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A Comparison Of Online And Offline Gamblers: An Experimental Manipulation Of Escape

Kevin Steven Montes

A COMPARISON OF ONLINE AND OFFLINE GAMBLERS: AN EXPERIMENTAL MANIPULATION OF ESCAPE

by

Kevin Steven Montes
Bachelor of Arts, Psychology, CSU Dominguez Hills
Masters of Arts, General Psychology, University of North Dakota

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This dissertation, submitted by Kevin Montes in partial fulfillment of the requirements of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

Dr. Jeffrey Weatherly

Dr. Adam Derenne

Dr. Thomas Petros

Dr. Richard Ferraro

Dr. Steven Light

This dissertation is being submitted by the appointed advisory committee as having met all of the requirements of the Graduate School at the University of North Dakota and is hereby approved.

Dr. Wayne Swisher

Date

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To Gaby

ABSTRACT

Few studies have examined differences between online and offline gamblers, with no study to date enlisting the participation of online gamblers in a laboratory-based study. Moreover, research indicates that there is a link between escape and problem gambling, however, no study to date has examined this relationship in online gamblers using an experimental design. The current study is the first to address these gaps in the literature. All 420 participants participated in the non-experimental phase of the study, and 50 participants participated in the experimental phase. All participants completed a demographics form, SOGS, PGSI, GFA-R, BDI-SF, discounting task, and a gambling motivations questionnaire. In the experimental phase, participants' mood state was manipulated using hypothetical scenarios before gambling. The results indicated that online gamblers had a higher rate of problem-gambling severity than offline gamblers, and that online gamblers gambled to escape to a greater degree than offline gamblers. In terms of differences in the gambling behavior of online and offline gamblers, online gamblers were found have to played more hands and committed more errors than offline gamblers. No statistically significant results were found across mood conditions, or when the interaction between participants' gambler status and mood condition was examined, although trends in the hypothesized direction were observed. No statistically significant group differences were observed when online gamblers' rate of discounting certain outcomes was compared to offline gamblers' rates. Based on the examination of a

factor structure derived from offline gamblers in the current study, the results indicated that motivations to gamble may be different for online gamblers. Taken together, these results suggest that some of the differences between online and offline gamblers may help explain the higher prevalence of problem gambling among online gamblers. Although gambling to escape was found to be positively correlated with problem-gambling severity, the experimental results did not support this finding. Future studies should further investigate the relationship between escape and problem gambling in online gamblers by using a different manipulation. A more knowledgeable understanding of the differences between online and offline gamblers will lead to better treatment outcomes for individuals who suffer from a gambling addiction.

CHAPTER I

INTRODUCTION

Gambling is ubiquitous. One can gamble in casinos, at home, or on the Internet using a laptop or cell phone. The ubiquity extends from humanity's past to its future. Gambling has been dated as far back as ancient Egypt and biblical times, where Egyptians would gamble using dice, and where individuals would cast lots for Jesus' belongings after his death (Petry, 2005).

The proliferation of online gambling outlets and the increased pressure of special interest groups to pass pro-gambling legislation make the prediction that gambling is going to be a more salient aspect of individuals' everyday life even more probable. The research also supports this trend, as increased accessibility to legalized forms of gambling have been linked to increases in the prevalence of problem and pathological gambling (Ladouceur, 1996; Volberg, 2004). Moreover, a number of explanations have been forwarded to explain why gambling prevalence rates may be on the rise, which include: accessibility to casinos (e.g., Griffiths, 2003), less restrictive social norms associated with gambling (e.g., Corney & Davis, 2010), proliferation of poker (Benston, 2004), weekly media coverage of gambling events (Benston, 2004), and the emergence of online gambling (e.g., Griffiths, Wardle, Orford, Sproston, & Erens, 2011), to name a few.

One of the more promising lines of research is the investigation of factors related to online gambling. With the advent of new technologies, individuals can gamble anywhere and at any time. Although factors related to gambling at a casino or at home with family are well documented, the generality of these research findings to online gamblers is debatable. In an attempt to generalize results from offline to online gamblers, researchers have predominantly relied on self-report measures (e.g., Potenza et al., 2011; Wong, 2010). Only recently have researchers gained access to online gamblers' actual betting behavior through the purchasing of data from online gambling websites (Laplante, Nelson, Labrie, & Shaffer, 2008). Although the analysis of online gamblers' betting history is a significant improvement when compared to the use of self-report measures alone, lacking in the extant literature is an experimental examination of variables that purportedly influence the gambling behavior(s) of online gamblers. The current study is an attempt to fill this gap in the existing literature.

The current study set out to answer the following research questions: (1) Will online gamblers be found to have more problem gambling symptoms compared to offline gamblers, (2) will the gambling behavior of online gamblers be maintained by escape to a greater extent than offline gamblers, (3) will online gamblers discount outcomes/commodities related to gambling at different rates compared to offline gamblers, and (4) will online gamblers be found to wager more, commit more errors, and play more hands after being placed in an aversive condition compared to offline gamblers? The answers to these research questions will have legislative, empirical, theoretical, and clinical significance.

Gambling

Gambling is defined as the wagering of something of value on an uncertain beneficial outcome (Petry, 2005). Examples of gambling include placing bets on horses, playing dollar slot machines, or playing cards or dominoes for money. Although most individuals who gamble do not experience any negative consequences as a result of their gambling, some individuals do experience serious gambling problems.

The clinical spectrum of problematic gambling behavior ranges from non-gambler to pathological gambler, whereas the non-clinical spectrum of problematic gambling behavior ranges from non-gambler to problem gambler. Thus, pathological gamblers would be considered problem gamblers, but problem gamblers would not necessarily be considered pathological gamblers. Another important distinction between pathological and problem gambling is that only a trained professional can diagnose an individual as being a pathological gambler.

In the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-R*; American Psychiatric Association, 2000), pathological gambling was categorized as an "Impulse-Control Disorder Not Elsewhere Classified," but the American Psychiatric Association has re-categorized pathological gambling in the *DSM-V* as a behavioral addiction (*DSM-V*; American Psychiatric Association, 2013). In terms of how pathological gambling was conceptualized in the *DSM-IV-R*, pathological gambling was defined as "persistent and recurrent maladaptive gambling." Individuals who experience five (or more) of the following symptoms, which have been adapted herein from the *DSM-IV-R*, would be considered a pathological gambler: (1) preoccupation with

gambling, (2) the need to gamble with increasing amounts of money to achieve a desired level of excitement, (3) repeated unsuccessful efforts to control, cut back, or stop gambling, (4) restlessness and irritability when attempting to stop gambling, (5) gambling as a way to escape from problems or to relieve a dysphoric mood, (6) gambling to recuperate past gambling losses, (7) lying to family members and others about the extent of their gambling behavior, (8) committing illegal acts to finance gambling, (9) losing a significant relationship, job, or career opportunity because of gambling, and (10) relying on others to provide money to relieve a financial situation caused by gambling. The three symptom clusters embedded in the diagnostic criteria for pathological gambling include: (1) disruption to the individual's life, (2) loss of control, and (3) dependence (Whelan, Steenbergh, & Meyers, 2007). In terms of being diagnosed with a gambling disorder, the DSM-V differs from the DSM-IV in that the question related to committing an illegal act to finance one's gambling behavior has been removed, and that the endorsement of only four out of the nine symptoms is required to be diagnosed with a gambling disorder.

Prevalence of Problem and Pathological Gambling

In a study that reviewed previously published prevalence rates of problem gambling, Volberg (1996) noted that the prevalence rates among states examined in 1990 or earlier tended to be lower than the prevalence rates published after 1990. That is, prevalence rates related to problem gambling have been on the rise over the past 20 years. More recently, the worldwide prevalence rate of problem gambling was reported to be at approximately 5.5% (Shaffer, Hall, & Vander Bilt, 1997). In a seminal book, Petry (2005) examined 22 prevalence studies conducted by researchers from around the world,

with most studies using the SOGS to determine rates of pathological gambling. According to Petry, the worldwide prevalence rate of pathological gambling ranged from 1% to 2%. With the proliferation of online gambling and the creation of new technological devices that make online gambling more accessible, the problem and pathological gambling prevalence rates may reach unprecedented levels (Volberg, 2004).

Theories of Problem and Pathological Gambling Related to Escape

There are many theories and models that have been formulated to explain why individuals gamble. However, only theories and models which include escape as a causal or maintenance factor will be described as the current study focused on how the manipulation of escape affects online and offline gamblers[1].

In the controversial debate concerning the role of trait and state factors in determining behavior, trait theorists have suggested that personality factors (e.g., sensation seeking) are what largely determine behavioral responding, whereas state theorists have suggested that environmental factors (e.g., contingencies) largely determine behavioral responding (Steyer, Schmitt, & Eid, 1999). In terms of escape being a product of state or trait factors, it would seem that both state and trait factors influence escape behavior, but that one factor may influence escape behavior to a greater degree.

Addictive Personality Syndrome

Developed by Jacobs (1986), and also known as the General Theory of Addictions, advocates for the use of Addictive Personality Syndrome suggest that the motivation underlying all addictions is the desire to escape reality. Extended to gambling,

[1] If one is interested in a more comprehensive review of theories related to problem and pathological gambling where escape does not play a central role, see Aasved (2003) or Walker (1992) for a review.

the gambling behavior of problem and pathological gamblers can be viewed functionally as a coping strategy to deal with life stressors and aversive stimuli in the environment.

In the model used to describe an Addictive Personality Syndrome, Jacobs proposed two distinct but interacting factors which are biologically and psychologically based. The biological factor took into account a gamblers' baseline arousal state (e.g., hypo- or hyper-arousal). If the gambler experienced chronic hypoarousal or hyperarousal, which in both cases would be considered an aversive state, the arousal that accompanied gambling would either bring the arousal state of the gambler to normative levels (hypoarousal) or establish consonance between the gamblers' internal state of arousal and external conditions. The psychological factor in the model was found to stem from problems in childhood and adolescence related to self-esteem, feelings of inadequacy, and feelings of inferiority (Aasved, 2003). These feelings were found to resurface in late adolescence and adulthood, but instead of dealing with these issues in a healthy way (e.g., consulting a therapists or personal introspection), some individuals chose instead to gamble in order to escape from past issues. Although biological factors played an important role in the model, problem and pathological gambling was considered to be a learned behavior.

Pathways Model

Blaszczynski and Nower (2003) developed the pathways model of problem gambling to describe subsets of gamblers along three different pathways. In this model, each pathway begins with access to gambling, operant and classical conditioning, and habituation, and culminates in the chasing of gambling losses. Pathway one represents the

behaviorally-conditioned gambler who is found to gamble as a result of operant conditioning (e.g., stress is re-interpreted as excitement, thus representing negative reinforcement as gambling eliminates stress) and classical conditioning (e.g., casino associated with arousal). Pathway-one gamblers are least likely to become problem gamblers.

Pathway two represents the emotionally-vulnerable gambler where emotional and biological factors are found to serve as mediators between access to gambling and classical/operant conditioning. That is, individual differences in risk taking, biochemical factors (e.g., serotonin and dopamine), and coping strategies are all factors that have been found to influence the gambling behavior of the pathway-two gambler. Interestingly, the researchers also noted that pathway-two gamblers tend to experience periods of inferiority and low self-esteem in childhood. These childhood experiences are similar to the explanatory variables used in McCormick's (1987) Learned Helplessness Theory. In addition, pathway-two gamblers are generally found to gamble to escape, which makes these gamblers vulnerable to the development of problems related to gambling (Miller, Dixon, Parker, Kulland, & Weatherly, 2010).

Pathway three represents the antisocial-impulsivist gambler who is similar to pathway-two gambler, except that pathway-three gamblers have also been found to have problems with impulsivity and substance abuse. Pathway three gamblers are also identified as being more antisocial compared to all other gamblers. Like the pathway-two gambler, pathway three gamblers are also at an increased risk of developing problems related to gambling.

The pathway approach to problem gambling reflects the field's acknowledgement that problem gamblers are not a homogenous group. Rather, factors associated with the cause and maintenance of gambling problems will interact and affect individuals in different ways.

Although escape is associated with problem and pathological gambling, activities that allow an individual to dissociate from reality can be psychologically and physiologically rewarding. In terms of reinforcement for pathway two gamblers who, for the most part, gamble to escape, the Pathways Model postulates that biological and affective factors mediate the relationship between access to gambling and classical and operant conditioning (Blaszczynski & Nower, 2003). In terms of classical conditioning, past positive gambling experiences may lead to conditioned stimuli (e.g., casino, commercials) that elicit physiological arousal and an inclination to gamble. In terms of operant conditioning in the model, gambling can reduce stress because individuals reinterpreted the physiological manifestations of stress in terms of excitement. Thus, stress is temporarily eliminated which means that gambling served as a negative reinforcer (i.e., reduction in stress leads to an increase in gambling behavior). Most individuals whose gambling behavior is maintained by positive and/or negative reinforcement do not experience any negative consequences as a result of their gambling behavior.

Review of Gambling Theories

The analysis of theories that have incorporated escape in order to explain problem and pathological gambling are of immense value because of their ability to explain individuals' gambling behavior; thus, the examination of escape in the current study was a suitable construct for experimentation in order to better understand the role of escape in the gambling behavior of online gamblers. Of the theories in the literature related to escape and addiction, Jacobs' (1986) General Theory of Addictions and Blaszczynski and Nower's Pathways Model of Gambling (2003) were found to be of greater utility than other theories not mentioned. First, Jacobs' viewed pathological gambling as largely a behavioral addiction which is consistent with how pathological gambling is currently conceptualized in the *DSM-V* (American Psychiatric Association, 2013). A theory that is consistent with the clinical classification of pathological gambling will undoubtedly be more useful than a theory that does not match with how pathological gambling is conceptualized in the *DSM-V*. Second, the Pathways Model does an adequate job of integrating concepts from various domains (e.g., reinforcement, social factors, and biological factors) in an attempt to delineate distinct pathways. Lastly, researchers have also used these theories to interpret findings related to gambling in past studies (e.g., Matthews, Farnsworth, & Griffiths, 2009; Wood, Griffiths, & Parke, 2007). In summary, both Jacobs' General Theory of Addictions and Blaszczynski and Nower's Pathways Model of gambling are of great utility, but for the sake of parsimony, only Blaszczynski and Nower's Pathways Model was used to interpret the data in the current study.

Online Gambling

Online gambling is a recent phenomenon that has captivated the attention of many in society. Surprisingly, the first Internet gambling website was created and made available to the general public in 1995 (Wong, 2010). As of 2010, there were over 2,500 gambling websites that individuals could visit if they wanted to gamble online (Spectrum Gaming Group, 2010). This number is a significant increase from the 160 online gambling websites that were available in 1999 (Potenza et al., 2011). The number of online gambling sites has grown exponentially since its inception, and as a result, the revenues that have been generated from online gambling have also increased. The expansion of online gambling sites and increased revenues are in response to the growing number of individuals who gamble online, and the global amelioration of legislative restrictions of online gambling (Gainsbury, 2012).

In addition, the way in which individuals' access gambling websites has changed as new technologies have emerged. With the adoption of new technologies that allow individuals to connect to the Internet from anywhere (e.g., through the use smartphones) and at any time, it is now possible to gamble while at work, at school, or at home. Thus, the situational variables that have traditionally accompanied gambling behavior (e.g., the lights and sounds) still exist when one is gambling in a casino, but these same variables may not be present or as salient for online gamblers as online gambling takes place predominantly at one's place of residence. If the environment in which online and offline gamblers engage in their gambling behaviors is different, it may be that online and offline gamblers differ in their responses to stimuli within these environments. This difference

could account for the discrepancy in problem and pathological gambling prevalence rates between online and offline gamblers. In addition to environmental explanations for gambling behavior, it could also be that online gamblers possess different traits which make them more susceptible to the allure of online gambling (e.g., impulsivity and sensation seeking). Both external and internal determinants of online gambling behavior hold promise to explain why some individuals seek out online gambling opportunities whereas others do not seek out opportunities to gamble online.

Prevalence of Problem and Pathological Online Gambling

Research indicates that the prevalence rates of problem and pathological gambling are higher in the online gambling population than in the offline gambling population[2] (e.g., Lloyd et al., 2010; Potenza et al., 2011). For example, according to Griffiths et al.'s (2011) examination of the British Gambling Prevalence Survey (BGPS; 2007), the rate of problem gambling was higher for individuals who gambled on the Internet (5%) compared to those who did not gamble on the Internet (0.5%). Moreover, the examination of the BGPS (2007) by the authors also indicated that individuals who gambled online also tend to gamble offline. Although research has consistently shown that online gamblers are more likely to be problem and pathological gamblers than offline gamblers, some have voiced caution in making such generalization based on the limited number of prevalence studies that have been conducted (Lloyd et al., 2011).

In an exploratory study that investigated the risk-taking behaviors of university students, McBride and Derevensky (2012) articulated the most succinct progression of online gambling prevalence rates for college students. Citing empirical research, the

[2] The term "offline gambler" was used if an individual had never gambled online.

authors reported that 2% - 4% of college students have gambled online (Jones, 2003), but that the rate of college student online gambling is on the rise as a more recent study reported that 23% of college undergraduate students have gambled on the Internet (Griffiths & Barnes, 2008). Moreover, in the BGPS (2007), participants between the ages of 16-34 were found to be more likely to gamble online than any other age group. In terms of problem gambling prevalence rates, another study reported that 18% of online poker players were identified as problem gamblers and that 30% were identified as at-risk problem gamblers (Griffiths, Parke, Wood, & Rigbye, 2010). Thus, preliminary reports examining rates of problem gambling among college student online gamblers have been found to be consistent with the existing gambling literature; namely that online gamblers are more likely to become problem or pathological gamblers compared to offline gamblers.

Online Gambling and Escape Research

No study to date has manipulated both online and offline gamblers' levels of escape to examine how escape affects their gambling behavior. However, past studies in the online and offline gambling literature have indicated that increasing an individual's motivation to escape will lead to longer gambling session, which in turn, could increase the probability that an individual will develop a gambling problem (i.e., gambling more money than he/she intended; Rockloff, Greer, Fay, & Evans, 2011). Qualitative studies concerning what motivates individuals to gamble have found that problem and pathological gamblers do self-report that they gamble to escape (Wood & Griffiths, 2007). In the literature, escape behavior is viewed as the product of a negative mood state

and/or boredom. In terms of negative mood states, these states can naturally occur in an individual's life. For example, if an individual was just recently fired and has multiple overdue bills to pay, but has no savings or job prospects to pay them, the individual will likely be in a negative mood. In contrast to how mood states are produced outside the laboratory, laboratory based studies have tried to induce a negative mood in participants by placing them in an aversive situation (Rockloff et al., 2011).

Online Gambling Research

The progression of online gambling research has its roots in qualitative (e.g., Corney & Davis, 2010; Wood & Griffiths, 2007) and quantitative methodologies (e.g., Laplante, Kleschinsky, LaBrie, Nelson, & Shaffer, 2009). In terms of research design, the studies have predominantly relied on non-experimental designs (e.g., Laplante et al., 2009; Potenza et al., 2011), and no study to date has examined online and offline gamblers under experimental conditions. Although causal inferences cannot be made, the existing online gambling research does provide a window into who gambles online. For example, in an examination of a survey administered by Lloyd et al. (2011) to improve the assessment and treatment of problem gambling, the researchers performed a cluster analysis on *DSM-IV* data from 4,125 online gamblers. The researchers identified five groups (i.e., clusters) of online gamblers: (1) non-problematic (69%), (2) preoccupied chasers (17%), (3) problematic/socially restrained (6%), (4) problematic/antisocial (5%), and (5) problematic/severe (3%). The participants in the study were predominantly male (79%).

In relation to the current study, participants in the last three groups (i.e., cluster 3, 4, and 5) were more likely than the other two groups to endorse the *DSM-IV* criterion that they had, in the past, gambled to escape. In addition, cluster three gamblers were least likely to endorse questions on the *DSM-IV* related to crime, risking employment, and borrowing money to gamble in comparison to individuals whose gambling behavior was best represented by cluster four and cluster five. Moreover, group four gamblers were less likely to commit a crime for gambling money compared to group five gamblers.

