subject matter of the articles.

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Student Health and Lifestyle Questionnaire

Please complete the following questionnaire.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX N

(8) PROCEDURE & SCRIPT

Thank you for your participation in this research study. Your participation will help us gain a better understanding of how cognitive activities affect performance on subsequent cognitive tasks. My name is Heather Edwards and I am a graduate student working under the supervision of Dr. Osborne. If at any time you have any questions about the research procedures, please let me know.

Your participation will involve several steps. First, you will be given material to casually read.

You will then complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You will be free to make as many attempts at the task as you wish and will not be judged on the amount of time required to complete it. If you do not feel that you can solve this puzzle, you may terminate the task.

In addition to the completion of these two tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits. Once all tasks have been completed, you will be debriefed on the research and allowed to go home.

Give Consent Form

Please read and sign the presented consent form. This form describes the purpose of this research as previously discussed. The form also assures that any information you provide will be confidential and your name will not be associated with the data. It is important that you also understand that your participation is entirely voluntary, and you are free to terminate your participation in this study at any time. Please note that if you would like a summary of the results sent to you by email upon completion of the study, please check the box on the form and provide your email address where indicated.

Give Demographic Questionnaire

Please complete the following questionnaire.

Give Reading Material.

For the following task you will be asked to simply read the presented articles. You will have 10 minutes to casually read as much as you can. Please read at your own pace. You

will not be judged on the amount of material you cover or the subject matter of the articles.

Give Spatial Cognitive Task

You will now complete a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting up your pencil. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you will take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you solve the puzzle, ring the bell on the table.

Give Personality Questionnaire & Student Health and Lifestyle Questionnaire

Please complete the following questionnaires.

Give Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

This form also includes information regarding who to contact if you feel you have been adversely affected in any way by your participation in this study.

APPENDIX O

Texas State University

Consent Form

You have been invited to participate in a research study being conducted by graduate student Heather Edwards (HE1025@txstate.edu).

The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. Your participation will entail several steps. The first step involves watching a funny video and responding based on instructions provided by the researcher. The next step is to complete an academic related task involving tracing a figure on paper without retracing or lifting a pencil. In addition to the completion of these tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits including your exercise habits, stress and depression levels, alcohol consumption, tobacco and marijuana use, and binge eating behaviors. This research study is expected to take no more than a total of 60 minutes to complete.

The data from your performance will be recorded on a form that is identified only by a code, and your name will not be associated with this data. All consent forms will be kept completely separate from data response sheets. All data collected will also be kept in a locked file cabinet. Once all data has been entered into a computer and analyses completed, all original data sheets will be destroyed. The results of the research study may be published but your name or identity will not be revealed.

Although there are no direct benefits to you, the possible benefits of your participation in this research include an increased knowledge of personality traits' influence on emotions. In addition to the extra credit available to you through your participation, you may also benefit from increased knowledge of research procedures. No significant risks are anticipated as a result of participating in this study.

Your participation is entirely voluntary, and you are free to terminate your participation in this study at any point without penalty. You are being compensated for your participation in this study by receiving extra credit in one of your psychology courses or fulfillment of a research requirement. You have been made aware that there are other methods of receiving extra credit in this course that do not require your participation in this research study.

If you have any questions regarding this study, you are free to contact the graduate student named above. If you have any questions about the research or your rights in this or any other study, you may contact the Institutional Review Board chairperson, Dr. Lisa Lloyd, and the Office of Sponsored Programs administrator, Ms. Becky Northcut. Dr. Lloyd may be reached at 512/245-8358 and Ms. Northcut may be reached at 512/245-2102.

You may request that a summary of the results be sent to you by email upon completion of the study.

□ I would like a copy of the research results sent to me via email to the following address:

_____

By signing below, you are giving your consent to participate in this research study. You will receive a copy of this consent form.

_____ _____
Participant's Signature Date

_____
Printed Name

_____ _____
Researcher's Signature Date

_____
Researcher's Printed Name

_____ _____
Professor & Course Class days & times

APPENDIX P

Texas State University

Consent Form

You have been invited to participate in a research study being conducted by graduate student Heather Edwards (HE1025@txstate.edu).

The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. Your participation will involve several steps. The first step is a proofreading task. The next step is to complete an additional academic related task consisting of tracing a figure on paper without retracing or lifting a pencil. In addition to the completion of these tasks, two questionnaires will be administered to assess your personality traits and lifestyle habits including your exercise habits, stress and depression levels, alcohol consumption, tobacco and marijuana use, and binge eating behaviors. This research study is expected to take no more than a total of 60 minutes to complete.

The data from your performance will be recorded on a form that is identified only by a code, and your name will not be associated with this data. All consent forms will be kept completely separate from data response sheets. All data collected will also be kept in a locked file cabinet. Once all data has been entered into the computer and analyses completed, all original data sheets will be destroyed. The results of the research study may be published but your name or identity will not be revealed.

