A BRIEF ELECTRONIC PERSONALIZED

NORMATIVE FEEDBACK INTERVENTION FOR THE

PREVENTION OF PROBLEMATIC GAMBLING

AMONG COLLEGE STUDENTS

by

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CHAPTER I

INTRODUCTION

Although low levels of gambling are common, problematic gambling can be
devastating for the gambler and his or her community. Gambling may be described as "an
attempt to win money by staking money on an uncertain event" (Toneatto & Ladouceur,
2003, p. 284) While it has been reported that as many as 92.5% of participants over 21
years of age have had at least one previous experience of casino gambling (Platz, Knapp,
and Crossman, 2005), far fewer individuals experience problematic gambling. Engwall,
Hunter, and Steinberg (2004) assert that individuals cross the line between gambling and
problem gambling when their behavior begins to result in many negative consequences.
Feelings of guilt, loss of time from work or school, and difficulty controlling amount of
gambling have all been identified as negative consequences of problematic gambling
(Engwall et al., 2004). A review of the literature reveals estimates of the prevalence rate
for adult pathological gambling at somewhere between 1% and 2% (Toneatto &
Ladouceur, 2003). However, some estimates are higher. For example, Winters, Bengston,
Dorr, and Stinchfield (1998) found that 12% reported at least weekly or daily gambling
and that this held true for a larger percentage of men (19%) than women (5%). Of this
rate, however, it has been reported that only 10% of problematic gamblers seek treatment
(Ladouceur, 2005).

While prevalence rates for adult gamblers in the general population are fairly universally accepted to be between 1% and 2%, there is some controversy surrounding the prevalence rate of gambling on college campuses. Although it may be debated whether or not problematic gambling exists to a greater degree on college campuses than in the general population, there is support for the fact that younger adults experience more severe problems as a consequence of gambling (Petry, 2002a). Further, college student gamblers are more likely to engage in a number of risky behaviors including: drug use, alcohol use, high-risk sexual behavior, eating disorders, and tobacco use (Engwall et al., 2004). These findings have lead some authors to hypothesize that problem gambling may be a symptom of a problem behavior syndrome or problem behavior clustering (Labrie, Shaffer La Plante, & Wechsler, 2003; Engwall, 2004). Although a multitude of possible risk factors for problematic gambling have been identified, alcohol behaviors and a positive parental history of gambling have been noted as prominent risk factors (La Brie et al., 2003). LaBrie et al. (2003) also discovered a number of things which may serve as protective factors against gambling.

Despite the already concerning level of current pathological gambling prevalence rate, many have suggested that this prevalence rate may be rising (Petry, 2002b). Indeed, given an increase in availability of gambling venues and marketing targeted at younger adults, the prevalence rates for college gamblers may be likely to rise. Given the negative consequences resulting from gambling for both the individual and those surrounding him or her, it is imperative that the issue of college gambling be addressed.

A number of interventions targeting problematic and pathological gambling have also been developed. Unfortunately, despite the fact that gambling interventions have

been in existence for over 30 years, there remains minimal knowledge about effective interventions for gambling (Ladouceur et al., 2003). Furthermore, of those studies which have been conducted, many are plagued by methodological limitations which render them uninterpretable (Ladouceur et al., 2003; Petry, 2002b).

In light of the paucity of knowledge about gambling and college gambling, it might be helpful to look to the research on treatment of other addictive behaviors such as alcohol abuse. One recent trend in this related area of high-risk alcohol use among college students has been to examine the effectiveness of brief interventions. Bien, Miller, and Tonigan (1993) reviewed 32 randomized trials of brief interventions for high-risk drinking and found a number of characteristics of these interventions. Common elements highlighted are that brief interventions tend to be significantly more effective than their no-treatment comparison, they are often comparable in treatment effects to more comprehensive interventions, and potentially boost the effectiveness of subsequent interventions (Bien et al., 1993).

With specific regard to alcohol brief interventions, Miller and Sanchez (1993 as cited in Bien et al., 1993) have asserted there are common components of these brief interventions. The acronym FRAMES is offered as an easy way to remember the following common elements: feedback, responsibility, advice, menu, empathy, and self-efficacy. Furthermore, although there is no clear evidence that these interventions are more valuable for individuals with low levels to moderate levels of alcohol problems, historically brief alcohol interventions have been targeted at those with less severe symptom presentation (Bien et al., 1993).

Numerous studies have supported the effectiveness of brief interventions for alcohol use, including effectiveness for feedback-only interventions (Walters, Bennett, & Miller, 2000; Neighbors, Larimer & Lewis, 2004). Others have begun testing the potential efficacy of similarly crafted brief interventions at reducing problem gambling. Hodgins, Currie, el-Guebaly, and Peden found a 77% improvement rate for a brief intervention at two year follow-up. Similarly, Takushi et al. (2004) found some support for a brief intervention targeting college gamblers.

In addition to brief interventions for gambling, other interventions have also been investigated. Though there is minimal outcome data for Gambler's Anonymous (GA) participant outcomes, reported outcomes have indicated very low success rate for GA with only 8% maintaining abstinence at one year follow-up (Rotter, 2004). In contrast, support has also been found for the effectiveness of cognitive and cognitive-behavioral therapies for gambling, as well as for bibliotherapy (Petry, 2002b; Toneatto, & Ladouceur, 2003).

Another proposed intervention has been controlled gambling. Despite some support for the effectiveness of these interventions, the lack of a universal understanding of what constitutes controlled gambling limits implications (Ladouceur, 2005). Nonspecific treatment variables have also been suggested as being responsible for the decreases in gambling seen from successful interventions (Toneatto & Ladouceur, 2003).

As can be seen, there is a scarcity of treatment outcome literature for interventions targeted specifically at college gamblers. However, despite the apparent lack of outcome studies for interventions targeted at problematic gambling, Takushi and colleagues (2004)

have suggested that elements effective for alcohol treatment may also be useful for gambling treatments.