The current study enlisted the participation of university students from a Midwestern University. Thus, a review of studies whose participants were both university students and online gamblers was undertaken. In the United Kingdom (UK), Griffiths and Barnes (2008) had 473 student respondents between the ages of 18 and 52 complete an online questionnaire which housed questions related to online gambling behavior, demographic information, and problem gambling behavior. The researchers were interested in determining if: (1) males were more likely than females to be online gamblers, (2) if online gamblers were more likely than offline gamblers to be problem gamblers, and (3) if male online gamblers were more likely than female online gamblers to be problem gamblers. All three hypotheses were supported by the data. The researchers attributed these results to the accessibility, convenience, instant reinforcement, and event frequencies related to online gambling. In the socio-demographic online gambling section, Wardle, Moody, Griffiths, Orford, and Volberg (2011) suggested that females may be more likely to gamble online than males, which contradicts Griffiths and Barnes results. Therefore, it was deemed important that

researchers monitor these trends in future studies due to the contradictory results reported in the online gambling literature.

In a study conducted in the UK by Griffiths et al. (2010), the researchers examined the poker behavior of university students who gambled online. The researchers considered it necessary to better understand university students' online poker behavior because of its burgeoning popularity (Griffiths, Parke, Wood, & Parke, 2006). The 422 university students, who were all online gamblers, completed an online survey that contained questions related to pathological gambling, frequency of play and wins, and motivations to gamble. The results indicated that a little less than half (48%) of the respondents were identified as having some problems related to online gambling, and these respondents were also found to gamble more frequently than non-problem gamblers. For some respondents (11%), their self-reported length of gambling per session was quite long, lasting an average of four hours. Longer gambling sessions were found to be associated with problem gambling, and the explanation for this relationship expressed by the researchers was that longer gambling sessions are likely to produce a dissociative state, which in turn, may cause an individual to gamble more than he/she intended (Griffiths et al., 2006). Thus, explanations for the increased prevalence of problem and pathological online gambling have spanned from the accessibility and convenience of online gambling to the dissociative state that online gambling has been reported to produce.

In a recent study, McBride and Derevensky (2012) investigated the online gambling and risk-taking behaviors of 465 Canadian university student respondents

between the ages of 18-20. The study was conducted because no study at the time had investigated the relationship between risk-taking and online gambling. Respondents were asked to fill out a demographics questionnaire, a risk-taking questionnaire, and a ten-item checklist to measure rates of problem gambling. The results indicated that 8% of the respondents had gambled online in the past year, with males (12%) being more likely than females (1%) to have gambled. These results were found to be consistent with Griffiths and Barnes (2008) findings, but inconsistent with Wardle et al.'s (2011) findings. One explanation may be that different countries and their respective cultures may influence men and women's proclivity to gamble online. In terms of risk taking, online gamblers were found to be more risk taking (i.e., based a self-report measure of risk taking) than offline gamblers. However, no construct to date has been experimentally examined to determine which explanations are more likely than others to explain why online gamblers develop problems associated with gambling at a higher rate than offline gamblers.

A significant improvement in the research methodologies used to study online gambling was undertaken by Laplante et al. (2009). In their two-year prospective epidemiological study on the gambling behaviors of online poker players, the researchers examined individuals' actual gambling behavior by acquiring access to data from an Internet betting website. The study consisted of 3,445 individuals who resided in any country where online gambling was legal, or from a country where online gambling sites could be accessed illegally. The researchers predicted that a majority of the respondents in the study would be moderate gamblers, and that a small minority of the respondents

would display problematic gambling behavior. Correlational analyses were conducted on respondents who were male and in their mid-to-late 20's. The results from the correlation analyses indicated that there was a negative relationship between the percentage of money lost and the following factors: (1) duration of the gambling session, (2) total number of sessions, and (3) amount wagered. That is, as an individual's gambling losses increased, the individual tended to gamble less frequently and wager less money. These results indicated rational gambling behavior. However, for online gamblers who were heavily involved in online gambling (i.e., 5% of the sample), these individuals tended to gamble three times longer than the least involved online gamblers. For the most involved gamblers, no significant correlations were found between percent of money loss and the following factors: (1) gambling duration, (2) total number of sessions, and (3) amount wagered. Interestingly, like the rest of the sample, even the most involved gamblers tended to reduce the amount that they wagered when losing. Thus, it seems that problem and pathological online gamblers also display some form of rational decision making when gambling. Rates of clinical and subclinical gambling pathology were not examined in the study, but the examination of individuals' actual gambling behavior represents an important step in determining what factors influence the gambling behavior of online gamblers.

Escape Research

Although there are many articles devoted to describing the construct of escape, it is surprising that more research has not been conducted on the subject as every individual has engaged in some activity (e.g., listening to music, playing videogames, watching

television) to escape. Individuals may engage in an activity to escape one of the following: depression, stress, boredom, responsibilities, or relationship problems. That is, one may, consciously or unconsciously make the decision to engage in an activity to escape from something. Escape in these situations could be described succinctly as a motivator or causal factor to gamble. For example, an individual may be stressed from a difficult day at the office and decide to gamble in an attempt to temporarily forget about work. Moreover, an individual may initially decide to gamble for social or monetary reasons, but the escape that gambling provides may serve to maintain an individual's gambling behavior when gambling. It could also be suggested that gambling produces a negative mood state, and that the desire to escape occurs as a consequence of one's gambling behavior. That is, if an individual gambles and loses money, the individual may continue to gamble in order to win back previous gambling losses (e.g., chasing behavior). Winning back past gambling losses would have psychological and financial benefits as the individual may not be so quick to view himself/herself as a loser, and no financial losses would have resulted if the losses were recuperated.

Negative Mood States and Escapism

In the existing literature, a pattern of research has emerged where theory, qualitative measures, and self-report measures have been used to narrow in on variables related to a particular construct of interest. Such is the case in the online and offline gambling literature, where negative mood states have been isolated and examined in relation to their effects on individuals' gambling behavior. For example, Dannewitz and Weatherly (2007) examined whether cognitive fallacies and depression perpetuated

problem gambling behavior. The researchers failed to find a significant effect of depression, indicating that the participants in the sample who were mildly depressed did not gamble significantly more or less than non-depressed participants. The lack of significant results related to the role depression plays in problem gambling behavior was attributed to certain intervening variables along with the small sample size.

In a qualitative study that examined problem gambling as an escape-based coping mechanism, Wood and Griffiths (2007) interviewed 50 problem gamblers. Based on past research and Jacobs (1986) General Theory of Addiction, the authors posited that some problem gamblers use gambling as a coping strategy to regulate mood and to deal with stress. No screening measures for problem gambling were employed, but all participants acknowledged to the interviewers that they experienced problems related to their gambling behavior. The results indicated that participants who were problem gamblers continued to gamble despite the fact that their gambling behavior resulted in negative consequences. According to Wood and Griffiths, the state of escape was achieved through mood modification which involved fantasies and dissociations from reality. Moreover, two types of problem gamblers emerged, as some individuals gambled purely to modify their mood (e.g., which would indicate that escape, independent of negative reinforcement, is psychologically and physiologically desirable) whereas others gamble to achieve a dissociative state in order to alleviate stress; thus for the latter, gambling served as a coping mechanism to deal with stress, boredom, and possibly depression.

Three empirical studies conducted by a research program at the University of North Dakota have also been interested in the role that escape plays in the gambling

behavior of individuals. For example, in a study conducted by Weatherly, Montes, and Christopher (2010b), 48 participants completed five paper-and-pencil questionnaires and were asked to play the five-card-poker variant Loose Deuces. In the study, participants did not actually gamble for real money. To measure escape, participants were asked to fill out the Gambling Functional Assessment (GFA)[3]. The researchers predicted that escape contingencies would be positively correlated to some aspect of participants' gambling behavior (e.g., persistence, risk, and/or accuracy). The results indicated that a significant positive correlation was observed, namely that escape was associated with the number of credits risked across sessions. These results suggest that individuals whose gambling behavior is controlled predominantly by escape tend to wager more credits than participants whose gambling behavior was maintained by other contingencies. Moreover, the researchers concluded that "people whose gambling behavior is maintained by escape contingencies gamble differently than people who may gamble primarily for other reasons" (p. 85). This specificity, particularly in regard to the relationship between different aspects of one's gambling behavior and escape, could allow clinicians to target specific aspects of a client's gambling behavior (e.g., limiting the number of credits risked when gambling). Lacking to a greater degree in the study is whether escape actually maintained participants' gambling behavior as the researchers found it difficult to determine if an individual was actually gambling to escape. Thus, two follow-up studies were conducted by Weatherly and colleagues where escape was experimentally manipulated.

[3] Developed by Dixon and Johnson (2007), the GFA is a 20-item and was designed to measure contingencies that maintain respondents' gambling behavior. The four contingencies measured on the GFA are sensory experience, escape, social attention, and tangible outcomes.

In an attempt to replicate Weatherly et al.'s (2010b) study, Martner, Montes, and Weatherly (2012) were interested in the experimental manipulation of escape through the use of an aversive situation. By experimentally manipulating participants' level of escape and then measuring their gambling behavior, the researchers would be able to present a stronger argument that escape may increase certain aspects of participants' gambling behavior. The researchers had 41participants complete six paper-and-pencil questionnaires: (1) an informed-consent form, (2) a demographics form, (3) the Gambling Functional Assessment-Revised (GFA-R), (4) the SOGS, (5) 16 unsolvable anagrams, and (6) 16 solvable anagrams. To manipulate levels of escape, the researchers randomly handed participants solvable or unsolvable anagrams. It was posited by the researchers that having participants try and solve unsolvable anagrams would be an aversive activity from which, participants would want to escape. It was therefore predicted that participants would gamble more after they failed to solve the unsolvable anagrams. Once participants were finished trying to solve the anagrams, they were asked to play the poker game Loose Deuces in two separate sessions with credits that did not have any monetary value. Each participant was given both solvable and unsolvable anagrams, and the researchers counterbalanced the order such that half of the participants received the unsolvable anagrams before the first gambling session whereas the other half received the solvable anagrams first.

The results did not support the researchers' hypothesis that some aspect of participants' gambling behavior would increase after being placed in an aversive condition (i.e., unsolvable anagrams). However, escape scores on the GFA-R were found

to be positively correlated to the number of hands participants played. Of the limitations described, the researchers suggested that participants may not have gambled more after being placed in the unsolvable condition because the condition may not have been an aversive enough situation given that participants spent a similar amount of time trying to solve both the unsolvable and solvable anagrams. If the unsolvable anagrams produced a negative mood state or aversive situation, one would expect that participants would spend a significantly shorter duration of time in the unsolvable anagram condition than in the solvable anagram condition.

In their most recent study related to escape, were interested in comparing the gambling behavior of 45 participants whose gambling behavior was maintained by positive and negative reinforcement. Similar to Martner et al.'s (2012) study, participants were asked to complete unsolvable anagrams before playing poker. Unlike Martner et al.'s study, participants were also placed in a gambling situation where they could win a gift card. Gambling after placement in the unsolvable anagram condition would represent gambling maintained by negative reinforcement, whereas gambling in the gift card condition would represent gambling maintained by positive reinforcement. The researchers predicted, based on past research (e.g., Weatherly, Miller, Montes, & Rost, 2012; Weatherly et al., 2011a), that participants would gamble more in the positive reinforcement condition than in the negative reinforcement condition. The researchers also predicted that participants' gambling behavior would vary as a function of annual income. Although the behavioral measures of gambling behavior (e.g., persistence, risk taking, accuracy) trended in the right direction, the results were not statistically

significant. That is, participants' gambling behavior, when maintained by positive reinforcement, was not statistically different than when their gambling behavior was maintained by negative reinforcement.

In terms of the GFA-R, participants whose gambling behavior was maintained by negative reinforcement (i.e., escape) were found to play more hands than participants whose gambling behavior was maintained by positive reinforcement, but this relationship was present only in the anagram session. This result was consistent with past research (e.g., Martner et al., 2012), which led the researchers to believe that both solvable and unsolvable anagrams were equally aversive. One then may question why Weatherly et al., (2012a) were unable to find statistically significant differences in gambling when participants were placed in a non-aversive (i.e., gift card) and aversive situation (i.e., anagram). It could be that the anagrams, although aversive, may just not have been an aversive enough activity capable of influencing participants' gambling behavior.

In terms of negative mood states directing escape behavior, past research indicates that there is a relationship between affect and escape. In a study conducted by Weatherly and Miller (2012), the researchers administered the GFA-R, a measure of neurological function, and two measures of affect and affective coping styles to 149 participants. An important point was made concerning the role of state and trait factors in producing negative mood states which could lead to gambling as a form of escape. It was suggested that state factors (e.g., daily stress) were predominantly driving the relationship between gambling and escape, but that trait factors (e.g., than an individual may have a predisposition to engage in behaviors to escape) also play a role but to a lesser degree. In

terms of the research findings, the results indicated that gambling to escape was related to orbitofrontal function. The results also indicated that the tendency to engage in impulsive behaviors when in a negative mood state was predictive of gambling to escape. That is, when an individual is placed in a negative mood state and then is given the opportunity to gamble, the individual's gambling behavior will, more often than not, be characterized as escape behavior. These results are consistent with past research findings which have suggested that there is an affective component associated with escape behavior (Lloyd et al., 2010). Thus, evidence from Weatherly and Miller's study indicates that negative mood states could influence an individual to engage in activities (e.g., gambling) to escape, or sustain an individual's current behavior if the activity produces a state of dissociation which allows the individual to temporarily escape a negative mood.

The previous studies described so far have been interested in the relationship between escape and offline gambling. Recently, studies have begun to investigate this same relationship as it pertains to online gamblers. For example, a study was conducted to understand factors related to the acquisition, development, and maintenance of online poker play (Wood et al., 2007). The researchers had 422 self-selected participants complete an online survey which housed 67 questions related to gambling severity, motivations, and mood states before and after gambling. The results indicated that a little under half (48%) of the participants had experienced a problem related to gambling. The most common reason cited by the participants for playing online poker was to win money. The problem gamblers in the study were more likely to play roulette in the casino, enter a poker tournament, or play poker at home with friends compared to non-

problem gamblers. More germane to the current study was the result that the best predictor of problem gambling was indicated by a negative correlation between problem gambling and the feeling of happiness after gambling. Other affective factors associated with problem gambling were reduced satisfaction after gambling, and the feeling of guilt after gambling. In relation to the current study, these results indicate that gambling behavior can produce negative mood states which may, in turn, promote future gambling behavior. Moreover, the researchers also added that psychological states (e.g., depression[4], anxiety, and cognitive regret) could lead to problem gambling. These results were also found to be consistent with Jacobs' (1986) General Theory of Addiction, where the researchers suggested that "problem gambling is frequently rooted in a response to 'block out' negative mood states" (p. 360).

In a study conducted two years later on students who were online gamblers, Matthews et al. (2009) reported results consistent with Wood et al.'s (2007) study. As in Wood et al.'s study, Matthews et al. were interested in understanding factors related to online problem gambling. A total of 127 participants who self-defined themselves as online gamblers (i.e., had gambled at least one time online in their lifetime) completed a demographic measure, SOGS, and an affective measure. Approximately 19% of the participants in the study were identified as problem gamblers. Similar to Wood et al., the best predictor of problem gambling was the occurrence of a negative mood state after gambling. Unlike Wood et al.'s study, a relationship between negative mood states and

[4] Although depression was not found to be predictive of gambling behavior in Dannewitz and Weatherly (2007), it was posited that the production of a negative mood state, as a product of depression, is driven more by trait, rather than state factors although both do play a role in depression according to the diathesis-stress model of mental disorders (e.g., Beck, 1967) and recent reviews (e.g., Klein, Kotov, & Bufferd, 2011) of depression.

problem gambling was reported more generally, such that the occurrence of a negative mood state (i.e., before or after gambling) was posited to increase the individuals propensity to gamble in the future. The finding that negative mood states more generally influence gambling behavior is consistent with past research findings (Dickerson, Cunningham, Legg-England, & Hinchy, 1991). Interestingly, certain characteristics emerged from the data about online gamblers. For example, online problem gamblers reported experiencing more positive than negative feelings while gambling, but that the overall effect of gambling significantly lowered their mood. These results were found to support the argument that for problem gamblers, gambling may serve as a coping mechanism to block out, or escape from, negative mood states. These results were also consistent with Jacobs (1996) and Blaszczynski and Nower (2003) theories of problem gambling.

Taking a different approach, Lloyd et al. (2010) posited that different kinds of affective disturbances represent unique motivations to gamble which could lead to different gambling behaviors. The researchers had 4,125 European participants, who were Internet gamblers and predominantly male (79%), complete an online questionnaire that contained questions about gambling motivations and the presence of problem gambling. To analyze the data, the researchers conducted an exploratory principal components analysis where three factors were identified: (1) mood regulation, (2) to obtain money, and (3) for enjoyment. In the first factor which explained the most variance in participants' gambling behavior, the item with the highest loading was gambling to escape from a routine. The results also indicated that all motivations to

gamble were at an increased level for problem gamblers, and that females were especially motivated to gamble to regulate mood and for enjoyment. More importantly, the results suggest that online gamblers who experienced depressive symptoms or hypomania were more likely to gamble to escape from these aversive emotional states. These results are consistent with the general finding that affective factors influence mood, which in turn, could increase individuals' gambling behavior.

The evidence upon which the current study was strongly based comes from a very recent study conducted by Rockloff et al. (2011). The researchers were interested in manipulating escapism by having some participants engage in a negative self-reflection activity where they were asked to speak into an audio recorder about things that they did not like about themselves. The negative self-reflection activity was designed to produce a negative mood state. Other participants were placed in either a positive self-reflection activity (which produced a positive mood state) or were told not to produce any self-reflections. After producing their self-reflections, except for participants in the control, all participants were asked to gamble with $20 that was originally given to them when they arrived, but was subsequently taken away from them to "pay" for their gambling session. Participants were asked to gamble on a simulated three-real slot machine which participants could play on a laptop.

The researchers predicted that participants in the negative self-reflection condition would gamble more than participants in the control condition because it was posited that the production of negative self-reflections would produce a negative mood state which would influence participants' gambling behavior. The results from participants' slot-

machine play supported the researchers predictions, as it was found that participants in the negative self-reflection condition placed more bets, wagered larger amounts of credits (i.e., risk taking), and gambled faster than controls. In addition, gender was not a significant predictor of gambling intensity.

The results from Rockloff et al.'s (2011) study are important to the current study in two respects. First, Rockloff et al.'s study was the first to find significant results as a function of manipulating participants' mood states. Thus, it was the first study to experimentally manipulate escape (through mood states) and find a positive correlation between escapism and indicators of problem gambling. Second, significant results were found when participants were of the impression that they were gambling for real money. Therefore, these results can be more confidently generalized to others who gamble with real money compared to past studies where participants did not gamble with real money (e.g., Weatherly et al., 2010b). Comparing the methodologies of Rockloff et al.'s study to past studies where escape was manipulated (e.g., Martner et al., 2012; Weatherly et al., 2012a), it seems as though an extreme manipulation of an individual's mood state is required to produce escape behavior. That is, it may be that producing negative self-reflections about oneself was a more aversive situation than having participants attempt to solve anagrams that were unsolvable. Based on Rockloff et al.'s results, a cogent argument could be made that a similarly aversive manipulation could produce a negative mood state in online gamblers which would affect participants' gambling behavior. The experimental manipulation of online gamblers' mood states, and subsequent

measurement of their gambling behavior, would be the first study of its kind in the online gambling literature.

Delay Discounting

Delay discounting is a phenomenon that occurs when an individual is asked to make a choice between a larger, delayed outcome and a smaller amount of the same outcome which could be received immediately. The selection of a smaller amount of the outcome received immediately over the larger, undiscounted amount whose receipt is delayed in time has been conceptualized as an impulsive choice. In addition, some studies have used rates of discounting delayed outcomes as a measure of impulsivity (e.g., Reynolds & Schiffbauer, 2004). Recently, however, the link between rates of discounting and impulsivity has been questioned (e.g., Hariri et al., 2006) because findings produced from delay-discounting data have not been consistent with other trait measures of impulsivity (e.g., Smith & Hantula, 2008).

A new line of research has also emerged where rates of delay discounting have been used to determine what outcomes or commodities an individual values (Weatherly, Derenne, & Terrell, 2010a). That is, in the delay discounting literature, if an individual values one outcome over another outcome, the individual will be less inclined to discount the more valuable outcome. Essentially, if an outcome is valuable, most individuals will wait to receive the full amount of the outcome, or will ask for a larger amount of the outcome immediately if pressed to make a decision.