Although there are no direct benefits to you, the possible benefits of your participation in this research include an increased knowledge of how cognitive activities affect future task performance. In addition to the extra credit available to you through your participation, you may also benefit from increased knowledge of research procedures. No significant risks are anticipated as a result of participating in this study.

Your participation is entirely voluntary, and you are free to terminate your participation in this study at any point without penalty. You are being compensated for your participation in this study by receiving extra credit in one of your psychology courses or fulfillment of a research requirement. You have been made aware that there are other methods of receiving extra credit in this course that do not require your participation in this research study.

If you have any questions regarding this study, you are free to contact the graduate student named above. If you have any questions about the research or your rights in this or any other study, you may contact the Institutional Review Board chairperson, Dr. Lisa Lloyd, and the Office of Sponsored Programs administrator, Ms. Becky Northcut. Dr. Lloyd may be reached at 512/245-8358 and Ms. Northcut may be reached at 512/245-2102.

You may request that a summary of the results be sent to you by email upon completion of the study.

□ I would like a copy of the research results sent to me via email to the following address:

_____

By signing below, you are giving your consent to participate in this research study. You will receive a copy of this consent form.

_____ _____

Participant's Signature Date

_____

Printed Name

_____ _____

Researcher's Signature Date

_____

Researcher's Printed Name

_____ _____

Professor & Course Class days & times

APPENDIX Q

Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate which personality traits make people more responsive to experiencing emotions. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

As I am sure you can understand, given that I am still in the midst of collecting data for my research, please refrain from discussing the experiment or the procedures with other students in your classes since they may also be participating in this study.

If you have any questions about the research or your rights in this or any other study, you may contact the Institutional Review Board chairperson, Dr. Lisa Lloyd, and the Office of Sponsored Programs administrator, Ms. Becky Northcut. Dr. Lloyd may be reached at 512/245-8358 and Ms. Northcut may be reached at 512/245-2102. If you feel you have concerns regarding symptoms related to either mental health or substance abuse/dependence, please contact the Texas State Counseling Center at 512/245-2208.

APPENDIX R

Initial Debriefing

Thank you for your participation in this study. The purpose of this research is to investigate how cognitive activities affect performance on subsequent cognitive tasks. We are unable to reveal the details of the study at this time. Once the study has been completed, full details regarding the hypothesis and results will be emailed to you as indicated on the consent form.

As I am sure you can understand, given that I am still in the midst of collecting data for my research, please refrain from discussing this experiment or the procedures with other students in your classes since they may also be participating in this study.

If you have any questions about the research or your rights in this or any other study, you may contact the Institutional Review Board chairperson, Dr. Lisa Lloyd, and the Office of Sponsored Programs administrator, Ms. Becky Northcut. Dr. Lloyd may be reached at 512/245-8358 and Ms. Northcut may be reached at 512/245-2102. If you feel you have concerns regarding symptoms related to either mental health or substance abuse/dependence, please contact the Texas State Counseling Center at 512/245-2208.

APPENDIX S

Final Debriefing Email

Hello,

Last semester, you participated in a research study for extra credit in you Intro to Psychology class. At the end of your participation, you were informed that the details regarding the study could not be revealed at the time. This message serves as a final debriefing.

As a participant, you were informed that the purpose of the study was to either: (1) gain an understanding as to which personality traits make people more responsive to experiencing emotions, or (2) gain a better understanding of how cognitive activities affect performance on subsequent cognitive tasks. These were both cover stories. The true purpose of this research was to examine the relationship between self-regulation and impulsivity. More specifically, the purpose was to observe how impulsivity scores relate to persistence on a spatial cognitive task during an ego-depleted state.

Self-regulation (or self-control) refers to "the ability to control or override one's thoughts, emotions, urges, and behavior" (Gailliot, et al., 2007, p. 325). According to the strength model of self-regulation, the ability to self-regulate relies on a limited energy or strength. Just as a muscle becomes tired with repeated exertions, the ability to self-regulate becomes more arduous with repetitive use. The term *ego depletion* refers to "the state of diminished resources following exertion of self-control (or other tasks that might deplete the same resource)" (Baumeister, Vohs, Tice, 2007, p. 352).

You were randomly assigned to one of four groups: (1) An ego-depletion condition, in which you watched a humorous video while suppressing your emotional reactions; (2) a corresponding control condition, in which you watched a humorous video while reacting naturally; (3) An ego-depletion condition, in which you performed a letter search task; and (4) a corresponding control condition, in which you simply read. After performing these initial tasks, all participants completed a spatial cognitive task, involving tracing a geometric figure on paper without retracing any lines or lifting their pencil. This puzzle was unsolvable. Some participants did ask me whether or not the puzzle was possible to solve, and I informed them that it was. Deception was used in order to protect the integrity of the research, and was not intended to undermine any participants.

In addition to these tasks, you also completed an impulsiveness scale and a health questionnaire.