One element common to alcohol interventions is normative feedback concerning the problematic behavior. There are two types of norms which have been hypothesized to influence an individual's behavior. Injunctive norms, also known as subjective norms, involve the perceptions of which behaviors and attitudes are socially approved of by one's community (Cialdini, 2003; Larimer & Neighbors, 2003). Descriptive norms on the other hand, involve the perceptions of which behaviors are actually occurring in the community (Larimer & Neighbors, 2003; Cialdini, 2003). It has been argued that people are drawn to fulfill both normative perceptions by doing what is most approved of as well as what is most popular (Cialdini, 2003). Both injunctive and descriptive norms have been found to be related to gambling behavior (Larimer & Neighbors, 2003). Furthermore, research has demonstrated that both types of norms can be and often are inaccurate. Korcuska and Thombs (2003) assert that the norms literature provides evidence for two things. First, most students overestimate the drinking norms of their peers. Similarly, Larimer and Neighbors (2003) found consistent normative overestimations of college gambling. Second, these misperceptions create an environment which is permissive of alcohol use. Again, the same findings hold true within the gambling literature (Larimer & Neighbors, 2003).

Discomfort, alienation, and a tendency to move in the direction of the group seem to be consequences of perceiving oneself as deviant, despite whether the perception is accurate or not (Prentice & Miller, 1993). Although individuals may employ a number of strategies to reduce the distress associated with normative misperceptions, change of

personal attitudes to be more consistent with the perceived norm is probably the easiest and most often utilized (Prentice & Miller, 1993). Researchers within the gambling literature have expressed concerns that the contemporary trend of increased availability and marketing for gambling will increase the prevalence rate of problematic gambling. More specifically the widespread marketing may lead at-risk gamblers to believe that frequent gambling is much more common than is actually the case and consequently alter their behavior to be more consistent with the perceived norm.

Social norms approaches to prevention, which attempt to correct normative misperceptions by publicizing more accurate norms, have been associated with reported decreased alcohol consumption in the general population (Carter & Kahnweiler, 2000). Personalized normative feedback may be considered more effective than a general norms campaign because it personalizes the information for each individual participant, highlighting discrepancies in the actual norm and that individual's behavior (Neighbors, Larimer, & Lewis, 2004). In fact, Neighbors, Larimer & Lewis (2004) have found that personalized feedback alone is an effective intervention for decreasing alcohol consumption. With regard to gambling, some support has been found for normative interventions, used as a component of a larger intervention, for college gamblers (Takushi et al., 2004).

Given the increasing support for brief interventions, research focus has turned to the creation of more innovative methods for administration and dissemination of the interventions (Moyer & Finney, 2004). In addition to the cost and time efficiency that are associated with computerized interventions, it is further possible that computer based assessment encourages clients to disclose information that they might be uncomfortable

disclosing to another person (Squires & Hester, 2002). Yet another advantage to

computer administered interventions is the fidelity with which the treatment is delivered.

Despite these advantages, however, currently computer-based interventions are not wide-

spread.

Given the current knowledge about college gambling, it seems imperative that efforts be

taken to create effective prevention and intervention programs.

CHAPTER II

REVIEW OF THE LITERATURE

Gambling may be described as "an attempt to win money by staking money on an uncertain event" (Toneatto & Ladouceur, 2003, p. 284). The prevalence of gambling in contemporary American society is astounding. For example, Winters, Bengston, Dorr, & Stinchfield (1998) reported that 91% of their male participants and 84% of female participants reported gambling on at least one occasion in the previous year. Similarly, Platz et al. (2005) note that 92.5% of their participants over 21 years of age had at least one previous experience of casino gambling. Perhaps even more shocking is that an additional 59.8% of 18 year olds, 72.8% of 19 year olds, and 86.1% of 20 year olds similarly reported a history of gambling. Results from this study suggest that while gambling appears to be much more prevalent among gamblers of legal age, underage gambling is also occurring at an alarming rate. Platz et al. (2005) note that this rate of underage gambling is concerning not only for the individuals, but also presents a social concern for the gaming industry.

Engwall et al. (2004) assert that individuals cross the line between gambling and problem gambling when their significant negative consequences accumulate, yet the behavior persists. Pathological gambling has been more formally described as including at least five of the following criteria: (a) preoccupation with gambling, (b) development of tolerance thus requiring increasingly larger amounts of gambling to achieve the same effects, (c) previous difficulty controlling or ceasing gambling behavior, (d) use of

gambling to escape or alter mood, (e) attempting to win back losses, (f) lying to those close to him or her in order to conceal the problematic gambling behavior, (g) previous or current engagement in illegal acts to finance gambling, (h) jeopardizing relationships or opportunities because of gambling, and (i) reliance on others for relief of financial difficulties created by gambling (American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, 1994). Feelings of guilt, loss of time from work or school, and difficulty controlling amount of gambling have all been identified as negative consequences of problematic gambling (Engwall et al., 2004).

Although a large percentage of survey populations have historically reported high prevalence rates for non-problematic gambling, prevalence rates may also be alarmingly high for problematic gambling. Winters et al. (1998) found that 12% reported at least weekly or daily gambling and that this held true for a larger percentage of men (19%) than women (5%). Of this rate, however, it has been reported that only 10% seek treatment (Ladouceur, 2005). Another consideration when determining accurate prevalence rates is to determine the methodology behind classifying the participant as a problem gambler. As a caution, Moore and Ohtsuka (1999) reported that although only .09% of their sample reported (or perhaps even perceived) themselves as having a gambling problem, the authors noted that close to 20% did report a history of difficulty controlling their gambling.

College Gambling

A review of the literature reveals estimates of the prevalence rate for adult pathological gambling at somewhere between 1% and 2% (Toneatto & Ladouceur, 2003). However, there is some controversy surrounding the prevalence rate of gambling on

college campuses. Some authors state that there is evidence that the prevalence of problem gambling among college students is higher than it is in the general population (Takushi et al., 2004). For example, Ladouceur, Dube', and Bujold (1994) found the prevalence rate for pathological college gambler to be between 2.8% and 5.8% depending on the cut-off criteria used. Additionally, Delfabbro and Thrupp (2003) state that many studies conducted in South Australia have yielded higher gambling prevalence rates for young adults (ages 18 to 30) than for the general population. Yet, despite reports that gambling at the college level far surpasses that of the general population and is the next student epidemic issue, some studies continue to report no support of an increased prevalence for college gambling (LaBrie et al., 2003).

Although it may be debated whether or not problematic gambling exists to a greater degree on college campuses than in the general population, there is support for the fact that younger adults experience more severe problems as a consequence of gambling (Petry, 2002b). In fact, it has been found that adolescents experience problems associated with gambling at rates two to three times that of adult gamblers (Delfabbro & Thrupp, 2003).