Three important studies related to the discounting of different commodities were conducted by Weatherly and colleagues (Weatherly & Terrell, 2010; Weatherly et al.,

2010a; Weatherly, Terrell, & Derenne, 2010c). In Weatherly et al. (2010c), 648 undergraduate students' data were ultimately used, and the participants in the study were split into two groups. Each group completed a different set of discounting questions. In the first group, participants were given Set A which contained questions related to the following commodities: money won ($1,000 and $100,000), ideal body image, ideal dating partner, and cigarettes. In group two, participants were given Set B which contained the commodities: money owed ($1,000 and $100,000), annual retirement income, medical treatment and federal legislation. The researchers predicted that significant differences would be found across commodities and that a multifactor solution would be produced. A multifactor solution would indicate that different domains of commodities exist. The results indicated that some commodities were discounted differently and that a multifactor solution (two factors) was produced. In light of the results, it was suggested that the discounting of a commodity in one domain is predictive of how another commodity within the same domain will be discounted, but may be a less reliable predictor of a commodity housed within a different domain.

In the second study, a confirmatory factor analysis was conducted on a new set of data to determine if the factor structure found in Weatherly et al (2010c) fit the data of 283 participants on two sets of commodities (Weatherly & Terrell, 2011). Sets A and B were the same sets used in the previous study (Weatherly et al., 2010b). For both data sets A and B, the loading specified by the researchers produced adequate model fit. Specifically, both monetary amounts (money won and money owed) loaded onto one factor suggesting that the processes underlying the discounting of hypothetical monetary

amounts were the same. The other domain of commodities loaded on a "personal or societal benefit" factor. Commodities that loaded onto this factor included obtaining one's ideal body image and dating partner in Set A, and federal education legislation and medical treatment in Set B.

These results were consistent with the researchers' previous findings that commodities can be grouped into different domains, with commodities in a particular domain being predictive of how commodities housed within the same domain are discounted. In terms of the current study, it could be that gambling motivations are housed in different domains, and as a result, a differential pattern of discounting will emerge between online and offline gamblers. Both Weatherly et al. (2010b) and Weatherly and Terrell's (2011) findings were used to support the contention that a differential pattern of discounting would emerge between online and offline gamblers.

In a third study, Weatherly et al. (2010a) examined the influence of contextual factors on the rate of discounting of two monetary commodities. The researchers had 648 participants complete a delay discounting task using the fill-in-the-blank method (FITB). Two hypothetical monetary amounts were used, $1,000 and $100,000, with delays ranging from 1 week to 10 years. More importantly, one group was given a packet with delay discounting questions pertaining to the outcome money won, whereas another group was given discounting questions related to the outcome money owed. The results indicated that participants discounted money won more than money owed. That is, individuals valued money owed to them to a greater extent than money won. As an extension, if online and offline gamblers were asked to discount outcomes related to

certain motivations that have been known to direct individuals' gambling behavior (e.g., money won or loss during gambling), it would be possible to compare how online and offline gamblers discount these outcomes to determine if differences exist between online and offline gamblers in their valuation of certain outcomes.

Main Hypotheses

Based on past research, it was predicted in the current study that online gamblers would have significantly higher SOGS and PGSI scores than offline gamblers (Shaffer et al., 1997). If online gamblers have a higher SOGS and PGSI score compared to offline gamblers, these results would indicate that online gamblers were more susceptible to the development of a gambling pathology. Moreover, it was predicted that online gamblers would have a significantly higher negative reinforcement sub-score on the GFA-R than offline gamblers. This outcome would indicate that negative reinforcement and escape influence the gambling behavior of online gamblers to a greater extent than offline gamblers.

More importantly, although escape has been identified as one of the contributing factors associated with problem and pathological gambling (e.g., Blaszczynski & Nower, 2003), no study to date has manipulated the escape behavior of online gamblers. Thus, it was predicted that both online gamblers and offline gamblers would play more hands, commit more errors, have a higher error rate, wager more credits per hand, lose more credits, and win fewer credits after being placed in a negative mood/emotional state. In addition, it was predicted that online gamblers in a negative mood state would play more hands, commit more errors, have a higher error rate, wager more credits per hand, lose

more credits, and win fewer credits than offline gamblers placed in the same negative mood state.

The rationale behind these predictions were that past studies have indicated that online gamblers are more likely to be problem gamblers than offline gamblers (e.g., Shaffer et al., 1997), and that problem gamblers are more likely to use gambling as a means to escape compared to non-problem gamblers (e.g., Blaszczynski & Nower, 2003). Thus, it was predicted that online gamblers would be more sensitive to the manipulation of escape compared to offline gamblers. That is, it was hypothesized that the manipulation of escape would influence the gambling behavior of online gamblers to a greater extent than offline gamblers.

In terms of discounting, no study to date has administered a delay discounting task to online gamblers. Administering a delay discounting task to online and offline gamblers would allow for comparisons to be made in regard to the comparative value of outcomes between groups. That is, if online and offline represent two distinct groups, one is likely to find that online and offline gamblers discount certain outcomes at different rates, thus allowing researchers to posit why online gamblers value a certain outcome more/less than offline gamblers. It was hypothesized that online and offline gamblers would discount certain outcomes at different rates.

In another attempt to better understand the difference between online and offline gamblers, an examination pertaining to differences in gambling motivations was undertaken by comparing the factor structure of the gambling motivations questionnaire (Lloyd et al., 2010) derived from online gamblers' responses to a factor structure derived

from responses on the same measure administered to offline gamblers in the current study. That is, it was hypothesized that the motivations that guide the gambling behavior of online gamblers would be different from the motivations that guide the gambling behavior of offline gamblers.

CHAPTER II

METHODOLOGY

Participants

In total, 52 participants over the age of 18 were recruited for the two-phase study. However, approximately 420 participants completed measures that represented the first phase of the study. The number of participants to complete both phases of the current study was arrived at based on results from an a priori power analysis using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007). The parameters of the power analysis included: a medium effect size found in the population, a commonly acceptable standard of power (.80), and a medium correlation between dependent measures (r = .30).

Participants were compensated in the form of one research credit if they completed the online portion of the study. Participants who participated in the offline portion of the study received an additional 90 mins of research credit. Participants in the second phase of the experiment were also given a chance to win one of four $25 gift cards. It was expected that the extra credit and a chance to win a gift card would provide the participants with sufficient compensation without unduly influencing their proclivity to participate in the study. In addition, two non-student participants were recruited during a lull in the recruitment of online gamblers. The non-student participants were recruited through personal communication with the principal investigator, and were compensated

in the form of $20. The non-student participants were not entered into the drawing to win one of the four $25 gift cards.

Materials and Apparatus

The packet of materials that each participant completed can be found in the Appendix. Forms common to all experimental studies will be briefly described (e.g., informed consent and demographics form), whereas measures that were more central in importance to the current study will be described in greater detail (e.g., GFA-R and delay discounting measure).

Informed Consent

An informed consent sheet was given to each participant. A participant's signature at the bottom of the informed consent sheet, or checked box for the online portion of the study, was considered sufficient acknowledgement that the participant both understood his/her rights as a participant and agreed to participate in the study.

Demographics Form

A demographics form was administered and completed by each participant. The demographics form consisted of 25 questions which inquired about the participant's: age, gender, ethnicity, annual income, marital status, education, employment status, memory, Internet history, and gambling history.

SOGS (Lesieur & Blume, 1987)

The SOGS is a 16-item self-report measure of gambling behavior which has been used by researchers and clinicians to screen for problem and pathological gambling. The SOGS measures past year and lifetime frequency of gambling behavior, and the degree to

which a participant has experienced interpersonal and financial problems (e.g., debts) as a result of their gambling behavior. The questions on the SOGS are based on the *DSM–III* (1980) criteria for pathological gambling. Of the 16 items, some items are not scored whereas other questions consist of multiple sub-questions. As a result, a participant's SOGS score can range from 0 to 20. The response options on the SOGS include both dichotomous (e.g., yes or no) response options as well as options that allow for more variance and specificity (e.g., never, some of the time I lost, most of the time I lost, and every time I lost) in responding. Two questions found in the SOGS include: (1) Have people criticized your gambling? (Question 8), and (2) have you ever lost time from work (or school) due to gambling? (Question 15). The SOGS has been shown to be both a reliable and valid measure of problem gambling (Stinchfield, 2002).

According to Lesieur and Blume (1987), only specific responses to certain questions are counted. The responses which are counted are summated and represent the participant's overall SOGS score. The original interpretation of the SOGS consisted of individuals being labeled as a probable pathological gambler if they had a SOGS score greater than five, or a non-probable pathological gambler if they had a SOGS score less than five (i.e., if the individuals was being evaluated by a trained clinician). Over the past 20 years, researchers have forwarded their own demarcations concerning how respondents should be labeled based on their SOGS score. These boundaries have been created and used to better understand and characterize gamblers who fall in the middle of the gambling continuum and who would not be appropriately labeled as a non-gambler or pathological gambler. The boundaries that were adopted for the current study were: (1)

non-problem gambler (SOGS = 0); (2) probable problem gambler (SOGS 3-4); (3) probable pathological gambler (SOGS $\geq$ 5). These cutoffs are consistent with the literature and can be easily interpreted within Shaffer, Hall, and Vander Bilt's (1997) conceptualization of gambling (Petry, 2005). Although one cannot label an individual as a pathological gambler based solely on their overall SOGS score, a score of five or more on the SOGS is indicative of pathological gambling behavior.

Pathological Gambling Severity Index (PGSI; Ferris & Wynne, 2001)

The PGSI is a 12-item self-report measure used to screen for pathological gambling. The 12-items on the PGSI are a subset of questions found on the more comprehensive Canadian Problem Gambling Index (CPGI). The items on the PGSI are designed to gather information about the respondent's past year gambling behavior. The response options on the PGSI include a four-point response scale (e.g., never, sometimes, most of the time, almost always). Two questions on the PGSI include: (1) have you bet more than you could really afford to lose; and (2) have you borrowed money or sold anything to get money to gamble.

The PGSI was included in the current study along with the SOGS because past research indicates that the PGSI has better psychometric properties (e.g., reliability) compared to the SOGS (Boldero & Bell, 2012). Moreover, proponents for the use of the PGSI instead of the SOGS have noted that the PGSI is a more theory-based measure and has also been found to be an easier measure to administer than the SOGS (Jackson, Wynne, Dowling, Tomnay, & Thomas, 2010). In terms of cutoffs, the PGSI is used to identify non-problem gamblers (PGSI =0), those with low to moderate gambling

problems (1 ≤ PGSI ≤ 7), and those who have more severe gambling problems (PGSI > 8).The PGSI has been shown to have good reliability and validity (Ferris & Wynne, 2001). The PGSI was used in the current study to screen participants who may have problems associated with gambling.

GFA-R (Weatherly, Miller, & Terrell, 2011)

The GFA-R is a 16-item self-report measure used to identify contingencies that maintain participants' gambling behavior. Of the 16 items, eight questions on the GFA-R relate to positive reinforcement contingencies and eight questions relate to negative reinforcement contingencies. An example of a question designed to measure positive reinforcement contingencies on the GFA-R is: "I like the sounds, the lights, and the excitement that often go along with gambling" (Question 4). An example of a question designed to measure negative reinforcement contingencies on the GFA-R is: "I gamble when I feel stressed or anxious" (Question 3). To respond to the questions on the GFA-R, participants were instructed to use a 7-point scale (0=Never; 6=Always). The scores from all of the questions pertaining to the positive reinforcement contingencies were added up and compared to the sum total of all the scores from the negative reinforcement contingency questions. The contingency with largest score was considered to be the dominant contingency maintaining a participants' gambling behavior. The GFA-R has been shown to have good reliability and validity (Weatherly et al., 2012b). The GFA-R was used in the current study to examine the dominant contingency maintaining participants' gambling behavior.

Delay Discounting

The 30-item delay discounting measure was constructed for the current study to compare the relative value of certain outcomes across participants and between online and offline gamblers. In addition, data from a delay discounting measure have been used in past research studies as a behavioral measure of impulsivity. Although some research indicates that using rates of delay discounting as a proxy for behavioral impulsivity may not be appropriate (Chapman, 1996; Vitaro, Arseneault, & Tremblay, 1999), behavioral definitions of impulsivity tend to be operationally defined as the rate at which an individual discounts an outcome when receipt of said outcome is delayed by some predetermined period of time (Reynolds, 2006). Because of the uncertainty associated with using rates of delay discounting as a behavioral measure of impulsivity, the current study will use rates of delay discounting to compare the relative value of outcomes across online and offline gambling rather than as a measure of impulsivity.

In the 30-item delay discounting measure, there were six commodities that participants were asked to discount at five different time intervals. The six commodities were selected based on past research and outcomes known to be related to gambling. Two of the commodities were written up verbatim from a study interested in how individuals discount different commodities (Weatherly et al., 2010c). The two outcomes examined in Weatherly et al. (2010c), and which were used in the current study, were the commodities money won ($100) and money won ($100,000). Two more commodities were also included based on Lloyd et al.'s (2010) principal component analysis where 11 items loaded on three factors related to variables that motivate online gamblers to gamble. The

three factors included: (Factor 1) mood regulation, (Factor 2) obtaining money, and (Factor 3) enjoyment. Because Factor 2 was already conceptually represented by Weatherly et al.'s money won outcomes, outcomes that reflect motivations found in Factor 1 and Factor 3 were created. That is, one question stem was created and framed to measure the degree to which an individual values escape, whereas another question stem was created to measure the degree to which an individual values enjoyment (via happiness which is a synonym for joy). The final two commodities were designed to measure the degree to which participants value probabilistic outcomes and money lost. Past research indicates that problem gamblers value probabilistic outcomes and money lost to a greater extent than non-gamblers (American Psychiatric Association, 2000, Holt, Green, & Myerson, 2003).Thus, the delay-discounting questions reflected commodities that online gamblers have been known to value.

The six commodities were examined along five delay intervals (i.e., one week, one month, six months, one year, & 10 years). An example of one question that was designed to measure the commodity money won was, "If you won $100 but were not going to get the money for *X time*, what is the smallest amount of money you would accept today rather than having to wait *X time*?" The term "*X time*" was replaced by one of the five delays. For the money won commodities, participants responded based on the amount of money they would be willing to accept immediately, whereas for the commodities of escape and enjoyment, participants were asked to provide a percentage of escape or enjoyment that they would be willing to accept immediately. Lastly, questions were randomly arranged to avoid an artificial pattern of responding. The delay

discounting measure was administered in the current study to examine the relative value of commodities between online and offline gamblers.

Gambling Motivations (Lloyd et al., 2010)

In Lloyd et al.'s (2010) exploratory factor analysis, participants in the current study were asked to rate the degree to which the eleven motivations influenced their gambling behavior. To perform an inferential exploratory factor analysis in the current study, participants were asked to answer the same eleven questions found in Lloyd et al.'s study using a four-point response scale (e.g., never, occasionally, fairly often, very often). The eleven questions corresponded to gambling motivations which loaded on three factors: (1) mood regulation, (2) money, and (3) enjoyment.

Beck Depression Inventory-Short Form (BDI-SF; Beck & Beck, 1972)

The 13-item BDI-SF is a measure that is used to screen for depression. For each item on the BDI-SF, participants are asked to circle or mark one of four statements that best describes how they feel on the day the BDI-SF is administered. One group of statements on the BDI-SF are: (a) I do not feel sad, (b) I feel sad or unhappy, (c) I am unhappy or sad all of the time and I can't snap out of it, and (d) I am so unhappy or sad that I can't stand it. In terms of scoring, all "a" statements count as zero points, all "b" statements count as one point, all "c" statements count as two points, and all "d" statements count as three points. A score of eight or more the BDI-SF would indicate that an individual is moderately depressed. The BDI-SF has been shown to be both a reliable and valid measure of depression (Reynolds & Gould, 1981). The BDI-SF was administered in the current study to measure depression.

Mood Measures

Throughout the experiment, participants were asked to complete two different mood measures. The mood measures administered in the current study were Lubin's Depression Adjective Checklist (DACL; 1965) and the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988).

Firstly, participants were asked to complete a revised measure of Lubin's Depression Adjective Checklist (DACL; 1965). The original DACL was constructed with 21 depressed-toned adjectives and 11 happy toned adjectives which participants were asked to circle if the adjective represents the participant's current mood state. Research indicates that the original DACL is easy to administer and has high face validity. The DACL was revised because the original intent of the DACL was that it be administered to individuals who were depressed. Because the intended use of DACL in the current study is to measure both positive and negative mood states, it seemed warranted to balance the number of depressed and happy toned adjectives in the DACL. Thus, participants selected from 11 happy-toned and 11 depressed-toned adjectives to measure participants' current mood. The unrevised DACL was scored by taking the total number of depressed adjectives selected and adding the number of positive adjectives not selected. Because the unrevised DACL was unidimensional (i.e., used to measure only depression), the revised DACL was scored by summating the total number of depressed and happy toned mood adjectives separately such that participants had both a negative and positive mood subscore, respectively.

Participants were also administered an abbreviated form of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants were asked to rate the degree to which they were currently feeling 12 mood states. There are six positive and six negative mood adjectives, and each participant was asked to circle a number that corresponded to one point on a seven-point response scale. The seven-point response scale had anchors of "not at all" and "extremely much." The positive and negative mood adjectives were distributed evenly across the measure. The PANAS was scored by creating two categories (i.e., positive and negative) and summing the points that corresponded to each category. The minimum score for each category was zero, and the maximum score was 36.

The mood measures were used in the current study to determine if the experimental manipulation actually influenced participants' mood. Specifically, if participants placed in the negative mood induction condition indicated that they were, in fact, experiencing a negative mood after induction (which was determined by adding up the positive and negative mood scores and comparing the two), one could more confidently state that the manipulation produced the intended mood state in participants.

Memory Test

Participants completed two five-item memory tests which were designed to address specific aspects of a participants' memory. The purpose of administering the five-item memory test was to provide participants with more time in between gambling sessions to limit the influence of carry-over effects.

Video Poker

For the gambling simulation, participants were expected to play the five-card poker variant, Loose Deuces, which was a game selected from the WinPoker CD (version 6.0.5; Zamrow Software Solutions, 2007). The game Loose Deuces was downloaded on a Dell desktop computer which was connected to two monitors and located in a room measured at approximately 3.0 m to 1.7 m. In terms of play, players were dealt five cards and were given an option to either: (1) Hold none of the cards, (2) hold all of the cards, or (3) hold some of the cards. If the participant decided to hold some of the cards, the cards that were not held were discarded and the participant received new cards. After participants were dealt new cards (or if participants held all of their cards on the first round), the round was over and the payout was determined. Participants lost their initial bet if they did not have a three of a kind or better (e.g., three nines). If participants had a three of kind, they received their initial bet back. In addition, there were different payouts for different hands (e.g., three of a kind, four of a kind, and a royal flush). The game Loose Deuces was selected over other poker variants (e.g., Jacks or Better) because more variance in play (i.e., errors) has been observed when participants play Loose Deuces compared to other variants of poker (Weatherly, Austin, & Farwell, 2007). More importantly, the poker variant Loose Deuces can be found and played online for real or play money (i.e., money that does not have any monetary value).

Procedure

To participate in the current study, participants were instructed to sign up using the SONA system (SONA Systems Ltd, Version 2.72; Tallinn, Estonia). In the SONA

system, participants were able to sign up and complete the online portion of the study. Moreover, participants were able to us SONA to sign up for the offline portion of the study.

As described previously, the current study has an online and offline component. For the online component, all participants were instructed to complete the following measures through the SONA system before arriving to the laboratory: informed-consent sheet, demographics form, SOGS, PGSI, GFA-R, delay discounting measure, and BDI-SF.

To determine groups, the participants' online and offline gambling status was determined by examining participants' responses to a question on the demographics questionnaire about past online and offline gambling experience. Participants who gambled at least once online in their lifetime were classified as online gamblers, whereas participants who had never gambled online, but who had gambled exclusively offline, were classified as offline gamblers. For participants who have gambled both online and offline, these participants were classified as online gamblers. In addition, participants who had experience gambling online in "free-play" mode were also considered online gamblers. In terms of the experimental manipulation of escape, all participants were placed in a positive mood, negative mood, and neutral condition; thus all participants were exposed to every level of the within-subjects variable. The information in Table 1 contains the number of participants who were assigned to each group.

Table 1. *Number of Participants in Groups*

	Positive Mood, Negative Mood, & Neutral Mood
Online Gamblers	20
Offline Gamblers	30

N = 50

If the participant met the criteria to participate in the second part of the study, the participant was asked to meet the researcher in the research laboratory. Upon entering the research laboratory, the researcher greeted the participant and asked the participant if he/she was ready to begin. When the participant was ready, the researcher handed the participant an informed consent document for the participant to sign. The participant's signature at the bottom of the informed consent document was taken as sufficient evidence that the participant had been informed of his/her rights, and agreed to participate in the study. After the participant signed the informed consent sheet, the participant was placed in three different mood state conditions and was asked to gamble on three separate occasions.