I hypothesized that participants who are highly impulsive would not persist at the spatial cognitive task after undergoing ego depletion as long as participants who were not highly impulsive. Since, impulsivity has also been linked to high-risk behaviors characterized by poor self-control, I also hypothesized that high impulsivity would be associated with increased unhealthy lifestyle habits.

If you requested a copy of the results on your consent form, I will email them to you as soon as my analysis is complete.

If you have any questions about the research or your rights in this or any other study, you may contact the Institutional Review Board chairperson, Dr. Lisa Lloyd, and the Office of Sponsored Programs administrator, Ms. Becky Northcut. Dr. Lloyd may be reached at 512/245-8358 and Ms. Northcut may be reached at 512/245-2102. If you have concerns regarding symptoms related to either mental health or substance abuse/dependence, please contact the Texas State Counseling Center at 512/245-2208.

Once again, thank you so much for your participation!

Sincerely,

Heather Edwards

REFERENCES

Abramowitz, A. & Berenbaum, H. (2007). Emotional triggers and their relation to impulsive and compulsive psychopathology. *Personality and Individual Differences, 43*, 1356-1365.

Allen, T. J., Moeller, F. G., Rhoades, H. M., & Cherek, D. R. (1998). Impulsivity and history of drug dependence. *Drug and Alcohol Dependence, 50*(2), 137-145.

Appleby, K. M. (2007, Fall). Sport Psychology: History, professional organizations & professional preparation. *Eye on Psi Chi,12*(1), 22.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252-1265.

Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality, 74*(6), 1773-1801.

Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science,16*(6), 351-355.

Cox, B. D., Cullen, K. L., & Buskist, W. (2007, Winter). Making the transition from undergraduate to graduate student: Insights from successful graduate students graduate school. *Eye on Psi Chi, 12*(2), 28.

Crawley, T. & Martin, F. H. (2006). Impulseive-aggression, antisocial behavior, and subclinical psychopathy: Preliminary findings from an undergraduate female sample. *Psychiatry, Psychology, and Law, 13*(2), 232-242.

Dewalt, T. A. (2007, Winter). Looking toward your future in psychology: Taking a closer look at career preparation. *Eye on Psi Chi,12*(2), 22.

Duckworth, A. L. & Seligman, M. E. P. (2006). Self discipline gives girls the edge: Gender in self-discipline, grades, and achievement test scores. *Journal of Educational Psychology, 98*(1), 198-208.

Engs, R. C. & Aldo-Benson, M. (1995). The Association of Alcohol Consumption with Self-Reported Illness. *Psychological Reports,76,* 727-736.

Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology, 92*(2), 325-336.

Hair, P. & Hampson, S. E. (2006). The role of impulsivity in predicting maladaptive behavior among female students. *Personality and Individual Differences, 40*, 943-952.

Hoyle, R. H. (2006). Personality and self-regulation: Trait and information-processing perspectives. *Journal of Personality, 74*(6), 1507-1525.

Muraven, M., Baumeister, R. F., & Tice, D. M. (1999). Longitudinal improvement of self-regulation through practice: Building self-control strength through repeated exercise. *The Journal of Social Psychology, 139*(4), 446-457.

Patton, J. H., Stanford, M. S. & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*, 768-774.

Pietrzak, R. H., Sprague, A., & Snyder, P. J. (2007). Trait impulsiveness and execution function in healthy young adults. *Journal of Research in Personality, 42*, 1347-1351.

Spinella, M. (2004). Neurobehavioral correlates of impulsivity: Evidence of prefrontal involvement. *International Journal of Neuroscience, 114*, 95-104.

Stanford, M. S., Greve, K. W., Boudreaux, J. K., Mathias, C. W., & Brumbelow, J. L. (1996). Impulsiveness and risk taking behaviour: comparison of high school and college students using the barratt impulsiveness scale. *Personality and Individual Differences, 21*, 1073-1075.

Stoltenberg, S. F, Batien, B. D., & Birgenheir, D. G. (2008). Does gender moderate associations among impulsivity and health-risk behaviors? *Addictive Behaviors, 33*, 252-265.

Website. Retrieved March 1, 2009, from http://impulsivity.org/BIS-11/history-and-development-of-the-bis

VITA

Heather Danielle Edwards was born in Baytown, Texas on June 25, 1980, the daughter of Sheryl Poth Edwards and James Owen Edwards, Jr. After completing her work at Robert E. Lee High School, Baytown, Texas, in 1998, she attended Lee College in Baytown where she received an Associates Degree in Liberal Arts in May 2001. In August 2001, she enrolled at the University of Texas at Austin where she graduated with high honors, receiving the degree of Bachelor of Arts in Psychology in 2003. In August 2007, she entered the Graduate College of Texas State University-San Marcos where she studied Health Psychology.

Permanent Address: 108 Tanglewood

Baytown, Texas 77520

This thesis was typed by Heather Danielle Edwards.