To make matters worse, problematic gambling among college students has also been linked to a number of other risky behaviors. Within the college student population, gamblers have been noted to demonstrate greater than average correlations with the following risky behaviors: drug use, alcohol use, high-risk sexual behavior, eating disorders, and tobacco use (Engwall et al., 2004). More specifically, one previous study reported that 42% of their participants had missed time from work or school due to gambling (Engwall et al., 2004). Perhaps even more troubling is the finding that problem

and pathological gamblers were less likely than their non-problem gambling counterparts to perceive drug use on a regular basis as exceptionally risky (Engwall et al., 2004). These findings have lead some authors to hypothesize that problem gambling may be a symptom of a problem behavior syndrome or problem behavior clustering (Labrie et al., 2003; Engwall, 2004).

A 2003 study by LaBrie et al. provides some insight in to possible risk factors associated with problematic gambling. LaBrie and associates (2003) found positive correlations between gambling problems and the following factors: being male, parent's highest level of education being lower than a four year degree, exposure to local gambling, binge drinking during the individual's last year of high school, considering parties to be very important, Greek membership, having earned a grade point average of less than a B+, cigarette use in the past 30 days, marijuana use in the past year, other illicit drug use, being over 21 years old, greater amounts of television watching time, less than three hours per day of study time, having a family who approved of gambling and drinks alcohol, and nonacademic computer use.

It appears that a significant predictor of problematic gambling may be alcohol behaviors (La Brie et al., 2003). La Brie and colleagues (2003) report that problematic gambling participants were more likely than their non problematic gambling counterparts to have consumed alcohol in the past year, and in the past 30 days as well as more likely to have binge drank in the past two weeks. This may also have implications for a needed similarity between alcohol interventions and gambling interventions.

A 1998 study by Winters et al. found the following variables to be "significantly associated with probable problematic gambling" (p. 131): greater weekly drug use, being

male, have $200 or more in disposable income each month, and a positive parental history of problematic gambling. Of these variables, a positive parental history was acknowledged as a prominent risk factor.

Another commonly cited risk factor is being male. A number of studies have reported an increased prevalence of gambling problems for men than for women (Larimer & Neighbors, 2003; Neighbors, Lostutter, Larimer, & Takushi, 2002). However, others have claimed that there are equal numbers of male and female gamblers and that gambling by women is increasing at a rate greater than that for men (Rotter, 2004).

Regardless of prevalence rates, support has been found for the fact that gender differences exist in risk factors for men and women. La Brie et al. (2003) found that women were more likely than their non-gambling or non-problematic gambling counterparts to think community service was less important, to not have a roommate, having never been married, and working for wages. In contrast, male problematic gamblers were more likely to consider athletics more important but academics less important, reside in a fraternity house, have five or more close friends, to have participated in physical activities, played intercollegiate sports and spent more than three hours per day socializing (La Brie, 2003).

LaBrie et al. (2003) also discovered a number of things to be negatively correlated with problematic gambling. Although this study was correlational in nature, these authors suggest that possessing the opinion that religion and the arts are important might be protective against problematic gambling behaviors for both men and women.

Therefore, it appears that a number of risk factors have been identified for problematic gambling. Neighbors, Lostutter, Larimer, and Takushi (2002) warn,

however, that studies have predominately been cross-sectional and thus the possibility of alternative explanations, including third variable explanations, cannot be eliminated.

Although it appears that problematic gambling already occurs at a troubling level, research and social trends would suggest that this prevalence rate may be rising. Authors have suggested that increased availability of gambling options may consequently lead to an increase in the prevalence of disordered gambling behavior (Toneatto & Ladouceur, 2003; Petry, 2002a). Indeed, even studies which do not necessary support that college gambling is a problem, have asserted that recent trends in targeting college student populations, as well as acceptance of internet gambling, could lead to an increase in college student gambling prevalence rates.

Another factor which may influence gambling prevalence rates is the fact that an abundance of American casinos have created easy gambling access to college students (Winters et al., 1998). With the demonstrated link between availability of gambling venues and pathological gambling, the current trend toward legalization of new forms of gambling may also lead to an increase in prevalence rates (Toneatto & Ladouceur, 2003, Rotter, 2004). Petry (2002a) asserts that this may even lead to a closing of the gap in the prevalence of male and female gamblers.

It has been suggested that as the prevalence increases, it will become increasingly more urgent to establish prevention and treatment programs for gambling (Ladouceur et al., 2003). Similarly, Engwall et al. (2004) assert that the growing acceptance of gambling on college campuses will create a greater need for universities to examine the relationship and influences of college gambling on other student health issues.

Problematic gambling carries many social as well as individual concerns. A multitude of negative consequences have been found to be associated with gambling at this level. For example, Labrie et al. (2003) cite the National Gambling Impact Study Commission as saying "there is evidence that more money is spent on gambling on campuses than on alcohol." Therefore, a major problem associated with problem gambling is financial loss. Winters et al. (1998) caution, however, that participant reported financial losses should be interpreted skeptically. These authors discuss the fact that participant perceptions of financial loss may not always be accurate due to reuse of the same money (Winters et al., 1998).

Although it has not yet been determined for certain whether or not gambling problems as a young adult necessarily are indicative that the individual will develop a continuing problem as an adult, college gambling is nevertheless problematic. Furthermore, there is an increased availability of gambling venues, and a hypothesized increased prevalence rate of problematic college gamblers. Given the negative consequences resulting from gambling for both the individual and those surrounding him or her, it is imperative that the issue of college gambling be addressed.

Interventions for addictive behaviors such as gambling can usually be classified into one of two categories, comprehensive or brief. Although there has been support for a variety of comprehensive interventions for a multitude of problems, they may often be practical limitations to the implementation of such comprehensive interventions. Therefore, a more recent trend has been to examine the effectiveness of brief interventions. Dickerson, Hinchy, and England (1990) cite Heather (1996) in identifying the following factors which may have influenced the popularity of brief interventions: the

cost of health care is rising, the increased popularity of self-help interventions, and evidence of the ineffectiveness of more traditional comprehensive interventions. Although another factor cited by Heather (1996) is the decline of a predominant illness model of personal problems such as addiction, other authors have asserted that brief interventions such as self-help are desirable because they alleviate the embarrassment associated with seeking help for an addictive problem (Dickerson et al. 1990).