The mood of each participant was manipulated on three separate occasions in the study. Because participants were exposed to all three mood manipulations, a counterbalancing procedure was employed. Table 2 is a graphical representation of the counterbalancing procedure. Four participants from each gambling group (i.e., online and offline gamblers) were placed in one of the six counterbalancing conditions, thus allowing the researcher to methodologically control for any carryover effects.

Table 2. *Counterbalancing Procedure*

Arrangement
Positive Mood---Neutral Mood---Negative Mood
Positive Mood---Negative Mood---Neutral Mood
Negative Mood---Neutral Mood---Positive Mood
Negative Mood---Positive Mood---Neutral Mood
Neutral Mood---Negative Mood---Positive Mood
Neutral Mood---Positive Mood---Negative Mood

After the mood manipulation, each participant completed an instrument that was designed to measure the participant's current mood. After the participant's current mood was measured, the participant was asked to gamble. After gambling, a different mood measure was administered to determine the participant's mood after gambling. Lastly, an irrelevant memory test was administered to participants between gambling sessions to minimize carry-over effects from the preceding mood manipulation and gambling activity. These procedures were repeated until each participant was exposed to every level of the within-subjects factor (i.e., mood manipulation).

Introduction

After the participant signed the informed consent document and was appropriately placed in an experimental group, the researcher read the following statement to each participant before the researcher manipulation the participant's mood:

> The following study is designed to examine the relationship between gambling and memory. Thus, you will be asked to gamble online and complete a memory test. You

will participate in three gambling sessions and you will be given 100 credits per session. For participating in the study, you will be entered into a drawing where you will have a chance to win one of four $25 gift cards. For each gambling session, you will be given 10 minutes to gamble. Before and after gambling, you will also be given a measure that corresponds to your current mood. In between gambling sessions, you will also be asked to complete a memory test.

Mood Manipulation

As previously mentioned, all participants were placed into a positive mood induction, negative mood induction and neutral mood induction group. Past research suggests that talking about or recalling negative aspects of oneself leads to a heighten sense of awareness, which when focused on shortcomings related to one's subjective ideal standards of behavior, leads to a negative mood state (Rockloff et al., 2011). Moreover, it has also been suggested that visually imagining a positive or negative event can produce a positive or negative mood state (Larsen & Ketelaar, 1981). It was expected that participants in the negative mood induction condition would use gambling to escape from the negative mood state created by reading and visualizing certain hypothetical scenarios, thus allowing the researcher to determine if gambling frequency, duration, and accuracy were affected when the function of a participant's gambling behavior was to escape. The instructions and manipulation were patterned off of Larsen and Ketelaar's (1981) manipulation of mood through the use of scenarios and mental imagery. Different instructions were provided to participants depending on which condition they were assigned, however, all participants were given the following general instructions:

Imagine the two situations as vividly as you can. Picture the event happening to you. Try to imagine all the details of the situation. See the people or objects: hear the sounds; experience the event happening to you. Think the thoughts you would actually think in this situation. Feel the same feelings you would feel in this situation. Let yourself react as if you were actually there. You will be given 4 minutes to read each scenario. After reading each scenario, try to relax and close your eyes and imagine being in that situation. I will hand you the first scenario now and you will be given 4 minutes to read and imagine yourself in the situation. I will then give you another scenario and you will have an additional 4 minutes to read and imagine yourself in the second scenario. You will then be given 2 minutes to circle adjectives (e.g., happy, sad) that best represent your current mood.

Positive Mood State

For participants in the positive mood state condition, the researcher handed the participant two scenarios with a four minute gap in between each scenario. The two scenarios used to produce a positive mood state in the current study were: (1) Imagine yourself winning an all-expenses-paid vacation to the destination of your choosing; (2) imagine yourself walking up to the podium at graduation to accept your college degree.

Negative Mood State

For participants in the negative mood state condition, the researcher handed the participant two scenarios with a four minute gap in between each scenario. The two scenarios used to produce a negative mood state in the study were: (1) Imagine yourself

witnessing your parents being diagnosed with an incurable disease and finding out that your parents only have 1 month left to live; (2) imagine being stuck in quicksand. There is no one else around you and you are slowly sinking to the point that you will no longer be able to keep your head above the sand.

Neutral Mood State

For participants in the neutral mood state condition, the researcher handed the participant two scenarios with a four minute gap in between each scenario. The two scenarios used to produce a neutral mood state in the current study were: (1) Imagine getting your car back from the mechanic after a routine oil change and you find out your car is in perfect working condition; (2) imagine walking down the aisle of a grocery store.

Current Mood Measure

After each gambling session, participants were asked to fill out a measure to determine the valence of their current mood using the revised DACL (Lubin, 1965). Participants were given two minutes to complete the DACL before gambling. The researcher administered the DACL to participants and read the following instructions:

> You will now be given 2 minutes to complete the following measure about your current mood. After 2 minutes has elapsed, I will come in to collect the measure.

Gambling Session

After each mood manipulation and measurement of participants' current mood, the participant was asked to play the five-card poker variant Loose Deuces. The researcher verbally stated the following to participants before leaving the room:

> The internet website "WinPoker" has allowed us to pilot their newest online version of gambling games, and the creators of the site have allowed us to let a select few gamble. You will participate in three online gambling sessions and you will be given 100 credits per session. For each gambling session, you will be given 10 minutes to gamble. You will also be asked to complete a memory test in between gambling sessions. The memory test will take approximately 2 minutes to complete.

The participant was then directed to the Dell desktop computer with the five-card poker variant Loose Deuces preloaded on the computer screen. Before the participant gambled, the researcher oriented the participant to the rules of the game and how to perform basic gambling functions (e.g., holding cards, increasing the size of the one's bet, and dealing). To articulate the rules and basic functions of the game to the participant, the researcher read the following instructions to each participant:

> The game in front of you is a five-card poker variant called Loose Deuces. As you can see according to the payout menu, you will win your initial bet back if you end the round with a three of a kind. Hands better than a three of kind will result in different payouts based on the above payout schedule (researcher points to the payout schedule). To start, you can select the number of credits that you would like to bet (researcher shows the participant how to increase wager) and hit deal. If you would like to hold a card, place the mouse pointer over the card and click on it. Above the card you selected, you will see the word "hold" above the card. Once you have finished holding a specific card(s), hit the deal button again and a

new set of cards will appear to replace the cards that you did not hold. At this time, the game is over and the number of credits won/lost will appear to your right. If you hit the deal button again, the process will be repeated. After playing for 10 minutes, I will come in and stop the gambling session.

Current Mood Measure

After each gambling session, participants were asked to fill out a measure to determine the valence of their current mood using the abbreviated PANAS. Participants were given two minutes to complete the current mood measure before gambling. The researcher handed participants the current mood measure and read the following:

You will now be given 2 minutes to complete the following measure about your current mood. After 2 minutes has elapsed, I will come in to collect the measure.

Memory Test

After participants completed the abbreviated form of the PANAS, participants filled out a five-item memory test which was designed to address specific aspects of the participant's memory. The purpose of administering the five-item memory test was to reduce the effects of the previous mood state before another mood state was experimentally induced. Thus, the memory tests were unrelated to the objectives of the current study and used for the sole purpose of reducing the influence of carry-over effects. After the final memory test, the participant was debriefed by the researcher with the following statement:

The current study was designed to explore if differences exist between online and offline gamblers. In addition, the current study was also interested in the

experimental manipulation of escape through the use of mental imagery. It is predicted that individuals who use gambling to escape will wager more, gamble more frequently, and lose more often than individuals who do not gamble to escape. Please do not tell others about the purpose of the experiment, but please feel free to recommend this study to your friends and classmates. If you have any question or concerns, please do not hesitate to contact the principal investigator at kevin.montes@my.und.edu.

CHAPTER III

RESULTS

Data Preparation

The data were screened for violations of the assumptions associated with normality, linearity, and homogeneity of variance. In addition, issues related to unequal group size, missing data, and outliers were also examined to ensure that the appropriate statistical techniques were employed to both analyze the data and to increase the validity of the inferences one could make based on the results.

In terms of the delay discounting data, the fill-in-the-blank method (FITB; Chapman, 1996) and area-under-the-curve method (AUC; Myerson, Green, & Warusawitharana, 2001) were used to analyze the data. The FITB method is considered to be a reliable and efficient way to analyze discounting data as past researchers have utilized this method on a variety of outcomes (Chapman, 1996; Smith & Hantula, 2008). Because the equation used in the AUC method has a lower bound of zero and an upper bound of one, the data are typically found to be normally distributed, which was also found to be the case in the current study. In addition, the AUC method does not require that a specific model fit be obtained before the discounting data can be interpreted (Smith & Hantula, 2008). Both features of the AUC method, in regard to normality and model fit, are significant strengths which resulted in the use of the AUC method over other methods (e.g., hyperbolic discounting) available.

The equation for calculating the AUC for a particular outcome has been presented, where X_1 and Y_1 represent one indifference point (i.e., point at which a smaller-sooner portion of an outcome is of equal subjective value to that of larger-delayed portion of the same outcome) and X_2 and Y_2 represent another indifference point at a different delay period:

$$(X_2 - X_1)[(Y_1 + Y_2)/2] \quad (1)$$

Thus, the x-values represent the predetermined range of delays until receipt of the full amount of an outcome (e.g., one week, one month, six months, two years, and 10 years), and the y-values represent the percentage of an outcome that a participant would accept immediately rather than having to wait a predetermined amount of time to receive the full amount of the outcome. The area between each indifference point (e.g., the area between X_1 and Y_1 and X_2 and Y_2) was computed and summed to derive participants' AUC value for each outcome. Smaller AUC values reflect a steeper rate of discounting and, theoretically, more behavioral impulsivity than larger AUC values.

All AUC data were screened to determine if participants overall AUC value for any particular outcome was greater than zero. An AUC value of zero was interpreted as a participant not valuing a particular outcome because the participant was unwilling to accept less of the outcome in order to receive it sooner. An AUC value of zero was also an indicator that the participant may not have understood the directions about what percentage to write in if the participant valued the outcome. For missing AUC values, it could be suggested that one replaces the missing AUC value with the mean of known AUC values, or to use a regression equation to predict an individual's missing AUC

value. Both replacement methods would not be appropriate for the following reason. The time in between delay periods is long such that information based on other delay periods for an outcome would not be predictive of how an individual would discount the outcome in the missing delay period. In sum, participants were excluded from each outcome analysis if they had an AUC value of zero for any particular outcome or if they had any missing data on one of the delay intervals.

Experimental Results - Internet Use, SOGS, PGSI, & GFA-R

For the 52 participants in the experimental phase of the study, information pertaining to groups' (i.e., online and offline gamblers) Internet use, gambling activity, rate of pathological gambling (e.g., SOGS and PGSI) and GFA-R results were examined using independent samples *t*-tests and descriptive statistics to determine if differences exist on these variables when online and offline gamblers were compared. Statistical significance was assumed when the obtained probability value for each test was less than .05. When multiple tests were conducted, a Bonferroni correction was used which resulted in a more stringent criterion level to reject the null. Of the 52 participants in the experimental phase of the study, two participants were excluded to increase the homogeneity of the online gamblers' group, and four more were excluded due to missing data. Thus, data from 46 participants (27 offline and 19 online) were analyzed.

In terms of Internet use, the results indicated that no significant differences were found when Internet usage per day was compared between online ($M = 2.89$, $SD = 1.76$) and offline gamblers ($M = 2.35$, $SD = 23.50$), $t(44) = -1.86$, $p = .39$. This result indicates that online and offline gamblers spend a similar amount of time on the Internet

Two screening measures were used to determine if participants were probable pathological gamblers, the SOGS and PGSI. A score of 5 or greater on the SOGS, or 8 or greater on the PGSI, would indicate that a participant may be a probable pathological gambler. In terms of the SOGS, the results indicated that no statistically significant differences were found when online (M = 1.58, SD = 2.14) and offline gamblers' (M = .96, SD = 1.02) SOGS scores were examined, $t(44) = -1.30$, $p = .20$. When examining PGSI scores, the results also indicated that no statistically significant differences in PGSI scores were found when online (M = 2.00, SD = 2.90) and offline gamblers' (M = 1.81, SD = 2.45) mean scores were compared, $t(44) = -2.34$, $p = .82$.

The GFA-R was administered to participants to determine the dominant contingency maintaining participants' gambling behavior. The results indicated that the dominant contingency maintaining online (Pos Reinforcement M = 29.00, SD = 7.74; Neg Reinforcement M = 14.37, SD = 6.17) and offline (Pos Reinforcement M = 29.18, SD = 9.89; Neg Reinforcement M = 13.70, SD = 6.00) gamblers' gambling behavior was positive reinforcement.

To determine if differences exist on the GFA-R between groups, online and offline gamblers' scores on the GFA-R were compared. The results indicated that the difference between online gamblers' negative reinforcement mean score on the GFA-R and offline gamblers' negative reinforcement mean score on the GFA-R was not statistically significant, $t(44) = -.37$, $p = .72$. Similarly, the results indicated that the difference between offline gamblers' positive reinforcement mean score on the GFA-R and offline gamblers' score on the same subscale was not statistically significant $t(44) =$

.07, $p = .94$. These results indicate that the primary reinforcement contingency maintaining online and offline gamblers' gambling behavior is positive reinforcement.

Non-Experimental Results - SOGS, PGSI, BDI-SF, & GFA-R

For the 420 participants in the non-experimental phase of the study, information pertaining to groups' (i.e., online and offline gamblers) rate of pathological gambling, depression and GFA-R scores were examined using Mann-Whitney *U* nonparametric *t*-tests and descriptive statistics to determine if differences exist on these variables when online and offline gamblers were compared. The nonparametric equivalent of the independent samples *t*-test was because of unequal group sizes between the online and offline gamblers. In addition, violations of the normality and homogeneity of variance assumptions were found during the data screening process. Statistical significance was assumed when the obtained probability value for each test was less than .05. Of the 420 participants in the non-experimental phase of the study, 22 participants were excluded for not providing a response regarding their online/offline gambling status. Thus, data from 398 participants (308 offline and 90 online) were analyzed.

A Mann-Whitney *U* test was performed to determine if statistically significant group differences exist in gambling severity as measured by the SOGS. The Mann-Whitney *U* test revealed a statistically significant group difference in SOGS scores, $U = 15{,}880$, $p = .03$. Examining group means, online gamblers were found to have had a significantly higher mean SOGS score ($M = 2.01$, $SE = .36$) compared to offline gamblers ($M = 1.00$, $SE = .88$).

A Mann-Whitney *U* test was performed to determine if statistically significant group differences exist in gambling severity as measured by the PGSI. The Mann-

Whitney *U* test revealed a statistically significant group difference in PGSI scores, *U* = 16,120, *p* = .02. Examining group means, online gamblers were found to have had a significantly higher mean PGSI score (*M* = 3.12, *SE* = .55) compared to offline gamblers (*M* = 1.78, *SE* = .18).

A Mann-Whitney *U* test was performed to determine if statistically significant group differences exist in depression severity as measured by the BDI-SF. The Mann-Whitney *U* test revealed that group differences on the BDI-SF were not statistically significant, *U* = 13,309, *p* = .00. Examining group means, online gamblers were found to have had a significantly higher mean BDI-SF score (*M* = 3.40, *SE* = .54) compared to offline gamblers (*M* = 2.71, *SE* = .28).

A Mann-Whitney *U* test was performed to determine if statistically significant group difference exists when online and offline gamblers' mean GFA-R positive reinforcement mean subscale were analyzed. The Mann-Whitney *U* test revealed a non-statistically significant group difference in mean GFA-R positive reinforcement subscale score, *U* = 14,862, *p* = .30. The group means of online gamblers (*M* = 28.73, *SE* = 1.01) and offline gamblers (*M* = 26.64, *SE* = .61) were compared.

A Mann-Whitney *U* test was performed to determine if statistically significant group differences exist when GFA-R negative reinforcement mean subscale scores were analyzed. The Mann-Whitney *U* test revealed a statistically significant group difference in mean GFA-R negative reinforcement subscale scores, *U* = 16,750 , *p* = .01. Examining group means, online gamblers were found to have had a significantly higher GFA-R

negative reinforcement subscale score (M = 15.27, SE = .88) compared to offline gamblers (M = 12.93, SE = .38).

In summary, the results indicated that online gamblers had higher SOGS, PGSI, BDI-SF (non-significant), GFA-R positive, and GFA-R negative mean scores compared to offline gamblers. A higher mean score on each individual scale or subscale indicates increased severity or level of what is being measured. For example, a high mean SOGS score (e.g., greater than five) indicates that a participant may have a gambling problem, whereas a high mean BDI-SF may indicate that a participant is depressed. Examining participants' mean scores on the GFA-R, participants' gambling behavior was found to be maintained by positive reinforcement, and that online gamblers had a mean negative reinforcement subscale score that was significantly greater than offline gamblers score on the same subscale.

Mood Manipulation

A series of mixed-model analysis of variances (ANOVAs) were conducted for the following dependent variables: (1) hands played, (2) errors committed, (3) error rate, (4) credits bet per hand, (5) credits lost/won and (6) credits won. Gambling status (i.e., online or offline) served as the grouping variables and participants' data from each of the three mood manipulation conditions (i.e., negative, positive, and neutral) served as the repeated-measures factor. For each analysis, equality of covariance matrices and sphericity were examined if a statistically significant result was found. All test reported henceforth did not substantially violate the assumptions of equality of covariance matrices or sphericity. Of the 52 participants in the experimental phase of the experiment, two participants were excluded to increase the homogeneity of the online gamblers'

group, and no additional participants were deleted due to missing data. Thus, data from 50 participants (30 offline and 20 online gamblers) were analyzed.

Hands Played

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the amount of hands participants played during the gambling sessions. A significant main effect for gambler status was found, $F(1, 48) = 5.47$, $p = .02$, $\eta^2 = .10$, but the main effect for mood was not statistically significant, $F(2, 96) = .266$, $p = .78$, $\eta^2 = .01$. The interaction between type of gambler and mood was also not statistically significant, $F(2, 96) = .51$, $p = .60$, $\eta^2 = .01$.

Interpreting the statistically significant main effect found for gambler status, the results indicated that online gamblers played significantly more hands (M =74.81, SE = 4.01) than offline gamblers (M =62.69, SE = 3.28). Although the main effect of the mood manipulation was not statistically significant, the mean number of hands played after being placed in one of three mood conditions has been provided: negative mood (M = 69.97, SE = 3.75), positive mood condition (M = 67.15, SE = 3.04), and neutral mood (M = 69.14, SE = 3.55).

Although the interaction between gambling status and mood was not significant, an examination of the number of hands played by online and offline gamblers has been provided: Positive Mood (Online M = 73.90, SE = 4.72; Offline M = 60.40, SE = 3.85), Negative Mood (Online M = 77.60, SE = 5.80; Offline M = 62.33, SE = 4.74), and Neutral Mood (Online M = 72.95, SE = 5.50; Offline M = 65.33, SE = 4.49).

In summary, these results indicate that online gamblers played more hands when gambling compared to offline gamblers, with the mean difference in hands played reaching statistical significance. Moreover, the results that pertain to the number of hands participants played after being placed in one of three mood conditions trended in the hypothesized direction. The interaction was not statistically significant, but the means did trend in the hypothesize direction.

Errors Committed

A 2 x 3 mixed model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of errors committed during the gambling sessions. There was a significant main effect for gambler status, $F(1, 48) = 5.08$, $p = .03$, $\eta^2 = .10$, but a non-significant main effect for mood, $F(2, 96) = .32$, $p = .72$, $\eta^2 = .01$. The interaction between gambler status and mood was also not statistically significant, $F(2, 96) = .18$, $p = .83$, $\eta^2 = .01$.

Interpreting the statistically significant main effect found for gambler status, the results indicated that online gamblers (M =36.48, SE = 2.51) committed more errors across all three gambling session compared to offline gamblers (M =29.19, SD = 2.05). Although the main effect of mood manipulation was not statistically significant, the mean number of errors after being placed in one of three mood conditions has been provided: positive mood (M = 33.75, SE = 1.94), neutral mood (M = 32.80, SE = 2.05), and negative mood (M = 31.95, SE = 2.20).

Although the interaction between gambler status and mood was not statistically significant, an examination of the number of errors committed by online and offline

gamblers has been provided: Positive Mood (Online M = 38.10, SE = 3.01; Offline M = 29.40, SE = 2.46), Negative Mood (Online M = 35.55, SE = 3.41; Offline M = 28.37, SE = 2.79), and Neutral Mood (Online M = 35.80, SE = 3.17; Offline M = 29.80, SE = 2.59).