Numerous studies have supported the effectiveness of brief interventions for high-risk alcohol use among college students, including effectiveness for feedback-only interventions (Walters, Bennett, & Miller, 2000; Neighbors, Larimer & Lewis, 2004). Miller and Sanchez (1993 as cited in Bien et al., 1993) have highlighted a number of elements common to brief interventions found to be effective for problematic alcohol use. These components have been presented as the acronym FRAMES and include the following discussed items. First, these interventions have typically involved a component in which the individual was presented with feedback about the problematic nature of his or her alcohol problem (Miller & Sanchez, 1993 as cited in Bien et al., 1993). It has been suggested that simple presentation of feedback to the individual concerning his or her level of personal risk or impairment may be an effective intervention independent of other components. Second, effective interventions for problematic alcohol use have often emphasized the target individual's responsibility for changing his or her own behavior (Miller and Sanchez, 1993 as cited in Bien, Miller, & Tonigan, 1993). This has been suggested to highlight that person's perceived sense of personal control and consequent motivation for change (Bien et al., 1993). Third, effective interventions have very frequently simply advised the individual that he or she should change his or her current

behavior (Miller & Sanchez, 1993 as cited in Bien et al., 1993). Fourth, in an attempt to present the individual with a method for change that he or she will actually utilize, brief interventions for alcohol use have typically included a presentation of a number of options for behavior change (Miller & Sanchez, 1993 as cited in Bien et al., 1993). Fifth, despite the fact that some brief interventions have been termed "confrontational," no reports of effective brief intervention for alcohol use have indicated an aggressive or coercive style (Bien et al., 1993, p. 327). Finally, a common factor to brief interventions has been the attempt to increase the individual's self-efficacy for change through methods such as motivational interviewing (Bien et al., 1993). Although brief alcohol interventions have often additionally included multiple follow-up visits, Bien and colleagues assert that significant behavior change frequently occurs after the brief intervention, even in the absence of further follow-up visits.

Brief alcohol interventions have been offered through a variety of settings such as within health care settings for the purposes of facilitating referral, within treatment contexts for the purpose of enhancing the effects of later treatments, or when more extensive interventions are not practical (Bien et al., 1993). Although it may seem intuitive that these brief interventions should be targeted at individuals with less severe presentation while individuals with more advanced alcohol problems should be referred for more comprehensive treatment, there is few data to support this differential effectiveness based on severity level (Bien et al., 1993).

Bien et al. (1993) assert that there is enough evidence to claim that brief interventions for problematic alcohol use are more effective than no treatment and often as effective as more comprehensive treatment methods. Furthermore, these authors state

that brief interventions are of value because they, especially brief motivational counseling, offer "low cost intervention that can be applied to large populations within the confines of ongoing service delivery systems" (Bien et al., 1993, p. 332). For example, Dimeff and McNeely (2000) found that an interactive computer program with personalized feedback effectively reduced drinking rates at 30 day follow-up.

Interventions

A number of interventions targeting problematic and pathological gambling have also been developed. Unfortunately, despite the fact that gambling interventions have been in existence for over 30 years, there remains minimal knowledge about effective interventions for gambling (Ladouceur et al., 2003). Furthermore, of those studies which have been conducted, many are plagued by methodological limitations which render them uninterpretable (Ladouceur et al., 2003; Petry, 2002b). Despite these limitations, a number of authors have attempted to review the available literature. A brief review of interventions historically utilized in the treatment of gambling will follow.

Modeled after the Alcoholics Anonymous program for treatment of problematic alcohol use, the Gambler's Anonymous (GA) program is an intervention designed to treat problematic and pathological gambling. Petry (2002b) reviewed available outcome studies for GA and reported increased abstinence rates for those who were actively engaged in the program. Given the closed system nature of the GA treatment for gambling, it has been difficult for researchers to obtain statistical data concerning improvement rates. It has been reported, however, that there is a very low success rate for GA with only 8% maintaining abstinence at one year follow-up (Rotter, 2004). Petry's

2002b review noted that the effects of GA may be improved by combining participation in the program with professional therapy.

Takushi et al. (2004) outline the following four components which have historically been included in successful gambling interventions: attempts to change dysfunctional beliefs via cognitive therapy, problem-solving skills training, coping skills and social skills training, and relapse prevention skills training. Review articles have examined the effectiveness of techniques from psychoanalytic, behavioral, cognitive, cognitive-behavioral, and bibliotherapy interventions for problematic gambling (Petry, 2002b).

Reviewed studies of psychoanalytic treatments were considered to be lacking in operational definitions and therefore not capable of being interpreted as solid support for the interventions. In contrast, with the exception of limitations such as small sample size and high attrition, Petry (2002b) reported that support was found for the efficacy of a number of behavioral techniques. Support has also been found for the effectiveness of cognitive and cognitive-behavioral therapies for gambling, as well as for bibliotherapy (Petry, 2002b). Further support has also been found for group administration of a cognitive gambling intervention. Ladouceur et al. (2003) reported that 30 out of 34 participants in their 2003 study improved to the point of no longer meeting criteria for pathological gambling, an effect that was not found for the wait list control condition.

Toneatto & Ladouceur (2003) present findings from a variety of clinical trials including interventions from the following theories: controlled gambling, cognitive-behavioral, individual cognitive, motivational and bibliotherapy. Consistent with the findings of Petry (2002b), Toneatto & Ladouceur (2003) assert that methodological

limitations of the studies prevent firm conclusions regarding the efficacy of these treatments. However, they also conclude that there appears to be support for the idea that cognitive and behavioral therapies are superior to a no treatment condition (Toneatto & Ladouceur, 2003). They note that it is not possible at this time to delineate the specific techniques which are the most effective (Toneatto & Ladouceur, 2003).

Another proposed intervention has been controlled gambling. Controlled gambling is the targeted goal of decreasing frequency or financial loss from gambling while continuing to engage in gambling behaviors (Ladouceur, 2005). Ladouceur (2005) asserts that a goal of abstinence is not acceptable to all problem gamblers and therefore should not be established as a treatment goal for all problem gamblers. Ladouceur (2005) further hypothesizes that a shift toward offering controlled gambling as an alternative goal to total abstinence might also decrease the treatment seeking delay for those needing treatment but resistant to commit to total abstinence. While support has been found for the effectiveness of controlled gambling interventions, there is no universal understanding of what constitutes controlled gambling (Ladouceur, 2005). In contrast to Ladouceur's advocating for controlled gambling as a treatment goal, Potenza (2002) suggests that, given participant reports about difficulties stopping gambling behaviors once they are initiated, a harm reduction approach such as controlled gambling may not be appropriate.

Yet another possibility which has been proposed while considering effectiveness of treatments for gambling is that nonspecific treatment variables such as motivation to change, natural recovery or maturing out, coercion, or financial crisis may be responsible for the decreases in gambling seen from successful interventions (Toneatto & Ladouceur,

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2003). This appears to be a hypothesis developed after several outcome studies revealed insignificant differences between treatment groups (Toneatto & Ladouceur, 2003).

Despite a lack of studies on gambling interventions in general some support has been found for brief interventions for gambling. In fact, Hodgins et al. (2004) found a 77% improvement rate for a brief intervention at two year follow-up. Similarly, Dickerson et al. (1990) tentatively asserted that their brief intervention was associated with lowered levels of gambling involvement. More specific to the college population of gamblers, Takushi et al. (2004) found some support for a brief intervention targeting college gamblers.

A major methodological flaw of gambling studies has been confusion over universally accepted definition of problematic gambling in general as well as over whether or not gambling versus problem gambling is categorical or dimensional (Blaszczynski, 2005). This has limited the ability to reach firm conclusions in many studies and therefore limited our current knowledge base as well as the generalizability of accepted research findings. It is important to keep in mind that reviews of gambling literature have been limited by the methodological flaws of the available research. It should be noted, however, that despite a surprising lack of clinical trial research for pathological gambling interventions, there is some indication that gambling is a treatable disorder (Petry, 2002b).

Using the principles outline above, Takushi et al. (2004) created an intervention based on the BASICS program for alcohol intervention with an additional component designed to provide cognitive correction training for gamblers. Participants in this study received personalized feedback, which included up to five components, and was based on

the individual's responses to assessment measures (Takushi et al., 2004). The feedback components included: college student gambler normative information, discussion of positive expectations, presentation of the participant's previous and typical gambling levels, negative consequences the participant had experienced from gambling in the past were discussed, and ways to decrease gambling (Takushi et al., 2004). Authors reported that while a descriptive review of the trial looks promising, decreases in gambling frequency were seen for both the experimental (68%) and control group (57%). Again, this may provide support for the effectiveness of nonspecific factors such as agreeing to participate in the study because of a pre-existing motivation to change or contact with a therapist.

Although the majority of previous studies have failed to take into account the participant's readiness to change his or her problematic behavior, Neighbors, Lostutter, Larimer and Takushi (2002) warn that shifts in readiness to change are an important outcome variable which should not be overlooked. Perhaps it is the case that change has occurred via shifts in the participant's readiness to change but this change has not been assessed and therefore not detected. Alternately, it is also possible that failure to acknowledge the participant's stage of readiness to change has actually decreased the effectiveness of the intervention (Neighbors, Lostutter, Larimer, Takushi, 2002). Neighbors et al. (2002) have created several measures which will be useful for future assessment and intervention with college gamblers but have published no outcome studies of interventions for college gamblers to date.

Takushi et al. (2004) found some support for a brief intervention targeting college gamblers. However, their study investigated a multi-component intervention including

the use of 45 to 60 minute feedback sessions, a component which may have practical

limitations. Takushi and colleagues (2004) have, however, discussed the fact that

elements effective for alcohol treatment may also be useful for gambling treatments.

They have also outlined the following components of gambling interventions as

including: cognitive correction of illusory control beliefs, problem solving training, social

and coping skills training, and relapse prevention training (Takushi et al., 2004).

As can be seen, there is a shortage of treatment outcome literature for

interventions targeted specifically at college gamblers. The current study is designed to

address this void.

Normative Perceptions

Given the proposed similarity between the risky behavior of alcohol use and the

risky behavior of gambling, a review of relevant theory from alcohol research is

indicated. Furthermore, given the early stage of gambling research, and the lack of

information which exists in the college gambling literature, alcohol research and alcohol

theory hypothesized to be related to the current study will be reviewed. One variable

consistently linked to alcohol use and abuse is normative perceptions.

There are two types of norms which have been hypothesized to influence an

individual's behavior. Injunctive norms, also known as subjective norms, involve the

perceptions of which behaviors and attitudes are socially approved of (Cialdini, 2003;

Larimer & Neighbors, 2003). Descriptive norms on the other hand, involve the

perceptions of which behaviors are actually occurring (Larimer & Neighbors, 2003;

Cialdini, 2003). These norms can also be referred to as attitudinal and behavioral norms

respectively (Perkins, 2002).

It has been argued that people are drawn to fulfill both normative perceptions by doing what is most approved of as well as what is most popular (Cialdini, 2003). It has also been suggested that there are two properties of norms which shape how they are perceived and transmitted (Prentice & Miller, 1993). First, social norms are defined by people's observable public behavior. Second, they are permeated with an impression of universality. Thus, as the appearance of universality decreases (a tactic used by norms approaches), the norm produces less influence (Prentice & Miller, 1993).

Both types of norms can be inaccurate. Furthermore, normative misperceptions appear to be common for many people across a multitude of behaviors. Discomfort, alienation, and a tendency to move in the direction of the group seem to be consequences of perceiving oneself as deviant, despite whether the perception is accurate or not (Prentice & Miller, 1993). However, when normative misperception is largely in an overestimation direction, this tendency for maladaptive behavior change may be even more concerning. Common misperceptions associated with norms include false consensus effects, false uniqueness effects, and pluralistic ignorance (Larimer & Neighbors, 2003). False consensus effects occur when individuals mistakenly believe that the behavior or attitudes of others are similar to their own (Larimer & Neighbors, 2003). For example, this would occur when individuals project their own attitudes and behaviors concerning gambling onto their friends and peer reference group. In light of this principle, it is understandable how those who gamble perceive close others as being more approving of gambling than do individuals who do not gamble. In contrast, false uniqueness effects occur when individuals falsely believe that their attitudes and behaviors are different from others (Larimer & Neighbors, 2003). A third common norm

misperception, pluralistic ignorance, is the shared faulty belief that one's own behavior and attitudes are different from others despite few public behavior differences (Larimer & Neighbors, 2003). Two key features of pluralistic ignorance are the departure of perceived norms from the actual norms and an illusion of universality (Prentice & Miller, 1993). Thus, for example, an individual might perceive himself to gamble much less than his misperception of the frequent gambling college student population as a whole.