In summary, online gamblers committed more errors when placed in the gambling sessions compared to offline gamblers, with the difference in mean number of errors committed between online and offline gamblers reaching statistical significance.

Error Rate

The error rate was calculated by dividing the number of errors a participant committed by the number of hands played. A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on participants' error rate during the gambling sessions. The main effect for gambler status, $F(1, 48) = .29$, $p = .59$, $\eta^2 = .01$, and main effect for mood, $F(2, 96) = 1.84$, $p = .16$, $\eta^2 = .04$, were both not statistically significant. The interaction between gambler status and mood was also not significant, $F(2, 96) = .23$, $p = .79$, $\eta^2 = .01$.

Although all tests did not reach statistical significance, the means have been reported. The error rate between online gamblers (M = .50, SE =.03) and offline gamblers (M =.48, SE =.03) was compared. In addition, the error rate of participants was compared across all mood conditions: positive mood (M = .51, SE = .02), neutral mood (M = .50, SE = .02), and negative mood (M = .47, SE = .02).

In summary, all of the results related to differences in error rate between online and offline gamblers and across mood conditions were not statistically significant.

Credits Bet Per Hand

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of credits bet per hand during the gambling sessions. The main effect for gambler status, $F(1, 48) = 1.89$, $p = .18$, $\eta^2 = .04$, and main effect for mood, $F(2, 96) = 1.18$, $p = .31$, $\eta^2 = .02$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 96) = .34$, $p = .72$, $\eta^2 = .01$.

Although all tests did not reach statistical significance, the means have been reported. The number of credits bet per hand was compared between offline gamblers ($M = 2.88$, $SE = .21$) and online gamblers ($M = 2.45$, $SE = .25$). In addition, the number of credits bet per hand was compared across all mood conditions: neutral mood ($M = 2.74$, $SE = .17$), negative mood ($M = 2.71$, $SE = .196$), and positive mood ($M = 2.54$, $SE = .18$).

In summary, although these results were not statistically significant, the results indicate a trend for offline gamblers to bet more credits per hand across all three gambling sessions compared to online gamblers. Moreover, participants tended to bet more credits in the gambling session that was preceded by placement in the positive mood condition.

Credits Lost/Won

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of credits lost or won during the gambling sessions. The main effect for gambler status, $F(1, 48) = .05$, $p = .82$, $\eta^2 = .01$, and main effect for mood, $F(2, 96) = .38$, $p = .68$,

$\eta^2 = .01$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 96) = 1.63$, $p = .20$, $\eta^2 = .03$.

Although all tests did not reach statistical significance, the means have been reported. In terms of the number of the number of credits won or lost, online gamblers ($M = -31.79$, $SE = 9.91$) and offline gamblers ($M = -28.25$, $SE = 12.14$) were compared. In terms of the number of credits lost by mood condition, the number of credits lost when placed in the mood conditions were: negative mood ($M = -38.86$, $SE = 39.81$), positive mood ($M = -33.26$, $SE = 69.40$), and neutral mood ($M = -19.00$, $SE = 141.74$).

In summary, the difference in credits lost between online and offline gamblers was not statistically significant. Moreover, the difference in credits lost by participants across the three mood conditions was also not statistically significant. Similarly, the difference in credits lost across mood conditions by online and offline gamblers was not statistically significant.

Credits Won

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of credits won during the gambling sessions. The main effect for gambler status, $F(1, 48) = .08$, $p = .78$, $\eta^2 = .01$, and main effect for mood, $F(2, 96) = .81$, $p = .45$, $\eta^2 = .02$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 96) = 1.18$, $p = .31$, $\eta^2 = .02$.

Although all tests did not reach statistical significance, the means have been reported. The number of credits that online gamblers ($M = 140.02$, $SE = 20.98$) was

compared to the number of credits offline gamblers (M = 147.58, SE =17.13) won. In terms of the number of credits won by mood condition, the means have been reported: neutral mood (M = 160.22, SE = 24.01), negative mood (M = 138.13, SE = 13.34), positive mood (M = 133.03, SE = 17.66).

In summary, although these results were not statistically significant, the results indicate a trend for offline gamblers as they won more credits across all three gambling sessions compared to online gamblers. Moreover, participants tended to win the most credits in the gambling session that was preceded by placement in the neutral mood condition.

Mood Manipulation- Controlling for the Effects of Covariates

A series of 2 x 3 mixed-model analyses of covariances (ANCOVAs) were conducted for the following dependent variables: (1) hands played, (2) errors committed, (3) error rate, (4) credits bet per hand, (5) credits lost/won and (6) credits won. Gambling status (i.e., online or offline) served as the grouping variable and participants' data from each of the three mood conditions served as the repeated-measures factor. Participants' SOGS, PGSI, BDI-SF, GFA-R positive, and GFA-R negative scores served as covariates. For each analysis, equality of covariance matrices and sphericity were examined, and all test reported henceforth did not substantially violate the assumptions of equality of covariance matrices or sphericity. Of the 52 participants in the experimental phase of the experiment, two participants were excluded to increase the homogeneity of the online gamblers' group, and four participants were excluded due to missing SOGS and PGSI data. Thus, data from 46 participants (27 offline and 19 online) were analyzed.

Hands Played

A 2 x 3 ANCOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, and neutral) have on the amount of hands played after controlling for participants' SOGS scores. ANCOVA results, with SOGS included as a covariate, indicated a significant main effect for gambler status, $F(1, 43) = 5.33$, $p = .03$, $\eta^2 = .11$, but a non-significant main effect for mood, $F(2, 86) = 2.72$, $p = .07$, $\eta^2 = .06$. The interaction between type of gambler and mood was also not significant, $F(2, 86) = .860$, $p = .43$, $\eta^2 = .04$.

Interpreting the main effect found for gambler status, the results indicated that online gamblers played more hands (M =74.45, SE = 4.22) than offline gamblers (M =61.65, SD = 3.52) after controlling for participants' SOGS scores. Although the main effect of the mood manipulation was not statistically significant, participants placed in the negative mood condition tended to play more hands (M = 70.43, SE = 3.81) when gambling than when placed in either the positive mood (M = 66.08, SE = 3.23) or neutral mood (M = 67.62, SE = 3.75) condition.

Although the interaction between gambling status and mood was not significant, an examination of the number of hands played online and offline gamblers has been provided: Positive Mood (Online M = 71.94, SE = 5.00; Offline M = 60.23, SE = 4.19), Negative Mood (Online M = 79.82, SE = 5.90; Offline M = 61.05, SE = 4.93), and Neutral Mood (Online M = 71.59, SE = 5.80; Offline M = 63.66, SE = 4.85).

When all other covariates (e.g., PGSI, BDI, GFA-R positive, and GFA-R negative) were analyzed in separate 2 x 3 mixed-model ANCOVAs with the dependent

variable being number of hands played, the analyses produced similar results to what was reported when participants' SOGS scores were entered into the model as covariates. That is, a significant group effect was found such that online gamblers played significantly more hands than offline gamblers after controlling for the effects of the covariate. In terms of the repeated-measures analyses which were conducted to determine if the mood manipulation affected the number of hands participants played after being placed in a positive, negative, and neutral mood state, the results with all the covariates entered into the model were not statistically significant.

In summary, these results indicate that online gamblers played more hands when gambling compared to offline gamblers after controlling for the effects of all covariates, with the mean difference in hands played reaching statistical significance. Although not statistically significant, participants tended to play more hands in the gambling session which was preceded by placement in the negative mood condition.

Errors Committed

When all other experimental dependent variables (e.g., errors committed, error rate, credits bet per hand, credits lost/won and credits won) were included in separate 2 x 3 mixed-model ANCOVAs and the data were analyzed, a significant main effect of gambler status (i.e., online and offline) was found only when the number of errors committed by participants served as the dependent variable, and participants' PGSI, BDI, GFA-R positive, and GFA-R negative scores were entered into the model as covariates.

In terms of using the SOGS as a covariate, the between-group analysis was not statistically significant when the number of errors committed between online and offline

gamblers were compared, $F(1, 43) = 3.76$, $p = .06$, $\eta^2 = .08$. However, all other between-group analyses were statistically significant when PGSI, BDI, GFA-R positive reinforcement, and GFA-R negative reinforcement scores were entered into the model as covariates. The analyses produced similar results to what was reported when the number of errors committed was examined with no covariates entered into the model. Similar to the results reported with no covariates entered into the model, the main effect of mood manipulation was not statistically significant, $F(2, 86) = 1.22$, $p = .30$, $\eta^2 = .01$.

When PGSI scores were entered into the model as a covariate, online gamblers ($M = 36.05$, $SE = 2.64$) committed significantly more errors than offline gamblers ($M = 28.68$, $SE = 2.21$), $F(1, 43) = 4.59$, $p = .04$, $\eta^2 = .10$. When BDI scores were entered into the model as a covariate, online gamblers ($M = 36.13$, $SE = 2.63$) committed significantly more errors than offline gamblers ($M = 28.62$, $SE = 2.21$), $F(1, 43) = 4.78$, $p = .03$, $\eta^2 = .10$. When GFA-R positive reinforcement scores were entered into the model as a covariate, online gamblers ($M = 36.10$, $SE = 2.65$) committed significantly more errors than offline gamblers ($M = 28.64$, $SE = 2.22$), $F(1, 43) = 4.65$, $p = .04$, $\eta^2 = .10$. When GFA-R negative reinforcement scores were entered into the model as a covariate, online gamblers ($M = 36.11$, $SE = 2.66$) committed significantly more errors than offline gamblers ($M = 28.64$, $SE = 2.23$), $F(1, 43) = 4.64$, $p = .04$, $\eta^2 = .10$.

In summary, online gamblers committed more errors when gambling compared to offline gamblers after controlling for the effects of all covariates, except when participants SOGS scores were entered into the model. The comparison between groups was found to be statistically significance. Although not statistically significant,

participants tended to commit more errors in the gambling session which was preceded by placement in the positive mood condition than in any other mood condition.

Mood Manipulation- Removal of Participants Unaffected by Manipulation

A series of mixed-model analysis of variances were conducted for the following dependent variables: (1) hands played, (2) errors committed, (3) error rate, (4) credits bet per hand, (5) credits lost/won and (6) credits won. Gambling status (i.e., online or offline) served as the grouping variables and participants' data from each of the three mood conditions served as the repeated-measures factor. For each analysis, equality of covariance matrices and sphericity were examined if the statistically significant results were found, and all test reported henceforth did not substantially violate the assumptions of equality of covariance matrices or sphericity. Of the 52 participants in the experimental phase of the experiment, two participants were excluded to increase the homogeneity of the online gamblers' group, and eight participants were deleted because the mood manipulation did not affect the participant's mood in the intended way. Thus, data from 42 participants (24 offline and 18 online) were analyzed.

Hands Played

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the amount of hands played. The main effect for gambler status was statistically significant, $F(1, 40) = 6.58$, $p = .01$, $\eta^2 = .14$, but the main effect for mood was not, $F(2, 80) = 1.41$, $p = .24$, $\eta^2 = .04$. The interaction between type of gambler and mood was also not statistically significant, $F(2, 80) = .63$, $p = .53$, $\eta^2 = .02$.

Interpreting the statistically significant main effect found for gambler status, the results indicated that online gamblers played more hands (M =74.87, SE = 4.29) than offline gamblers (M =60.31, SD = 3.70). Although the main effect of the mood manipulation was not statistically significant, participants tended to play more hands after being placed in the negative mood condition (M = 71.56, SE = 3.91) compared to after being placed in the positive mood (M = 65.01, SE = 3.33) or neutral mood (M = 66.22, SE = 3.82) condition.

Although the interaction between gambling status and mood was not significant, an examination of the mean number of hands online and offline gamblers played has been provided: Positive Mood (Online M = 71.44, SE = 5.03; Offline M = 58.58, SE = 4.36), Negative Mood (Online M = 81.44, SE = 5.91; Offline M = 61.68, SE = 5.12), and Neutral Mood (Online M = 71.72, SE = 5.77; Offline M = 60.71, SE = 5.03).

In summary, online gamblers who were affected by the mood manipulation played more hands during when gambling compared to offline gamblers, with the difference in mean number of hands played being statistically significant. Moreover, participants tended to play more hands in the gambling session which was preceded by placement in the negative mood condition, although these results were not statistically significant. Lastly, differences in the mean number of hands played by online and offline across mood conditions trended in the hypothesized direction. That is, online gamblers tended to play more hands after being placed in the negative mood condition compared to offline gamblers placed in the same mood condition, and this effect seemed especially

pronounced only when online and offline gamblers were placed in the negative mood condition.

Errors Committed

A 2 x 3 mixed model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of errors committed during the gambling sessions. The main effect for gambler status, $F(1, 40) = 3.82$, $p = .06$, $\eta^2 = .09$, and main effect for mood, $F(2, 80) = .10$, $p = .90$, $\eta^2 = .01$, were not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 80) = .56$, $p = .58$, $\eta^2 = .01$.

For the main effect of gambler status, the number of errors online (M =35.30, SE = 2.74) and offline (M = 28.27, SD = 2.37) committed was compared. For the main effect of mood condition, the number of errors committed across sessions was compared: negative mood (M = 32.16, SE = 2.49), positive mood (M = 31.92, SE = 1.96), or neutral mood (M = 31.24, SE = 2.14).

Although the interaction between gambler status and mood was not significant, an examination of the number of errors committed by online and offline gamblers has been provided: Positive Mood (Online M = 35.22, SE = 2.97; Offline M = 28.62, SE = 2.57), Negative Mood (Online M = 36.94, SE = 3.77; Offline M = 27.38, SE = 3.26), and Neutral Mood (Online M = 33.72, SE = 3.23; Offline M = 28.71, SE = 2.80).

In summary, online gamblers tended to commit more errors when placed in the gambling sessions compared to offline gamblers, with the comparison between groups not reaching statistical significance. Moreover, participants tended to commit more errors

in the gambling session which was preceded by placement in the negative mood condition than in any other mood condition.

Error Rate

The error rate was calculated by taking the number of errors a participant committed divided by the number of hands played. A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on participants' error rate during the gambling sessions. The main effect for gambler status, $F(1, 40) = .01$, $p = .94$, $\eta^2 = .00$, and main effect for mood, $F(2,80) = 3.03$, $p = .05$, $\eta^2 = .07$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 80) = .034$, $p = .97$, $\eta^2 = .00$.

In summary, although all of the results were not statistically significant, the results trended in the hypothesized direction as online gamblers were found to have committed a higher percentage of gambling errors than offline gamblers. In addition, participants tended to have the highest error rate in the gambling session which was preceded by placement in the positive mood condition.

Credits Bet Per Hand

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of credits bet per hand during the gambling sessions. The main effect for gambler status, $F(1, 40) = 2.56$, $p = .12$, $\eta^2 = .06$, and main effect for mood, $F(2, 80) = 1.62$, $p =$

.21, $\eta^2 = .04$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 80) = .255$, $p = .78$, $\eta^2 = .00$.

In summary, all of the results were not found to be statistically significant. However, offline gamblers tended to bet more credits per hand when gambling than online gamblers. Moreover, participants tended to bet more credits in the gambling session which was preceded by placement in the positive mood condition than in any other mood condition.

Credits Lost/Won

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the number of credits lost or won during the gambling sessions. The main effect for gambler status, $F(1, 40) = 1.50$, $p = .31$, $\eta^2 = .03$, and main effect for mood, $F(2, 80) = .01$, $p = .99$, $\eta^2 = .00$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 80) = .64$, $p = .53$, $\eta^2 = .02$.

In summary, although these results were not statistically significant, the results from the between-group analysis trended in the hypothesized direction as offline gamblers tended to lose fewer credits than online gamblers. Moreover, participants tended to lose more credits in the gambling session which was preceded by placement in the negative mood condition.

Credits Won

A 2 x 3 mixed-model ANOVA was conducted to determine the effect gambler status (i.e., online or offline) and mood states (i.e., negative, positive, neutral) have on the

number of credits won during the gambling sessions. The main effect for gambler status, $F(1, 40) = .05$, $p = .81$, $\eta^2 = .01$, and main effect for mood, $F(2, 80) = 1.60$, $p = .20$, $\eta^2 = .01$, were both not statistically significant. The interaction between gambler status and mood was also not statistically significant, $F(2, 80) = .12$, $p = .88$, $\eta^2 = .00$.

In summary, although these results were not statistically significant, he results from the between-group analysis trended in the hypothesized direction as offline gamblers were found to have won more credits across gambling sessions compared to online gamblers. Moreover, participants tended to win the most credits in the gambling session which was preceded by placement in the neutral mood condition.

Delay Discounting

In terms of analyzing AUC values to interpret the delay-discounting data, a 2 x 6 mixed-model ANOVA was conducted. Gambler status (e.g., online or offline) served as the between-subjects factor and the six discounting outcomes served as the within-subjects factors (i.e., won $1,000, won $100,000, mood regulation, enjoyment, outcome related to 70% chance of winning $1,000, and money lost during gambling). Equality of covariance matrices and sphericity were examined if statistically significant results were found, and all test reported henceforth did not substantially violate the assumptions of equality of covariance matrices or sphericity. Of the 52 participants in the experimental phase of the experiment, two participants were excluded to increase the homogeneity of the online gamblers' group, and 13 participants were deleted because they had an AUC value of zero on at least of one of the six outcomes. Thus, data from 37 participants (22 offline and 15 online) were analyzed.

The main effect of gambler status was not statistically significant, $F(1, 283) = .68$, $p = .41$, $\eta^2 = .02$. However, the main effect for discounting of the six outcomes across the five delay periods for all participants was statistically significant, $F(5, 175) = 4.77$, $p = .001$, $\eta^2 = .120$. The interaction between gambler status and delay discounting was not statistically significant, $F(5, 175) = .87$, $p = .50$, $\eta^2 = .02$. Bonferroni *post-hoc* tests and hand-calculated Tukey's Honestly Significant Difference (HSD) *post-hoc* test were conducted to determine which outcomes were discounted to a statistically greater extent relative to other outcomes.

The results indicated that participants discounted the outcome of money lost (*M* AUC = .54, *SE* = .04) to a greater extent compared to the outcome related to a 70% chance of winning $1,000 (*M* AUC = .61, *SE* = .03) and the outcome related to enjoyment (*M* AUC = .72, *SE* = .03). The results also indicated that participants discounted the outcome related to a 70% chance of winning $1,000 (*M* AUC = .61, *SE* = .03) to a greater extent than the outcome related to enjoyment (*M* AUC = .72, *SE* = .03).

Hand calculated Tukey (HSD) *post-hoc* tests were also conducted. Tukey (HSD) *post-hoc* tests revealed that participants discounted the outcome money lost (*M* AUC = .54, *SE* = .04) to a greater extent than the outcome related to $100,000 won (*M* AUC = .63, *SE* = .04). In addition, participants were found to discount the outcome money lost (*M* AUC = .54, *SE* = .04) to a greater extent than the outcome related to exercise (*M* AUC = .71, *SE* = .03). However, the mean difference in discounting between the outcome related to a 70% chance of winning $1,000 (*M* AUC = .61, *SE* = .03) and the outcome related to enjoyment (*M* AUC = .72, *SE* = .03) was not statistically significant. All other

statistically significant results were similar to what was reported in the Bonferroni *post-hoc* section.

In summary, the results indicated that participants valued the outcome money lost to a lesser extent than the outcomes related to a 70% chance of winning $1,000 and the outcome related to enjoyment. All other main and interaction effects were not statistically significant.

Non-Experimental Results – Delay Discounting

In terms of analyzing AUC values to interpret the delay-discounting data, a 2 x 6 mixed-model ANOVA was conducted. Gambler status (e.g., online or offline) served as the between-subjects factor and the six discounting outcomes served as the within-subjects factor (i.e., money won $1,000, money won $100,000, mood regulation, enjoyment, outcome related to a 70% chance of winning $1,000, money lost during gambling). Equality of covariance matrices and sphericity were examined if statistically significant results were found, and all test reported henceforth did not substantially violate the assumptions of equality of covariance matrices or sphericity. Of the 420 participants in the non-experimental phase of the experiment, 135 participants were excluded from the analysis because these participants either did not enter a response or because they had an AUC value of zero on one of the six outcomes. Thus, data from 285 participants (226 offline and 59 online) were analyzed.