Individuals often employ strategies to reduce the distress associated with normative misperceptions. Prentice and Miller (1993) assert that there are three strategies for decreasing the discrepancy between the perceived norm and privately held attitudes: changing private attitudes so that they are more similar to the perceived norm, changing the norm so that it is more similar to an individual's private attitudes, and rejecting the normative group. Of these, the method which is easiest and probably most often used is to change personal attitudes so that they are more in line with perceived norms (Prentice & Miller, 1993). With the increase of commercial gambling advertising targeted at young adults, changing one's individual attitudes may come more easily than corresponding attitudes about alcohol or drug use. In their 1993 study, Prentice and Miller also found gender differences related to the strategies used to reduce the discrepancy between perceived norms and private attitudes. They found that men changed their own attitudes to more favor their perceived social norm but that women did not. This may be especially problematic in the context of gambling given the suggested higher prevalence of male gamblers.

The shift from influence by other reference groups to peer groups often occurs during late adolescence and is especially pertinent to alcohol and substance abuse

(Perkins, 2002). Although studies have not specifically addressed this shift for gambling

normative reference groups, given the similar nature of gambling to drinking and

substance use, it is hypothesized that the same relationship would exist. While there are

other groups which provide norms for students to follow, there is evidence of relatively

little impact of the norms of parental values and behaviors on students (Perkins, 2002).

However, there may be a small influence through internalized attitudes and modeled

behavior which have often been passed down primarily through religious beliefs and

traditions (Perkins, 2002). Indeed, this is supported by La Brie et al.'s 2003 finding that

belief that religion is important may be a protective factor against problematic gambling.

It is also supported by the finding that parental history of problematic gambling is a

significant risk factor for offspring problematic gambling (La Brie et al., 2003). Parental

influence appears to differ from peer influence in that it is exerted through the

transmission of norms to their children as well as influencing the child's selection of

friends whereas peers model drinking behaviors (Lo, 1995). Similarly, although parental

history of gambling appears to be a risk factor for problematic gambling, it may also be

the case that young adults receive a majority of modeling of gambling behaviors from

peers. There is little research to consult about the impact of faculty norms on student

drinking and no research to date concerning student gambling. However, a prevention

component may be norms about expectations for academic performance (Perkins, 2002).

Korcuska and Thombs (2003) assert that the norms literature provides evidence

for two things. First, most students overestimate the drinking norms of their peers.

Similarly, Larimer and Neighbors (2003) found consistent normative overestimations of

college gambling. Second, these misperceptions create an environment which is

permissive of alcohol use. Students have consistently been mistaken in believing that peer alcohol use is higher and peers hold more permissive attitudes than is really the case (Perkins, 2002). Again, the same findings hold true within the gambling literature (Larimer & Neighbors, 2003). Perkins (2002) proposes that one reason misperceptions are so common is that they are facilitated and reinforced by media sources which disproportionately represent heavy drinking as part of youth culture. The perceptions are re-created and reinforced through the media by such means as advertising campaigns targeting students (e.g. Happy Hour) (Lederman., Stewart, Goodhart, & Laitman 2003). Researchers within the gambling literature have similarly expressed concerns that the contemporary trend of increased availability and marketing for gambling will increase the prevalence rate of problematic gambling.

Normative misperceptions can be beneficial for risk-taking students by allowing them to believe that their behaviors are within the range of drinking behaviors for the typical student and thus not problematic. Through this belief, the individual is not forced to encounter dissonance about his or her self-concept by acknowledging participation in a risky behavior. Indeed, normative research indicates that binge drinking may not be perceived as a high risk behavior that needs to be changed (Carter & Kahnweiler, 2000). Similarly, Moore and Ohtsuka (1999) found that, despite admitting to previous problems controlling amount of money spent while gambling, only .08% of participants reported having a problem with gambling.

Within the college population, normative misperceptions are not secluded to a single group but are instead found across genders, ethnic groups and residences (Perkins, 2002). However, differences in perceptions have been found both between genders and

among ethnicities (Larimer & Neighbors, 2003). Norms on drinking and drinking behaviors vary according to the social situation and according to individual variations on various social factors (Room, 1975). Perhaps it can be assumed that the same social context variability also occurs for gambling attitudes and behaviors.

Although normative misperceptions were certainly associated with problematic gamblers, it has been found that these perceptions exist for gamblers at all levels (Larimer & Neighbors, 2003). Both injunctive and descriptive norms have been found to be related to gambling behavior (Larimer & Neighbors, 2003). Norms have also been found to be correlated with behavioral intention (Oh & Hsu, 2001). Furthermore, the perceptions from both types of norms have been linked to individuals experiencing negative consequences from gambling (Larimer & Neighbors, 2003). Consistent with findings from the field of alcohol research, Larimer and Neighbors (2003) found that perceived frequency of gambling and perceived expenditure norms were both higher than was the actual norm. Similarly, Moore & Ohtsuka (1999) found a link between norms and gambling behavior in that a majority of their participants believed family and friends were approving of the participants gambling behavior. Individuals who gambled at greater frequencies, with greater amounts of money and who experienced a greater number of negative consequences were also found to have overly optimistic normative misperceptions about the gambling frequency and monetary expenditure of others as well as the level of approval of important others. Similar results from a 2003 study by Delfabbro and Thrupp suggest that gambling adolescents were more likely to perceive approving attitudes toward others from close others than were their peers who did not gamble.

Furthermore, gender differences were found in these perceptions. In this study, although both genders overestimated the prevalence of gambling, women did so to a greater degree than did men (Larimer & Neighbors, 2003). Ethnic differences were also observed with Caucasians reporting the least perceived gambling prevalence of all examined ethnicities (Larimer & Neighbors, 2003). More specifically, males and Caucasians appear to perceive others as more approving of gambling than do their female and Asian/Pacific Islander counterparts (Larimer & Neighbors, 2003).

Normative Interventions

Norms theory suggests that many individuals arrive at problematic levels of behavior after trying to decrease the discrepancy between their own behavior and their perceptions of others behavior by increasing the level of their own problematic behavior. Social norms approaches to prevention, which attempt to correct normative misperceptions by publicizing more accurate norms, have been associated with reported decreased alcohol consumption in the general population (Carter & Kahnweiler, 2000). Personalized normative feedback may be considered more effective than a general norms campaign because it personalizes the information for each individual participant, highlighting discrepancies in the actual norm and that individual's behavior (Neighbors, Larimer, & Lewis, 2004).