The main effect of gambler status was not statistically significant, $F(1, 283) = .00$, $p = .96$, $\eta^2 = .00$. However, the main effect which corresponded to the discounting of the six outcomes across the five delay periods for all participants was statistically significant,

*F(*5, 1415) = 12.14, *p* = .01 , η^2 = .12. The interaction between gambler status and delay discounting was not statistically significant, *F(*5, 1415) = .31, *p* = .91 , η^2 = .00. Bonferroni *post-hoc* tests were conducted to determine which outcomes were discounted to a statistically greater extent relative to other outcomes.

The statistically significant Bonferroni *post-hoc* results indicated that participants discounted the outcome related to a probabilistic chance of winning $1,000 (*M* AUC = .57, *SE* = .02) more than the outcomes related to a guaranteed amount of money won if the participant decided to wait ($1,000; *M* AUC = .63, *SE* = .02), money won ($100,000; *M* AUC = .68, *SE* = .02), exercise (*M* AUC = .66, *SE* = .02), and enjoyment (*M* AUC = .67, *SE* =.02). The results also indicated that participants discounted the outcome of money lost (*M* AUC = .58, *SE* = .02) to a greater extent compared to the outcomes money won ($100,000; *M* AUC = .68, *SE* = .02), exercise, and enjoyment (*M* AUC = .67, *SE* =.02). Furthermore, the results indicated that participants discounted the outcome money won ($1,000; *M* AUC = .63, *SE* = .02) to a greater extent compared to the outcome money won ($100,000; *M* AUC = .68, *SE* = .02).

Hand calculated Tukey (HSD) *post-hoc* tests were also conducted. Tukey (HSD) *post-hoc* tests revealed that participants were also found to discount the outcome related to money lost (*M* AUC = .58, *SE* =.02) to a greater extent than the outcome of $1000 won (*M* AUC = .63, *SE* =.02). Participants were also found to discount the outcome related to $1,000 won (*M* AUC = .63, *SE* =.02) to greater extent than the outcome related to enjoyment (*M* AUC = .67, *SE* =.02). All other statistically significant results were similar to what was reported in the Bonferroni *post-hoc* section.

In summary, the results indicated that participants valued the outcome related to a 70% chance of winning $1,000 to a lesser extent than the outcomes related to money won ($1,000 & $100,000), exercise, and enjoyment. The results also indicated that participants valued the outcome related to money lost to a lesser extent than outcomes related to money won ($100,000) exercise, and enjoyment. Lastly, participants valued the outcome money won ($1,000) to a lesser extent than the outcome related to money won ($100,000). All other main and interaction effects were not statistically significant.

Factor Analysis

An inferential exploratory factor analysis was conducted from the data of 284 offline gamblers to determine if different motives direct the gambling behavior of online and offline gamblers. For online gamblers, Lloyd et al. (2010) conducted an exploratory factor analysis on 4,125 online gamblers and found that three motivations (mood regulation, obtain money, and enjoyment) underlie online gamblers' motivations to gamble. The current study administered the same questionnaire to offline gamblers to determine if the factor structure in the current study from offline gamblers is similar to, or different from, the factor structure published by Lloyd et al. Thus, an inferential exploratory factor analysis was conducted using the same parameters utilized by Lloyd et al. (2010) to determine if the factor structure from Lloyd et al.'s sample of online gamblers is similar to the factor structure when offline gamblers respond to the gambling motivation questions. Specifically, an exploratory principle components analysis was conducted using a direct oblimin rotation, and factor extraction was based on the examination of two criteria: eigenvalue greater than 1 and the use of a scree plot. The

resulting factor solution satisfactorily met the two criteria, and a two-component solution was investigated.

After rotation, the first component accounted for 45.58% of the variance, and the second component accounted for 15.63% of the variability in explaining motivations of offline gamblers. The results from the inferential exploratory factor analysis based on data from the current study can be found in Table 3.

Table 3. *Factor Loadings for the Exploratory Factor Analysis with Direct Oblimin Rotation of Gambling Motivations - 284 Offline Gamblers*

Gambling Motivation Items	Factor 1: General	Factor 2: Socialize
To escape from routine	**.69**	-.44
Because you can't help it	**.62**	-.55
To make yourself feel better	**.75**	-.46
To relieve boredom	**.74**	.14
To test your luck	**.69**	.13
To make money	**.65**	-.01
Because you need the money	**.64**	-.36
Because you enjoy it	**.66**	.53
For the thrill of it	**.75**	.32
To socialize	.42	**.66**
For the chance to win big	**.74**	.18

Note. Factor loadings greater than .60 are in boldface

For ease of comparison, the factor solution from Lloyd et al.'s (2010) study on online gamblers is presented in Table 4. The factor structure was derived from the responses of

4,125 respondents who were online gamblers. In a related manner, the current study was interested in the motivations that direct the gambling behavior of offline gamblers in order to compare the factor structures of gambling motivations between online and offline gamblers.

Table 4. *Factor Loadings for the Exploratory Factor Analysis with Direct Oblimin Rotation of Gambling Motivations- Lloyd et al. (2010) - 4,125 Online Gamblers*

Gambling Motivation Items	Factor 1 Mood Regulation	Factor 2 To Obtain Money	Factor 3 For Enjoyment
To escape from routine	**.83**		
Because you can't help it	**.83**		
To make yourself feel better	**.79**		
To relieve boredom	**.64**		**.31**
To test your luck	**.46**		**.30**
To make money		**.89**	
Because you need the money	**.32**	**.77**	
Because you enjoy it			**.97**
For the thrill of it			**.82**
To socialize			**.39**
For the chance to win big		**.36**	**.39**

Note. Factor loadings greater than .30 are in boldface. Only factor loadings greater than .30 were included.

The results of the inferential factor analysis, which were derived from participants' responses to the gambling motivation survey, indicated that offline gamblers' motivation to gamble can be explained by two latent constructs. The first latent

construct was composed of items related to escape, to make money, and for the thrill and enjoyment related to gambling. Based on the items contained in the first factor, the first factor was labeled “general gambling motivation” given the way the items loaded on this factor. The second latent construct only contained one item related to socialize, and was thus labeled “socialization gambling motivation.”

CHAPTER IV

DISCUSSION

The current study was conducted to determine if the gambling behavior of online and offline gamblers is affected by situations designed to produce positive, negative and neutral mood states. More generally, the main research question being addressed in the current study is: "Do fluctuations in gamblers' mood, influence how they gamble?" Based on the non-experimental literature, problem gamblers were found to have experienced negative mood states before and after gambling, with the gambler's mood state during gambling being generally positive (Matthews et al., 2009). Thus, it could be that mood states that precede gambling engagement influence how individuals gamble. Although studies have been published where the mood of offline gamblers has been manipulated and their subsequent gambling behavior recorded (Rockloff et al., 2011), no study to date has conducted a similar study with online gamblers. The current study is the first attempt to fill this gap in the literature.

Experimental Results – Internet Use, SOGS, PGSI, & GFA-R

Before addressing the central research question, information pertaining to online and offline gamblers' Internet use per day, problem-gambling severity, and function of gambling behavior were examined. The results indicated that online and offline gamblers spend approximately 2½ to 3 hours per day on the Internet, and that the difference in

mean hours a day spent on the Internet between groups was not statistically significant. Amount of time spent on the Internet was used as an indicator to assess if online and offline gamblers have equal access to the Internet. If significant differences in the amount of time spent per day on the Internet were observed, gamblers' online and offline status could be partially explained by one's access to the Internet, and not related to gamblers' psychological and physiological responsiveness to mood-inducing situations.

In terms of problem-gambling severity, the results from both the SOGS and PGSI indicated that there were no statistically significant differences in problem-gambling severity between online and offline gamblers. The null results are discordant with results published in the gambling literature where online gamblers were reported to have had higher problem gambling prevalence rates compared to offline gamblers (Griffiths et al., 2011). One possible explanation for the null results reported in the current study could be attributed to small sample size. The small sample size in the experimental phase of the current study is likely the main cause of the null results for two reasons. First, the group means from the SOGS and PGSI trended in the hypothesized direction. That is, online gamblers tended to have a higher mean SOGS and PGSI score compared to offline gamblers, although the differences in SOGS and PGSI mean scores were not statistically significant. Second, results from the larger non-experimental data set in the current study indicated that online gamblers did have higher rates of problem-gambling severity compared to offline gamblers. In terms of rates of problem gambling according the SOGS and PGSI, 6.5% of the participants were classified as probable pathological gamblers.

Examining the reinforcement contingencies that maintain the gambling behavior of online and offline gamblers, the dominant reinforcement contingency that maintained both groups' gambling behavior was positive reinforcement. That is, participants' past gambling behavior was found to be predominantly maintained by positive (e.g., gambling to win money or for the excitement that gambling brings), rather than by negative (e.g., gambling to mentally escape from a stressful work day) reinforcement. The finding that positive reinforcement is the dominant reinforcement contingency maintaining participants' past gambling behavior is consistent with the gambling literature (Weatherly & Miller, 2012). Another interesting result from both the experimental and non-experimental analyses indicated that participants' mean scores on the GFA-R negative and positive reinforcement subscale in the current study were much higher than what was reported in past studies on a similar sample (Weatherly & Miller, 2013). This finding may be attributed to how participants were selected in the current study as one prerequisite to participate in the study was that the participant needed to have gambling experience.

Although not statistically significant, online gamblers mean GFA-R negative reinforcement subscale score trended in the hypothesized direction when compare to offline gamblers mean negative reinforcement subscale score. Past research examining the relationship between the SOGS and GFA-R has shown that a statistically significant positive correlation exists between participants' scores on the GFA-R negative reinforcement subscale and SOGS (Weatherly, Dymond, Samuels, Austin, & Terrell, 2013). That is, participants who were found to have had elevated scores on the GFA-R

negative reinforcement subscale were also found to have had correspondingly elevated scores on the SOGS, with high SOGS scores indicting that a participant may have a gambling problem. The results from the current study (i.e., based on analyses of mean SOGS and GFA-R scores in addition to the correlation between SOGS and GFA-R) are consistent with the literature in that a positive correlation exists between negative reinforcement (i.e., gambling to escape) and problem gambling (Weatherly et al., 2013). For correlations between dependent measures in non-experimental phase of the current study, see Table 5.

Table 5. *Correlations Between Dependent Measures*

Measure	1	2	3	4	5
1. SOGS	1	.64**	.24**	.22**	.44**
2. PGSI		1	.27**	.34**	.64**
3. BDI-SF			1	.05	.25**
4. GFA-Pos				1	.46**
5. GFA-Neg					1

Note. *p < .05, **p < .01

With the relationship between negative reinforcement and problem gambling firmly supported by past studies and the current study, more evidence is mounting to augment the claim that gambling to escape from a negative mood state increases gamblers' susceptibility to gambling problems. Moreover, models and pathways describing the psychological and physiological bases of the relationship between gambling to escape and problem gambling have been cogently articulated (e.g., Asavad,

2003; Blaszczynski & Nower, 2002), further strengthening the gambling field's interest in the relationship between escape and problem gambling.

Non-Experimental Results –SOGS, PGSI, BDI-SF, & GFA-R

The results related to problem-gambling severity, depression, and reinforcement contingency maintaining participants' gambling behavior were analyzed from the data of 398 participants (308 offline and 90 online gamblers). In terms of reporting statistically significant findings, the results indicate that online gamblers have significantly higher scores on the SOGS, PGSI, and GFA-R negative subscale compared to offline gamblers. These results indicate that online gamblers may be at risk for the development of a gambling problem, as higher scores on the SOGS and PGSI indicate a greater likelihood of being a problem gambler. The finding that online gamblers have higher mean scores on scales that measure problem gambling compared to offline gamblers support the researcher's hypotheses and are consistent with the literature (Griffiths et al., 2011). Upon closer examination of online and offline gamblers' mean SOGS and PGSI scores, no group appears seriously at risk for the development of a gambling problem as groups' mean scores on the SOGS and PGSI are not very close to their respective cutoffs (e.g., SOGS > 5, PGSI > 8). However, in terms of rates of problem gambling according the SOGS and PGSI, 6.2% of the participants according to the SOGS, and 6.9% according the PGSI were classified as probable pathological gamblers.

Taken together, online gamblers generally have a higher risk propensity for the development of a gambling problem, which may warrant the creation and implementation of additional safeguards to protect online gamblers. Interestingly, the rate of problem

gambling as measured by the SOGS the PGSI was found to be higher than the prevalence rates reported in the literature (Griffiths et al., 2011). The finding that the prevalence rate of problem gambling among college students is higher than what is reported in the existing literature on samples consisting of non-college students is well documented (e.g., Shaffer & Hall, 2001). In response, additional protective measures (e.g., access to information about problem gambling and counseling) should be enacted to protect college students who gamble online, as the confluence of being both a college student and an online gambler may increase one's susceptibility to engage in behaviors that could lead to a gambling problem.

Continuing on with findings related to reinforcement, the results indicated that online gamblers had a higher mean GFA-R negative reinforcement score compared to offline gamblers. These results were found to support the hypotheses outlined in the introduction. The results also indicate that the dominant contingency maintaining the gambling behavior of online and offline gamblers was positive reinforcement. That is, participants in the current study gambled predominantly for the excitement, thrill, or chance to win money that may have resulted from gambling. The finding that positive reinforcement maintained the gambling behavior of a majority of participants in the current study is consistent with findings in the literature (Weatherly & Miller, 2012).

Transitioning from mean GFA-R positive reinforcement to GFA-R negative reinforcement subscale scores, online gamblers had a higher mean negative reinforcement subscale score compared to offline gamblers. This finding supports the hypothesis that online gamblers would have a higher mean negative reinforcement score

than offline gamblers. Although online and offline gamblers' mean scores on the GFA-R negative reinforcement subscale were well below (i.e., 10-15 points) their mean scores on the GFA-R positive reinforcement subscale, online gamblers' higher GFA-R negative reinforcement score in comparison to offline gamblers' negative reinforcement score warrants attention. As described previously, higher GFA-R negative reinforcement scores have been found in past studies to correlate with higher SOGS scores (Weatherly et al., 2013). Thus, high GFA-R negative reinforcement scores may indicate that an individual's gambling behavior is guided by a need to escape, with gambling to escape also being predictive of negative outcomes outside of gambling (e.g., divorce and domestic abuse). Taken together, with the high rate of problem gambling and negative outcomes associated with problem gambling, elevated GFA-R negative reinforcement scores may be a warning sign that an individual has experienced, or will experience, problems related to gambling.

Mood Manipulation

Of the 50 participants in the experimental phase of the study, 30 participants were offline gamblers and 20 participants were online gamblers. A counterbalancing procedure was employed to account for possible carry-over effects when placing all participants in the negative, positive, and neutral mood conditions. The protocol used to manipulate participants mood consisted of having participants read hypothetical scenarios and having participants mentally imagine that the scenarios actually occurred to them. Participants were placed in the mood conditions before being asked to gamble.

It was hypothesized that online gamblers would engage in potentially deleterious gambling behaviors (e.g., play more hands, commit more errors, have a higher error rate, bet more credits per hand, lose more credits, and win fewer credits) compared to offline gamblers. Moreover, based on the results from a similar study where offline gamblers' mood was manipulated (e.g., Rockloff et al., 2011), it was hypothesized that all participants would engage in potentially deleterious gambling behavior when placed in a negative mood condition before gambling. Lastly, it was hypothesized that online gamblers would exhibit more deleterious gambling behavior after being placed in the negative mood condition compared to offline gamblers.

The results from the current study indicated that online gamblers did engage in some forms of potentially deleterious gambling behavior to a greater extent than offline gamblers, which partially supported the hypothesis. Specifically, it was predicted that online gamblers would gamblers played more hands and committed more errors across all three gambling sessions compared to offline gamblers, and the results supported this prediction. The finding that online gamblers played more hands and committed more errors when gambling is problematic for a number of reasons. First, playing more hands exposes the gambler to more risk and the possibility of losing more money than when one plays fewer hands. Second, playing more hands corresponds to a time component such that gamblers who play more hands generally spend more time gambling, thus possibly increasing the chance that the gambler will experience problems due to preoccupation with gambling (e.g., financial, relational, emotional). Third, the combined effect of playing more hands and committing more gambling errors will undoubtedly lead the

gambler on a path toward a gambling addiction, as the gambler will lose ever-increasing amounts of money and may be tempted to borrow money in order to win/pay back gambling losses.

Group differences on the other gambling behaviors (e.g., bet more credits per hand, lost more credits, won more credits) were not statistically significant, but some results did trend in the hypothesized direction. For example, online gamblers tended to lose more credits, win fewer credits, and have a higher error rate compared to offline gamblers.

The results from the current study indicated that participants' gambling behavior (e.g., playing more hands, commit more errors, higher error rate, bet more credits per hand, lose more credits, and win fewer credits) was not affected by placement in either a negative, positive, or neutral mood condition. Although changes in the gambling behavior of participants produced by placement in the mood conditions were not statistically significant, some results trended in the hypothesized direction. For example, participants tended to play more hands and lose more credits in the gambling session after being placed in the negative mood condition. Although the reliability of the non-significant results that trended in the hypothesized direction is questionable, observing changes in participants' gambling behavior that may have partially resulted from the manipulation of participants' mood states holds promise that constructs purported to have an effect on gamblers as mentioned in the non-experimental literature (e.g., Blaszczynski & Nower, 2003) do, in fact, influence the gambling behavior of gamblers in experimental studies.

It was also predicted that online gamblers would engage in more potentially deleterious gambling behavior compared to offline gamblers after being placed in the negative mood condition. Taking a look again at the positive correlation reported in the literature between the SOGS and GFA-R negative reinforcement subscale, it was predicted that online gamblers in the current study would report to the lab with more gambling experiences that were maintained by negative reinforcement. Moreover, it was predicted that online gamblers in the current study would have higher rates of problem gambling than offline gamblers. Thus, as consequence of the factors purported to maintain online gamblers' gambling behavior, and the higher rate of problem gambling found among online gamblers in the literature (Griffiths et al., 2011), it was hypothesized that online gamblers would be differentially affected by placement in the negative mood condition. According to Blaszczynski and Nower's (2003) pathways model, it was predicted that online gamblers placed in the negative mood condition would engage in more deleterious gambling behavior compared to offline gamblers who were also placed in the same negative mood condition.

In terms of examining the interaction effect between gamblers' status (i.e., online and offline gambler) and mood condition (i.e., negative, positive, and neutral) to determine if the gambling behavior of online gamblers was affected to a greater extent by placement in the negative mood condition, the results indicated that online gamblers were similarly affected by the negative mood-inducing condition when compared to offline gamblers.

Interestingly, one non-significant interaction result did trend in the hypothesized direction. Specifically, online gamblers tended to play more hands than offline gamblers, and this effect seemed especially pronounced when compared to the number of hands online and offline gamblers played after being placed in the negative mood condition. That is, these results suggest that online gamblers may be more sensitive to the mood-inducing hypothetical scenarios found in the negative mood condition compared to offline gamblers, which resulted in online gamblers playing more poker hands than offline gamblers.

Experimental Results – Mood Manipulation (Controlling for the Effects of Covariates)

To increase the chances of finding statistically significant results in the hypothesized direction in regards to the mood-manipulation findings, covariates were selected and controlled for in a series of ANCOVAs. The covariates were selected, on a theoretical basis, based on each covariates relationship to participants' gambling behavior (e.g., errors committed, error rate, credits bet per hand, credits lost/won, and credits won). The covariates entered into the model included participants': (1) SOGS, (2) PGSI, (3) BDI-SF, (4) GFA-R positive reinforcement, and (5) GFA-R negative reinforcement scores.

The results from the series of ANCOVAs were similar to the results reported when no covariates were entered into the model. That is, online gamblers were found to have played significantly more hands, and to have committed more gambling errors, than offline gamblers when the covariates were entered into the model (except for when

participants' SOGS scores where no statistically significant results were reported for hands played). No other statistically significant differences were found between groups when the dependent variables related to participants' gambling behavior were entered into the model. More importantly, the main effect of the mood manipulation, and the interaction effect between gambler status (i.e., online and offline) by mood manipulation were analyzed and reported. The results from these analyses indicated that no statistically significant differences exist in the gambling behavior of participants when placed in the three different mood conditions. In addition, the results indicated that there were no statistically significant interactions between gambler status and mood condition when the covariates were entered into the model. Both findings did not support the hypothesis that online gamblers are affected to a greater extent by placement in a negative mood-inducing situation.

Experimental Results –Removal of Participants Unaffected by Manipulation

One possible explanation for why participants' gambling behavior thus far has not been significantly affected by the mood manipulation could be that the mood manipulations did not induce the mood states that they were designed to produce. That is, one most ask the question: "Did the hypothetical scenarios in the current study actually influence participants' mood?" This issue was anticipated and addressed by measuring participants' mood states after participants' mood was manipulated and after they gambled. Because participants participated in three gambling session, participants' mood was measured six times throughout the study. Participants were removed if their mood did not change across mood conditions. A total of eight participants were removed

because their mood did not change across conditions. Analyses similar to what were conducted in the mood manipulation without covariates were conducted, with participants who were not affected by the mood-inducing scenarios removed from the data set.