Walters and Neighbors (2005) reviewed 13 studies which utilized a normative feedback component as part of the intervention. The authors concluded that "it appears that personalized feedback can be effective whether delivered via an individual interview, mail, or computer" (Walters & Neighbors, 2005). Furthermore, they assert that findings from studies to date do not indicate increased effectiveness short-term impact for in-

person meetings versus feedback only (Walters & Neighbors, 2005). They also state that there is no definitive support for the idea that the addition of other forms of feedback is more effective than normative feedback alone (Walters & Neighbors, 2005). In fact, Neighbors, Larimer & Lewis (2004) have found that personalized feedback alone is an effective intervention for decreasing alcohol consumption.

With regard to gambling, some support has been found for normative interventions, used as a component of a larger intervention, for college gamblers (Takushi et al., 2004). Therefore, it is hopeful that effects similar to those found in the alcohol research may be found for college student gambling.

Electronic Interventions

Given the increasing support for brief interventions, research focus has turn to creation of more innovative methods for administration and dissemination of the interventions (Moyer & Finney, 2004). Therefore, the field has seen as rise in the use of computerized and internet based programs used for brief interventions. In addition to the cost and time efficiency that are associated with computerized interventions, it is further possible that computer based assessment encourages clients to disclose information that they might be uncomfortable disclosing to another person (Squires & Hester, 2002). Yet another advantage to computer administered interventions is the fidelity with which the treatment is delivered. Despite these advantages, however, currently computer-based interventions are not wide-spread. Examples of brief motivational interventions available on the internet include the Drinker's Check-Up (DCU, Hester, Squires, & Delaney, 2005, Squires & Hester, 2004), electronic Check-Up to Go (e-CHUG, Walters, Hester, Chiauzzi, Miller, 2005), www.mystudentbody.com (Chiauzzi et al., 2005), and the

Drinker's Assessment and Feedback Tool for College Students (DRAFT-CS;

Leffingwell, Lack, & Leedy, 2005; Leffingwell et al., 2007). More recently, web sites

have been developed to target gambling by adolescents (Delfabbro & Thrupp, 2003).

Given the current knowledge about college gambling, it seems imperative that

efforts be taken to create effective prevention and intervention programs. The purpose of

this study is to examine the effectiveness of a brief, electronically delivered intervention

for problem gamblers. The intervention is comprised of a one-time personalized norms

feedback delivered via electronic mail. The goal of the intervention is to alter the

trajectory of high-risk gamblers so that their gambling behavior becomes less severe over

time.

CHAPTER III

THE PRESENT STUDY

The field of gambling research is fairly new. Accordingly, there is little
information available about specific interventions or targeted populations. Previous
research studies have examined prevalence rates for adult gambling in the general
population as well as interventions for this population (Takushi et al., 2004). Other
studies have pointed to the increased prevalence rate of college gambling (Ladouceur et
al., 1994; Delfabbro & Thrupp,2003). Furthermore, some researchers have asserted a
correlation between college gambling and increased negative consequences associated
with gambling (Petry, 2002a, Delfabbro & Thrupp, 2003.) Several researchers have
suggested that effective gambling interventions or intervention components may be
determined by looking to effective interventions for problematic alcohol consumption.
Findings from the area of alcohol research suggest there is support for the effectiveness
of brief interventions, including single session interventions delivered via computer or
mail (Bien et al., 1993, Neighbors, Larimer & Lewis, 2004). One brief intervention cited
often for its effectiveness in treating problematic alcohol use is the use of personalized
normative feedback to correct normative misperceptions (Neighbors, Larimer & Lewis,
2004.) However, no studies to date have examined the effectiveness of such brief,
personalized normative feedback intervention for the treatment of college gambling.
Given the suspected increased prevalence rate for college gamblers and the concern by

many that widespread gambling advertisements may serve only to worsen the problem, investigation of such a brief, practical intervention is in order. By examining the effectiveness of a brief, computerized, personalized normative feedback intervention for college gambling, the current study will provide important information about the practicality and effectiveness of such an intervention. This will further provide information essential to the understanding of how to best intervene with college gambling. Effective interventions for problematic gamblers will be beneficial via decreased negative consequences for the individual, his or her friends, campus and community.

The present study divided participants into two equal groups, the intervention group and the control group (See Figure 1). Both groups received a baseline internet assessment of their current and historical gambling practices. This assessment was followed by both an electronic mail and a letter by postal mail thanking them for their participation and reminding them that they would be contacted in approximately one month for a follow-up online assessment. Both groups were emailed a link to an online assessment with a request that they complete the assessment. This email was sent approximately one month and again three months after completion of the baseline assessment. In addition to these items, the email and postal letter participants in the intervention group received immediately after baseline included personalized normative feedback (see Appendix C).

Hypothesis one: Participants assigned to the experimental group will decrease both the quantity and frequency of their own gambling to a greater degree than will participants in the control group.

Walters and Neighbors (2005) reviewed 13 studies which utilized a normative feedback component as part of an intervention for high-risk alcohol use. The authors concluded that "it appears that personalized feedback can be effective whether delivered via an individual interview, mail, or computer" (Walters & Neighbors, 2005, p.1174). Given the effectiveness of these interventions and the suggested similarity in treatment of problem gambling, it would follow that brief normative feedback will be an effective intervention for gambling as well.

Hypothesis two: Participants assigned to the experimental group will change their perceived gambling norms to a greater degree than will participants assigned to the control group.

Social norms approaches to prevention, which attempt to correct normative misperceptions by publicizing more accurate norms, have been associated with reported decreased alcohol consumption in the general population (Carter & Kahnweiler, 2000). The purpose of this study is to lead participants to hold more accurate norms about the quantity and frequency of gambling by others. In light of these things, it would seem intuitive that those with more inaccurate normative perceptions about gambling have the greatest possibility for changing currently held norms.

Hypothesis three: Behavior change related to gambling behaviors will be mediated by change in individual participants' normative believes regarding gambling.

Given the proposed relationship between perceived norms and personal behavior, it is likely that changing of these norms will result in consequent changing of the individual's behavior. Personalized normative feedback may be considered more effective than a general norms campaign because it personalizes the information for each

individual participant, highlighting discrepancies in the actual norm and that individual's behavior (Neighbors, Larimer, & Lewis, 2004).

Hypothesis four: Participants in the experimental group will increase their readiness to change their gambling behavior.

Some brief interventions have been hypothesized to be effective for their role in preparing clients to accept additional treatment or preparing them for change (Bien et al., 1993). Furthermore, progression of an individual in his or her readiness change may be indicative of some success related to the intervention, despite the possible absence of actual behavior change (Neighbors et al., 2002). Therefore, it seems important to assess participant readiness to change. Furthermore, it seems likely that the nature of this brief intervention will lead participants to increase individual readiness to change risky or problematic gambling behaviors.