Examining group differences between online and offline gamblers, the results indicated that online gamblers played more hands than offline gamblers, with the difference between means reaching statistical significance. All other between-group main effects related to participants' gambling behavior (e.g., errors committed, error rate, credits bet per hand, credits lost/won, and credits won) were not statistically significant. When the main effect of placing participants in the mood conditions was analyzed with each dependent variable entered separately into model, the results were not statistically significant. That is, the mood conditions did not affect how participants gambled.

In terms of errors committed, the results trended in the hypothesized direction as online gamblers tended to commit more errors across the three gambling sessions than offline gamblers. The main effect of mood condition was not statistically significant, and the means did not trend in the hypothesized direction.

In addition, the results indicated that there were no statistically significant interactions between gambler status and mood condition, with the dependent variables related to participants' gambling behavior entered separately into the model. That is, participants' gambling behavior did not vary as a function of both gambler status and placement in a particular mood condition. However, two interaction effects trended in the hypothesized direction when the number of hands played, and number of errors

committed by participants were analyzed. That is, an examination of group means indicated that online gamblers in the negative mood condition tended to play more hands, and commit more errors than offline gamblers. This finding, although not statistically significant, is consistent with the hypothesis that the gambling behavior of online gamblers may be differentially affected by placement in a negative mood-inducing condition.

Delay Discounting

All participants were instructed to discount the outcomes (1) money won $1,000, (2) money won $100,000, (3) mood regulation, (4) enjoyment, (5) outcome related to a 70% chance of winning $1,000, (6) and money lost during gambling along five delay intervals (i.e., one week, one month, six months, one year, & 10 years). It was hypothesized that statistically significant differences would be observed in the discounting of outcomes delayed in time by online and offline gamblers. It was also hypothesized that the main effect for the discounting of the six outcomes delayed in time across all gamblers would be statistically significant. Moreover, it was hypothesized that a statistically significant interaction effect would be found. Of the 50 participants who participated in the experimental phase of the study, the data from 37 participants were analyzed due to missing or aberrant data.

It was hypothesized that online and offline gamblers would value the outcomes presented in the discount task differently, and as a result, statistically significant differences in groups' rate of discounting would be observed. However, the results were

not found to support this hypothesis as the results indicated that no statistically significant differences exist in how online and offline gamblers discounted the six outcomes.

In terms of the results that were statistically significant, the results indicated that participants discounted some of the outcomes at different rates. Specifically, participants were found to have valued the outcome of winning back $1,000 in gambling losses to a lesser extent than the outcomes related to a 70% chance of winning $1,000 and the outcome of enjoyment. This finding is interesting considering that gambling to recuperate past gambling losses is an official symptom of pathological gambling (American Psychiatric Association, 2000). Taken together, it is not surprising that participants in the experimental phase of the study valued the outcomes related to a 70% chance of winning $1,000 and the outcome of enjoyment more than the outcome related to money lost when gambling, as the majority of participants in the sample were found to be mostly non-problem gamblers, as evidenced by online and offline gamblers' mean SOGS and PGSI scores being below the problem-gambling cutoffs of 5 and 8, respectively.

Participants were also found to have valued the outcome related to enjoy more than the outcome related a 70% chance of winning $1,000. This result is consistent with past research finding in that the gambling behavior of most gamblers is maintained predominantly by positive (e.g., enjoyment), rather than negative (e.g., escape, reinforcement; Weatherly & Miller, 2012) reinforcement.

Overall, differences were observed in how participants discounted the six outcomes, with the receipt of the outcomes delayed in time. However, no group differences were observed when rates of discounting were compared between online and

offline gamblers. Although the results from the current study did not support the delay-discounting hypothesis, it would seem that if online and offline gamblers represent two distinct groups and have different value systems, one should find that online gamblers value certain outcomes to a greater or lesser extent than offline gamblers. At this point, the results point to more variability across gamblers than between online and offline gamblers. For example, it may be that differences in problem gambling could be better explained by the type of gambling an individual engages in, rather than by whether or not an individual is an online gambler or offline gambler.

Non-Experimental Results – Delay Discounting

All participants were instructed to discount the outcomes (1) money won $1,000, (2) money won $100,000, (3) mood regulation, (4) enjoyment, (5) the outcome related to a 70% chance of winning $1,000, (6) and money lost during gambling, along five delay intervals (i.e., one week, one month, six months, one year, & 10 years). It was hypothesized that statistically significant differences would be observed in the discounting of outcomes delayed in time by online and offline gamblers. It was also hypothesized that the main effect for the discounting of the six outcomes delayed in time across all gamblers would be statistically significant. Moreover, it was hypothesized that a statistically significant interaction effect would be found. Of the 420 participants who participated in the non-experimental phase of the study, the data from 285 participants were analyzed due to missing or aberrant data.

It was hypothesized that online and offline gamblers would value the outcomes presented in the discount task differently, and as a result, statistically significant

differences in groups' rate of discounting would be observed. However, the results did not support this hypothesis as the results in the current study indicated that no statistically significant differences were found in how online and offline gamblers discounted the six outcomes.

In terms of the results that were statistically significant, the results indicated that participants discounted some of the outcomes at different rates. Specifically, participants were found to have valued the outcomes related to money won ($1,000 & $100,000), exercise, and enjoyment more than the outcome related to a 70% chance of winning $1,000. The results also indicated that participants valued the outcomes money won ($100,000), exercise, and enjoyment more than the outcome related to money lost. Lastly, the results indicated that participants valued winning $100,000 more than winning $1,000.

In one respect, the results from the discounting task in the non-experiment phase of the study were consistent with some of the results in the experimental phase. Participants' indicated that they did not value the outcome related to a 70% chance of winning $1,000 very much in comparison to the other outcomes. This result was anticipated based on how the discounting context was worded for the outcome related to a 70% chance of winning $1,000. Participants were asked to discount a ticket that would give them a 70% chance of winning $1,000, or wait until a pre-determined amount of time for someone to purchase the ticket for $700. As a result, participants who were not inclined to take risks were discounting the outcome as if the guaranteed payout was $700, not $1,000, so when participants provided a response in terms of a dollar amount that

they would be willing to accept immediately to sell the ticket, most responded by typing in an amount around the range of $600-$700, and not $900-$1,000. Given that the responses participants provided were converted into a percentage by taking the discounted amount over the total amount of the outcome (e.g., $700/$1,000 = .70), it was expected that participants' rate of discounting the outcome related to a 70% chance of winning $1,000 would be much greater than the rate that other outcomes were discounted. Seeing that the results confirmed that this was the case, it was also concluded that participants took the time to read and provided thoughtful responses to each of the outcomes presented in the discounting task.

Given that only 6.2 % of participants in the non-experimental phase of the study could be classified as a probable problem gambler according to the SOGS, the finding that participants valued winning $100,000, exercise, and enjoyment more than money lost indicates that participants are not strongly motivated to recuperate past gambling losses. If the same discounting task was administered to a clinical sample of problem and pathological gamblers, one might expect to find a reversal of this effect such that the clinical sample would be found to value the outcome of money lost more than other outcomes because gambling to recuperate gambling losses is an official symptom of pathological gambling (American Psychiatric Association, 2000).

The last statistically significant discounting result indicates that participants valued winning $100,000 more than winning $1,000. This result is consistent with literature (Weatherly et al., 2010a). This finding aptly represents human beings decision-making processes, as individuals, if given the opportunity to discount the value of $1 and

$10,000 with receipt of the $1 and $1,000 delayed in time by five years, would likely discount the value of $1 at a higher rate than $10,000. That is, if an individual decides to take a reduced amount of both monetary outcomes, the reduction in terms of a percentage would be much greater for the $1 (e.g., 50%) than the $10,000 (e.g., 80%) because the $10,000 is more valuable to individuals than $1,000.

Factor Analysis

An exploratory factor analysis was conducted from the data of 284 offline gamblers who completed the same gambling motivations questionnaire that was administered to 4,125 online gamblers in Lloyd et al.'s (2010) study. The factor structure from the current study was compared to the factor structure reported in Lloyd et al.'s study. If the factor structure in the current study was found to be similar to the factor structure in Lloyd et al.'s study, then the motivations underlying online and offline gamblers would be, for the most, equally influential. However, if differences are observed between the factor structures, the motivations that influence the gambling behavior of online gamblers may be different then the motivations that influence offline gamblers to gamble.

The results indicated that the factor structure from the current study based on participants' responses to the gambling motivations questionnaire was substantially different from the factor structure reported by Lloyd et al. (2010). In the current study, a two-factor structure was produced with nearly all items (i.e., except gambling for socializing) loading on the first factor. In comparison, Lloyd et al. reported that the gambling behavior of online gamblers was motivated by three distinct factors: mood

regulation, to obtain money, and enjoyment. Although the factor structures were different, caution should be exercised before concluding that the motivation to gamble for online and offline gamblers was guided by different motivational processes. If the factor structure produced in the current study stands the test of replication, and differences in the motivations to gamble by online and offline gamblers are further supported in the literature, it may be that online and offline gamblers differ in terms of the motivations that direct their gambling behavior. A better understanding of the motivations that influence online and offline gamblers to gamble could also inform researchers as to what motivational constructs should be manipulated in the lab. Moreover, clinicians will benefit from a better understanding of the differences between online and offline gamblers, with the knowledge gleaned potentially leading to the creation and implementation of differential treatment protocols for online and offline gamblers.

Limitations

The current study is not without limitations. First, the manipulation of participants' mood states using hypothetical scenarios was selected in the current study based on the assumption that proximal changes to participants' mood state greatly influence their gambling behavior. Although one study has demonstrated that proximal changes to a participant's mood state has an effect on gambling behavior (e.g., Rockloff et al., 2011), it may be that more distal factors related to mood (e.g., personality factors), or the interaction between distal and proximal factors (e.g., general temperament vs. current emotional state), influence the gambling behavior of a participant more than moment-to-moment fluctuations in mood states. If the interaction between distal and

proximal factors is a better predictor of subsequent gambling behavior than each factor in isolation, the complexity of the interaction would make measuring and explaining how the factors interact to influence gambling behavior extremely difficult. This complexity associated with the interaction between distal and proximal factors may explain why researchers have reported divergent results when manipulating a participant's mood state and measuring the participant's gambling behavior (Martner et al., 2012; Rockloff et al., 2011). Seeing that the primary motive to gamble for online gamblers is to regulate mood (Lloyd et al., 2010), a model is needed to explain how distal and proximal factors related to changes in participants' mood influence their gambling behavior.

Second, it may have been that the hypothetical scenarios influenced participants' mood, but not to the degree necessary to influence their gambling behavior. In addition, it may have also been that participants infrequently engage in mental imagery of this sort in their daily lives, whereas other studies have had more success using a manipulation that requires participants to engage in a process in which, participants are more familiar (e.g., producing negative self-reflections). If a model explaining how distal and proximal factors that influence participants mood is not specified, future experimental studies interested in the differences between online and offline gamblers should replicate the current study with online and offline gamblers using a different manipulation (e.g., have participants produce self-reflections; Rockloff et al., 2011).

Third, it may have also been that the participants were not given a sufficient amount of time to gamble in order to achieve the variability necessary to find statistically significant results. Participants were given 10 mins to gamble per gambling session, thus

increasing the amount of time participants spend gambling (e.g., 20-30 mins) may improve the probability of finding statistically significant results between online and offline gamblers.

Fourth, participants were asked to rate their mood six times throughout the experiment. It is quite possible that participants developed an understanding of the research hypotheses based on the number of times their mood was measured in relation to the gambling task. Thus, demand characteristic may have partially contributed to the lack of statistically significant findings. Future studies should create unobtrusive manipulations and measures to ensure that participants are unaware of the researcher's hypotheses.

Fifth, given that few studies in the gambling literature have reported effect-size measures related to the constructs investigated in the current study, it may be that the effect size associated with the manipulation of participants' mood states and gambling behavior is smaller than what has been originally reported in the literature. Given that the number of participants was arrived at based on a power analysis where a medium effect size was used, the selection of a more representative effect size would have resulted in a much larger sample size. Future studies should take a more conservative approach when selecting an appropriate sample size until more effect-size estimates are reported.

Sixth, in terms of a limitation that cannot be entirely addressed, but should be mentioned whenever research is conducted on mood or emotions, is the unobservable nature of the construct. That is, it is difficult to confidently assert that the manipulation actually influenced participants' mood by examining participants' self-reported current

mood before and after gambling. When a construct is unobservable, internal validity may be speculative, but steps can be taken (e.g., the use of convergent measures) to increase the internal validity of study. For example, different measures (e.g., state and trait measures of mood) that tap into different aspects of the construct (e.g., distal and proximal) could be used to suggest that participants' mood was, in fact, manipulated in the intended direction.

Legislative Significance

Whenever legislation regarding the legalization of online gambling is discussed, the issue pertaining to legalization is both a federal and state issue. When legalization of online gambling is debated, it is expected that representatives at these proceedings engage in various cost-benefit analyses for their respective constituency (e.g., government, citizens, online gaming industry), weighing the financial and societal cost to the benefits associated with legalization. That is, a fiduciary relationship exists between representatives and the stakeholders they represent to prohibit the legalization of an activity or substance if the costs outweigh the benefits of legalization.

With respect to online gambling, three states have passed legislation to legalize online gambling (i.e., Delaware, Nevada, Delaware, and New Jersey). However, one must question whether sufficient empirical and non-empirical research has been conducted in the United States related to the potential societal and financial cost associated with the legalization of online gambling. The lack of research in the United States on issues pertaining to online gambling could be due to a number of factors, stemming for the illegality of online gaming in the past, to a lack of interest by

researchers and clinicians presently. Regardless, it would prove difficult based on the existing research to properly engage in a well-informed discussion on the costs and benefits associated with legalization of online gambling. Although this topic is outside the author's area of expertise, it may be prudent of state lawmakers to postpone legalization until the positive and negative effects of online gambling can be examined from states where online gaming has been legalized, or through the examination of the positive and negative effects of online gambling in countries where online gambling is currently legalized.

Based on the results from the current study, online gamblers were found to play more hands, and commit more errors, than offline gamblers. Taking into consideration that online gambling presents gamblers with an opportunity to play more hands per hour than offline gambling (e.g., the amount of time it takes a dealer to deal cards to players compared to a computer), the results from the current study should be taken quite seriously. Contrasting the findings that online gamblers played more hands and committed more errors than offline gamblers in the current study to a study that found online gamblers to be more rational in their gambling behavior (e.g., Laplante et al., 2009), it is without question that more research needs to be conducted to elucidate the positive and negative effects that online gambling has on society before widespread legalization of online gaming takes place.

Empirical and Theoretical Significance

First and foremost, the current study is the first experimental study where online gamblers served as participants. In terms of the methodological progression undertaken to

date, researchers began the investigation looking at the difference between online and offline gamblers through qualitative studies (e.g., Corney & Davis, 2010; Wood & Griffiths, 2007). Researchers then transitioned from qualitative studies to quantitative studies where surveys were administered to both online and offline gamblers (e.g., Kairouz, Paradis, & Nadeau, 2012). Further along the methodological continuum, researchers have purchased data from an online gaming site in order to better describe the gambling behavior of online gamblers by examining the betting histories of online gamblers; however, experimental control was lacking in the study (Laplante et al., 2009). The current study represents the much heralded culmination of methodological progression. That is, questions pertaining to cause-and-effect relationships as they relate to the gambling behavior of online gamblers can finally be appropriately addressed, given that true-experimental designs lend themselves well to the evaluation of cause-and-effect statements.

Second, the current study is the first study to administer a delay discounting task to online gamblers. The results indicated that offline and online gamblers value money won ($1,000 & $100,000), exercise, and enjoyment more than the outcomes related to a 70% chance of winning $1,000 and money lost (except for money won $1,000). Participants also valued $100,000 more than $1,000. Although differences in how online and offline gamblers discounted the outcomes were not found, an exploratory factor analysis could be conducted in a future study to examine if online and offline gamblers discount sets of outcomes similarly or differently. However, a greater number of online

and offline gamblers would be needed for the results to be reliable, and it may prove challenging to enlist the participation of online gamblers.

Finally, the current study is the first study to administer the GFA-R to online gamblers. With the results indicating that the gambling behavior of online gamblers is directed most strongly by positive reinforcement, future studies should investigate which reinforcers (e.g., money, thrill-seeking, and socialization) play a more important role in the maintenance of problem gambling behavior.

Final Conclusion

The current study is an important first step toward a better understanding of the differences between online and offline gamblers. The current study also represents the first true-experimental study with online gamblers serving as participants, thus allowing for statements regarding causality to be made based on empirical evidence. It is hoped that future studies continue this trend of conducting experimental studies with online gamblers, as the benefits of the design far outweigh its costs. In time, a better understanding of online gamblers will emerge, allowing researchers to better compare and contrast the differences between online and offline gamblers.

At present, we are still left with unanswered questions: Are online gamblers a distinct subgroup of gamblers? Are there higher prevalence rates of problem gambling among online gamblers than offline gamblers? How will the legalization of online gambling in the United States affect society in general, and problem and non-problem gamblers specifically? It is now researchers, clinicians, granting agencies, and government officials' responsibility to invest time, energy, and resources to answer these

questions to the best of their abilities in order to determine if online gamblers are at a greater risk of developing a gambling problem compared to offline gamblers. If online gamblers are at a greater risk, granting agencies should set money aside for researchers to explore why online gamblers become problem gamblers at a higher rate than offline gamblers. A more knowledgeable understanding of online problem gambling will also improve clinicians' abilities to treat individuals who seek treatment for an online gambling addiction. To this end, online gamblers, and society in general, will benefit from additional research designed to better understand the differences between online and offline gamblers.

APPENDIX

APPENDIX

Consent Form (Phase 1-Online Component)

The present research is being conducted by Kevin Montes and Dr. Jeffrey N. Weatherly of the UND Psychology Department. Your participation is voluntary. This study is designed to explore the relationship between memory and gambling. Approximately 500 participants will be recruited, and you must be at least 21 years old or older to participate in the study. Based on your responses to the questions in the study, you may be asked to participate in the second part of study, so your consent herein acknowledges that you agree to be contacted via email if you are found eligible for the second part of the study. Your participation in this study will last one hour; thus you will receive one hour's worth of extra credit for completing the measure. You will receive an additional 1.5 hour's worth of extra credit for participating in the second part of the present study which will take place in the Northern Plains Center for Behavioral Research.

In the present study, you will be asked to complete the following measures: (1) Informed Consent Sheet, demographics form, SOGS, PGSI, GFA-R, delay discounting measure, ATIS, and BDI-SF. In short, the measures are intended to collect data about your demographics information, gambling behavior, discounting of commodities, Internet use, and depression. It is estimated that completing these materials will take approximately 1 hour. You have the right to discontinue your participation at any time, for any reason or not complete any question(s) that make you feel uncomfortable. All data from this study will be anonymous and confidential

The records of this study will be kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your study record may be reviewed by Government agencies, the UND Research Development and Compliance office, and the University of North Dakota Institutional Review Board. Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by deleting participant's email address after their data from the screening measures have been matched with their experimental data. Moreover, only Kevin Montes and Dr. Weatherly will have access to the data, which will be stored in a lockable file cabinet in NPCBR-260b. If we write a report or article about this study, we will describe the study results in a summarized manner so that you cannot be identified.

A possible risk of this study may be discomfort when completing the questionnaires. Again, you may discontinue participation in the study without penalty. Benefits of the study include awareness of specific factors that may affect University of North Dakota (UND) students specifically, and all college students generally. If you suffer discomfort as a result of your participation, you can contact the Psychological Services Center (701-777-3691), University Counseling Center (701-777-2127), and UND Community

Counseling Clinic at North East Human Services (1-701-777-3745). Participants are responsible for all counseling expenses associated with participating in the study. You will not incur any cost for being a participant in this study. You may also contact Kevin Montes (310-467-1113) or Dr. Weatherly (701-777-3470) directly. Any questions that arise can also be answered by Kevin Montes. Any other questions can be directed toward Research Development and Compliance at (701-777-4279).

Online: If you agree to participate in the study, click "Yes, I agree to participate in the study." If you do not agree to participate in the study, click "No, I do not agree to participate in the study."

Yes, I agree to participate in the study ___
No, I do not agree to participate in the study ____

Consent Form (Phase 2-Experimetnal Component)

The present research is being conducted by Kevin Montes and Dr. Jeffrey N. Weatherly of the UND Psychology Department. Your participation is voluntary. This study is designed to explore the relationship between memory and gambling. Approximately 48 participants will be recruited, and you must be at least 21 years old or older to participate in the study. Your participation in this study will last 1.5 hours; thus, you will receive 1.5 hour's worth of extra credit for participating in the study.

In the present study, you will be asked to gamble and visualize certain scenarios. It is estimated that the experiment will take approximately 1.5 hours. You have the right to discontinue your participation at any time for any reason and/or not complete any questions that make you feel uncomfortable. All data from this study will be anonymous and confidential. Only Kevin Montes and Dr. Weatherly will have access to the data, which will be stored in a lockable file cabinet in NPCBR-260b.

The records of this study will be kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your study record may be reviewed by Government agencies, the UND Research Development and Compliance office, and the University of North Dakota Institutional Review Board. Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by deleting participant's email address after their data from the screening measures have been matched with their experimental data. Moreover, only Kevin Montes and Dr. Weatherly will have access to the data, which will be stored in a lockable file cabinet in NPCBR-260b. If we write a report or article about this study, we will describe the study results in a summarized manner so that you cannot be identified.

A possible risk of this study may be discomfort associated that some may experience while gambling. Moreover, you may be asked to visualize events that could lead to a negative mood, which may cause some emotional discomfort. Again, you may discontinue participation in the study without penalty. Benefits of the study include awareness of specific factors that may affect University of North Dakota (UND) students specifically, and all college students generally. If you suffer discomfort as a result of your participation, you can contact the Psychological Services Center (701-777-3691), University Counseling Center (701-777-2127), and UND Community Counseling Clinic at North East Human Services (1-701-777-3745). Participants are responsible for all counseling expenses associated with participating in the study. You will not incur any cost for being a participant in this study .You may also contact Kevin Montes (310-467-1113), or Dr. Weatherly (701-777-3470) directly. Any questions that arise can also be answered by Kevin Montes. Any other questions can be directed toward Research Development and Compliance at (701-777-4279).

Subjects Name: _____

_____ _____
Signature of Subject Date

I have discussed the above points with the subject or, where appropriate, with the subject's legally authorized representative.

_____ _____
Signature of Person Who Obtained Consent Date

Demographics Form (25 items)

Instructions: Please circle the response for each question that best describes you

1. **Age**: _____
2. **Gender**
    a. Male b. Female
3. **Ethnicity**
    a. American Indian or Alaska Native
    b. Hawaiian or Other Pacific Islander
    c. Asian or Asian American
    d. Black or African American
    e. Hispanic or Latino
    f. Non-Hispanic White
4. **Annual Income** (Approximately)
    a. 0-$9,999
    b. $10,000-$19,999
    c. $20,000-$29,999
    d. $30,000-$39,999
    e. $40,000-$49,999
    f. $50,000+
5. **Marital Status**: Are you:
    a. Married
    b. Divorced
    c. Widowed
    d. Never been married
    e. Single
6. **Education**: What is the highest grade or year of school you completed?
    a. Never attended school
    b. College 0-1 yrs
    c. College 1-2 yrs
    d. College 2-3 yrs
    e. College 3-4 yrs
    f. College 4+ yrs
    g. Graduate School(Advance Degree)
7. **Employment Status**: Are you currently:
    a. Employed for wages
    b. Self-employed
    c. Out of work for more than 1 year
    d. Out of work for less than 1 year
8. **Memory**: Do you think that you have good memory?

a. Yes
b. No

9. **Memory**: Do you believe that people can improve their memory?
    a. Yes
    b. No
10. **Memory**: Can you remember an event that occurred when you were five years old?
    a. Yes
    b. No
11. **Internet**: Do you have reliable access to the internet?
    a. Yes
    b. No
12. **Internet**: How much money do you spend online (e.g., gambling, shopping, books, clothes) in a month?
    a. $_____
13. **Internet**: How many hours a day do you spend online?
    a. _____ hr(s)
14. **Gambling**: Have you ever gambled offline (e.g., at a casino, with parents or friends)?
    a. Yes
    b. No
15. **Gambling**: Have you ever gambled online (e.g., Texas Hold'em, sports betting)?
    a. Yes
    b. No

If you answered "yes" to question 14 or question 15, proceed to the next section. If you answered "no" to question 14 or 15, you do not have to answer the remaining questions.

16. **Offline Gambling**: In the past year, how many times have you gambled offline (e.g., at a casino)?
    a. 0
    b. 1-3
    c. 4-6
    d. 7-9
    e. 10-12
    f. 12-18
    g. 18-24
    h. 24+
17. **Online Gambling**: In the past year, how many times have you gambled online (e.g., online betting sites)?
    a. 0
    b. 1-3
    c. 4-6
    d. 7-9

e. 10-12
f. 12-18
g. 18-24
h. 24+

18. **Online Gambling**: Have you ever played gambling games (e.g., video poker, Texas Hold'em) in free-play mode (i.e., where you were stacked with credits that were not worth real money)?
    a. Yes
    b. No
19. **Online Gambling**: Circle the options below that best describes your online gambling behavior?
    a. Gamble on only one game online
    b. Play multiple gambling games online
20. Circle the form of gambling that you prefer most?
    a. Offline
    b. Online
    c. Both
21. **Online Gambling**: What devices, if any, do you use when you gamble? Circle all that apply.
    a. Computer
    b. Cell Phone
    c. Tablet
    d. Gaming console (e.g., Xbox or Playstation)
22. When you gamble, how long is your average gambling session?
    a. Offline
        i. 0-1hr
        ii. 1-2hr
        iii. 3-4hr
        iv. 4+
    b. Online
        i. 0-1hr
        ii. 1-2hr
        iii. 3-4hr
        iv. 4+
23. How much money have you won and lost as a result of your gambling (both online and offline)? Please fill in an estimated amount of money that you have won and lost.
    a. Won _____
    b. Lost_____
24. Do your parents gamble?
    a. No c. Yes. Father
    b. Yes. Mother d. Yes. Both Parents
25. Mark the games that you have played online or offline by placing an "X"

	Online	Offline

a.	Play cards for money	_____	_____
b.	Bet on horses, dogs or other other animals (in off-track betting, at the track, or with a bookie)	_____	_____
c.	Bet on sports (parlay cards, with a bookie, or at jai alai)	_____	_____
d.	Play dice games (including craps, over and under, or other dice games) for money	_____	_____
e.	Played the numbers or bet on lotteries	_____	_____
f.	Played bingo	_____	_____
g.	Played the stock and/or commodities market	_____	_____
h.	Played slot machines, poker machines, or other gambling machines	_____	_____
i.	Play video games for money	_____	_____
j.	Bowled, shot pool, played golf, or played some other game of skill for money	_____	_____

SOGS

1. Indicate which of the following types of gambling you have done in your lifetime. For each type, mark one answer: "not at all," "less than once a week," or "once a week."

	Not at all	**Less than once a week**	**Once a week or more**
a. Play cards for money	_____	_____	_____
b. Bet on horses, dogs or other other animals (in off-track betting, at the track, or with a bookie)	_____	_____	_____
c. Bet on sports (parlay cards, with a bookie, or at jai alai)	_____	_____	_____
d. Play dice games (including craps, over and under, or other dice games) for money	_____	_____	_____
e. Went to a casino (legal or illegal)	_____	_____	_____
f. Played the numbers or bet on lotteries	_____	_____	_____
g. Played bingo	_____	_____	_____
h. Played the stock and/or commodities market	_____	_____	_____
i. Played slot machines, poker machines, or other gambling machines	_____	_____	_____
j. Bowled, shot pool, played golf, or or played some other game of skill for money	_____	_____	_____

2. What is the largest amount of money you have ever gambled with on any one day?
   - **a.** Never Have Gambled
   - **b.** More than $100 up $1,000
   - **c.** $10 or less
   - **d.** More than $1,000 up to $10,000
   - **e.** More than $10 up to $100
   - **f.** More than $10,000
3. Do (did) your parents have a gambling problem
   - **a.** Both my father and mother
   - **b.** My father gambles (or gambled) too much
   - **c.** My mother gambles (or gambled) too much
   - **d.** Neither gambles (or gambled) too much

4. When you gamble, how often do you go back another day to win back money you lost?
    a. Never
    b. Some of the time (less than half of the time)
    c. Most of the time I lost
    d. Every time I lost
5. Have you ever claimed to be winning money gambling but weren't really? In fact, you lost?
    a. Never (or never gamble)
    b. Yes, less than half the time I lost
    c. Yes, most of the time
6. Do you feel you have ever had a problem with gambling?
    a. No
    b. Yes, in the past, but not now
    c. Yes
7. Did you ever gamble more than you intended to?
    a. Yes
    b. No
8. Have people criticized your gambling?
    a. Yes
    b. No
9. Have you ever felt guilty about the way you gamble or what happens when you gamble?
    a. Yes
    b. No
10. Have you ever felt like you would like to stop gambling but didn't think you could?
    a. Yes
    b. No
11. Have you ever hidden betting slips, lottery tickets, gambling money, or other signs of gambling from your spouse, children, or other important people in your life?
    a. Yes
    b. No
12. Have you ever argued with people you live with over how you handle money?
    a. Yes
    b. No
13. (If you answered yes to question 21): Have money arguments ever centered on your gambling?
    a. Yes
    b. No
14. Have you ever borrowed from someone and not paid them back as a result of your gambling?
    a. Yes

b. No

15. Have you ever lost time from work (or school) due to gambling?
    a. Yes
    b. No
16. If you borrowed money to gamble or to pay gambling debts, who or where did you borrow from? (circle "yes" or "no" for each).

a.	From household money	No	Yes
b.	From your spouse	No	Yes
c.	From other relatives or in-laws	No	Yes
d.	From banks, loan companies, credit unions	No	Yes
e.	From credit cards	No	Yes
f.	From loan sharks (Shylocks)	No	Yes
g.	You cashed in stocks, bonds, or other securities	No	Yes
h.	You sold personal or family property	No	Yes
i.	You borrowed on your checking account (passed bad checks)	No	Yes
j.	You have (had) a credit line with a bookie	No	Yes
k.	You have (had) a credit line with a casino	No	Yes

PGSI

Instructions: Circle one of the response option below for each question

Never=0 Sometimes=1 Most of the time=2 Almost always=3

1. Have you bet more than you could really afford to lose?

2. Still thinking about the last 12 month, have you needed to gamble with larger amounts of money to get the same feeling of excitement?

3. When you gambled, did you go back another day to try to win back the money you lost?

4. Have you borrowed money or sold anything to get money to gamble?

5. Have you felt that you might have a problem with gambling?

6. Has gambling caused you any health problems, including stress or anxiety?

7. Have people criticized your betting or told you that you had a gambling problem, regardless of
whether or not you thought it was true?

8. Has your gambling caused any financial problems for you or your household?

9. Have you felt guilty about the way you gamble or what happens when you gamble?

10. Have you lied to family members or others to hide your gambling?

11. Have you spent more money than you wanted to on gambling?

12. Have you wanted to stop betting or gambling but you did not think that you could?

GFA-R

Please answer each question with the appropriate number from the following scale:

0	1	2	3	4	5	6
Never	Almost Never	Seldom	Sometimes	Usually	Almost Always	Always

_____ 1. After I gamble, I like to go out and celebrate my winnings with others.
_____ 2. I gamble after fighting with my friends, spouse, or significant other.
_____ 3. I gamble when I feel stressed or anxious.
_____ 4. I like the sounds, the lights, and the excitement that often go along with gambling.
_____ 5. If I have a hard day at work or school, I am likely to gamble.
_____ 6. I gamble when my friends are gambling with me.
_____ 7. I find myself feeling a rush, and getting excited, when I gamble.
_____ 8. When I gamble, I choose which games to play based upon my best chance of winning.
_____ 9. I gamble to get a break from work or other difficult tasks.
_____ 10. I gamble when I am feeling depressed or sad.
_____ 11. I find that gambling is a good way to keep my mind off of problems I have in other parts of my life.
_____ 12. I gamble when I am in debt or need money.
_____ 13. I really enjoy the complementary perks that come along with gambling, like free points, drinks, comp coupons, etc.
_____ 14. I enjoy the social aspects of gambling such as being with my friends or being around other people who are having a good time and cheering me on.
_____ 15. I gamble when I have a work project or class assignment that is due in the near future.
_____ 16. I gamble primarily for the money that I can win.

Delay Discounting

X times = 1 week, 1 month, 6 months, 1 year, & 10 years

Question Stems:

Factor 1: You Won $1,000*

If you won $1,000 and were not going to get the money for *X time*, what is the smallest amount of money you would accept today rather than having to wait *X time*?

Factor 1: You Won $100,000*

If you won $100,000 and were not going to get the money for *X time*, what is the smallest amount of money you would accept today rather than having to wait *X time*?

Factor 2: Mood Regulation (Cognitive Escape)*

A specific exercise plan will help you attain peace of mind if you stay on the plan for *X time*. However, an alternative plan is available that is less effective at producing peace of mind but gives you immediate results. What is the smallest percentage of peace of mind (i.e., 100%) that you would settle for to get immediate results?

Factor 3: Enjoyment*

You have the option of participating in an activity that will make you happy only after you engage in the activity for *X time*. However, an alternative activity exist that will not produce the same high level of happiness but the activity will produce happiness immediately. What is the smallest percentage of happiness (i.e., 100%) that you would settle for to be happy immediately?

Probability

You purchased a ticket and find out that you have a 70% chance of winning $1,000. You also have the option of selling your 70% chance of winning $1,000 to an individual for $700, but not until *X time* has passed. How much money would you accept *immediately* from the individual who is interested in buying your ticket for the chance to win $1,000 rather than having to wait *X time*?

Money Lost During Gambling

You decide to gamble and you end up losing $1,000. You are told, however, that if you play a specific gambling game, you will be able to win your money back but not until *X time* has passed. What amount of your gambling losses would you be willing to accept *immediately* rather than having to wait *X time* until you win back the full amount that you loss ($1,000)?

Gambling Motivations (Lloyd et al., 2010)

Instructions: For each gambling motivation, circle the number that corresponds to how often you gamble for that particular reason.

Never 0	Occasionally 1	Fairly Often 2	Very Often 3

1.	To escape from routine	0	1	2	3
2.	Because you cannot help it	0	1	2	3
3.	To make yourself feel better (e.g., when sad/stressed/angry)	0	1	2	3
4.	To relieve boredom	0	1	2	3
5.	To test you luck	0	1	2	3
6.	To make money (e.g., as a profession)	0	1	2	3
7.	Because you need the money	0	1	2	3
8.	Because you enjoy it/it's fun	0	1	2	3
9.	For the thrill of it	0	1	2	3
10.	To socialize	0	1	2	3
11.	For the chance to win big	0	1	2	3

Beck Depression Inventory (Short Form)

Instruction: This is a questionnaire. On this questionnaire are groups of statements. Please read the entire group of statements in each box. Then pick out the one statement in that group that best describes the way you feel **TODAY**, that is right now. Circle **only one** statement in each group.

1. Question 1
    a. I do not feel unhappy
    b. I feel sad or unhappy
    c. I am unhappy or sad all of the time and I can't snap out of it
    d. I am so unhappy or sad that I can't stand it
2. Question 2
    a. I do not feel like a failure
    b. I feel I have failed more than the average person
    c. As I look back on my life all I can see is a lot of failures
    d. I feel I am a complete failure as a person (parent, husband, wife)
3. Question 3
    a. I don't feel particularly guilty
    b. I feel bad or unworthy a good part of the time
    c. I feel guilty
    d. I feel as though I am very bad or worthless
4. Question 4
    a. I don't have any thoughts about harming myself
    b. I feel I would be better off dead
    c. I have definite plans about committing suicide
    d. I would kill myself if I could
5. Question 5
    a. I make decisions about as well as ever
    b. I try to put off making decisions
    c. I have great difficulty in making decisions
    d. I can't make decisions anymore
6. Question 6
    a. I can work about as well as before
    b. It takes extra effort to get started at doing something
    c. I have to push myself very hard to do anything
    d. I can't do any work at all
7. Question 7
    a. My appetite is no worse than usual
    b. My appetite is not as good as it used to be
    c. My appetite is much worse now
    d. I have no appetite at all any more
8. Question 8
    a. I am not particularly pessimistic or discouraged about the future

b. I feel discouraged about the future
c. I feel I have nothing to look forward to
d. I feel that the future is hopeless and that things cannot improve

9. Question 9
    a. I am not particularly dissatisfied
    b. I don't enjoy things the way I used to
    c. I don't get satisfaction out of anything anymore
    d. I am dissatisfied with everything
10. Question 10
    a. I don't feel disappointed in myself
    b. I am disappointed in myself
    c. I am disgusted with myself
    d. I hate myself
11. Question 11
    a. I have not lost interest in other people
    b. I am less interested in other people than I used to be
    c. I have all of my interest in other people and have little feeling for them
    d. I have lost all of my interest in other people and don't care about them at all
12. Question 12
    a. I don't feel I look worse than I used to
    b. I am worried that I am looking old or unattractive
    c. I feel that there are permanent changes in my appearance and they make me look unattractive
    d. I feel that I am ugly or repulsive looking
13. Question 13
    a. I don't get more tired than usual
    b. I get tired more easily than I used to
    c. I get tired from doing anything
    d. I get too tired to do anything

Mood Induction Scenarios

Pre-Induction (Larsen & Ketelaar, 1991):

> Imagine the two situations as vividly as you can. Picture the event happening to you. Try to imagine all the details of the situation. See the people or objects: hear the sounds; experience the event happening to you. Think the thoughts you would actually think in this situation. Feel the same feelings you would feel in this situation. Let yourself react as if you were actually there.

Positive Mood Induction

1. Imagine yourself winning an all expenses paid vacation to the destination of your choosing.
2. Imagine yourself walking up to the podium at graduation to accept your college degree.

Negative Mood Induction

1. Imagine yourself witnessing your parents being diagnosed with an incurable disease and finding out that your parents only have 1 month left to live.
2. Imagine being stuck in quicksand. There is no one else around you and you are slowly sinking to the point that you will no longer be able to keep your head above the sand.

Neutral Mood Induction

1. Imagine getting your car back from the mechanic after a routine oil change and the mechanic tells you that your car is in perfect working condition.
2. Imagine walking down the aisle of a grocery store.

Lubin's Mood Measure (DACL; Lubin, 1965)

Instructions: Circle as many of the mood adjectives that reflect your current mood

1. Downhearted
2. Lively
3. Alone
4. Alert
5. Unhappy
6. Bright
7. Poor
8. Composed
9. Glum
10. Clean
11. Exhausted
12. Pleased
13. Dispirited
14. Light
15. Moody
16. Easy-going
17. Dead
18. Hopeful
19. Sorrowful
20. Alive
21. Unlucky
22. Joyous

Mood Measure

Instructions: Indicate how much of the mood you are feeling right now. **Circle only one**.

Not at all 0	Very slightly 1	Somewhat 2	Moderate Amount 3	Much 4	Very Much 5	Extremely Much 6

1.	Distressed	0	1	2	3	4	5	6
2.	Inspired	0	1	2	3	4	5	6
3.	Afraid	0	1	2	3	4	5	6
4.	Strong	0	1	2	3	4	5	6
5.	Nervous	0	1	2	3	4	5	6
6.	Alert	0	1	2	3	4	5	6
7.	Jittery	0	1	2	3	4	5	6
8.	Upset	0	1	2	3	4	5	6
9.	Irritable	0	1	2	3	4	5	6
10.	Enthusiastic	0	1	2	3	4	5	6
11.	Excited	0	1	2	3	4	5	6
12.	Proud	0	1	2	3	4	5	6

Memory Test #1

1. Please describe your earliest memory. What age were you at the time?

_____
_____
_____
_____

2. Do you think that you have a better memory than most people?
   a. Yes b. No
3. As you have aged, do feel that your memory has gotten better or worse?
   a. Better b. Worse
4. By memory alone, do you know your social security number?
   a. Yes b. No
5. If you could improve your memory by taking a class, how much would you spend?
   a. _____

Memory Test #2

1. Please describe your most recent memory. Be as descriptive as possible

_____
_____
_____
_____

2. Are you able to remember your dreams when you wake up?
   a. Yes b. No
3. Who was the president of the United States during the Gulf War?
   a. _____
4. What is the name of your earliest childhood friend. When did you meet him/her?
   a. Name_____
   b. Age_____
5. Do you remember more than 50% of what you learned in high school?
   a. Yes b. No

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