CHAPTER IV

METHODOLOGY

Participants

   Recruitment. Participants were recruited at baseline based on their responses to a

multi-topic screening questionnaire administered to classes across multiple disciplines at

the beginning of the Fall 2006 semester (See Appendix A). Participants were asked to

respond to the following questions "Approximately how often do you gamble (in past 6

months)", "What is the largest amount of money that you have gambled with on any one

day in the past 6 months", "In the past 6 months have you ever gambled more than you

intended to", and "Sometimes I think I should cut down on my gambling." Respondents

were contacted if they were at least 18 years old and gambled at least 2 times per month.

Priority recruitment was given to those who spent at least $50 to $100 on peak gambling

occasion in the past six months, have gambled more than they have intended to (loss of

control), or thought they should cut down on their gambling. Eligible respondents were

contacted for participation and interviewed according to a pre-scripted phone screener

(see Appendix B). After providing informed consent to participate in the study,

participants were randomly assigned into two groups, intervention and control.

Participants received an email with a hyperlink to the online questionnaire at each time

point.

   Sixty-eight students at Oklahoma State University participated in the study. Of

these participants, six participants did not complete Time 2 and two participants had

excessive missing data. Thus, sixty participants thoroughly completed both Time 1 and Time 2 (the time points necessary for inclusion in the analyses, See Figure 2).

Demographic and Descriptive Data

Descriptive data in the form of frequencies, means, and standard deviations were obtained for age, designation in school, high school grade point average, college grade point average, marital status, socioeconomic status, and number of children (if any).

Sixty participants were examined in the analyses. Of this sample, participants' had a mean age of 21.40, were primarily male (90%), had a mean high school grade point average (GPA) of 3.56, and a mean college GPA of 2.93. The largest percentage reported for ethnicity was Caucasian (85%), for designation in school was senior (31.7 %), for marital status was single (90%). Furthermore, the majority of participants reported having no children (93.3%) and earning an annual income of less than $10,000 (66.7%). Complete demographic information is reported in Table 1.

Design and Procedure

The current study utilized a mixed-model design where participants were randomly assigned into one of two groups. One group of participants will receive the intervention (intervention group) and the other received assessment only (control group).

All participants were administered the questionnaire at three time points; baseline, one month follow-up, and three month follow-up (see Appendix C). Participants were contacted via electronic mail at each assessment point with a link to the online questionnaire and a request to complete the questionnaire. Participants in the control group completed the assessment measures only. After completion of baseline questionnaires, they received both an electronic mail labeled "urgent" and a letter by

postal mail thanking them for their participation and reminding them that they were

contacted in one month for the follow-up study (see Appendix D).

Participants assigned to the experimental group received an additional component

of personalized feedback (see Appendix E). Approximately two days after completion of

the survey, participants in the experimental group were sent an electronic mail labeled

"urgent" and a letter by postal mail. Each contained a verbal and graphic comparison of

participant gambling levels and perceptions of other college students' gambling levels to

actual normative gambling levels determined for the Oklahoma State University subject

pool. These norms were determined from screener responses ($n = 1185$). The

correspondence included feedback on three pieces of information. Participants were

provided feedback about their own gambling quantity, frequency, and peak amount of

money lost gambling. This style of presentation of feedback was adapted from the

computerized normative feedback intervention developed by Neighbors, Larimer, and

Lewis (2004). The correspondence also thanked them for their participation and reminded

them that they would be contacted for follow-up participation in approximately one

month. In an attempt to determine whether or not the participants read the electronic mail

or letter by postal mail, a question at the end of the one-month questionnaire asked them

if they received the correspondence and whether or not they read each one.

The same measures were administered to members of both the experimental and

control groups. To ensure anonymity of data, participants created a unique code number

which they used both at baseline and at both follow-ups. The unique code number was

created by each participant using the following algorithm: last four digits of social

security number- birth month- birth date. For example, if a participant's social security

number is 123-45-6789 and he was born on November 3, 1986, his unique code would be 6789-11-03. This is a procedure commonly used within our research lab and recommended by the Oklahoma State University's Institutional Review Board (Horton, 2005).

In exchange for participation at time points one and two, participants who were eligible for research credits received two credits upon the completion of the one month follow-up. Research credits are used by course instructors to assign extra credit for voluntary participation in research. In exchange for participation at the final time point for these participants and for all three time points for participants not eligible for research credit, participants had their email addresses entered into a raffle for a portable DVD player. After completing all time points of the study, participants were directed to a separate page where they are asked to submit their email address and other information such as class they would like to be credited in order to ensure each participant was acknowledged for participating and receives appropriate credit and raffle entry for doing so. This procedure has been commonly used with internet studies in our laboratory for several years as an effective means to maintain anonymity of data while obtaining identifiable information for assigning credit and other incentives (Horton, 2005).

Although the design of the study was for participants to complete measures at baseline, one-month follow-up, and three-month follow-up, attrition from the study resulted in alteration of the design. Despite numerous contacts with the participants, both by telephone and via electronic mail, a large number of participants failed to complete the Time 3 questionnaire. Without these participants' data, it was not possible to achieve enough statistical power to accurately determine any effects. Therefore, information from

this time point was removed from the analysis leaving information from Time 1 and Time 2.

Measures

    Demographics. All participants were asked to provide demographic information. This information was requested as part of the other measures in the questionnaire packet. The measure asked participants to report data such as age, ethnicity, designation in school, high school grade point average, college grade point average, marital status, socioeconomic status, and number of children (if any).

    South Oaks Gambling Screen (SOGS). The SOGS is an instrument widely cited for its use for both screening and outcome measurement purposes. The screener is comprised of a seven-component index including the following components: "1) family disruption, 2) job disruption, 3) lying about gambling wins and losses, 4) default on debts, 5) going to someone else to relieve a desperate financial situation produced by gambling 6) borrowing from illegal sources, and 7) committing an illegal act to finance gambling" (Lesieur & Blume, 1987, p. 1185). The screener has been shown to be both internally consistent (Cronbach's $\alpha = .97$) and reliable, with a test-retest correlation of .71 (Lesieur & Blume, 1987). The original SOGS screener utilizes a cutoff score of affirmative responses to five or more items as indication of probable pathological gambling. However, for analysis purposes, the current study assigned increasing value for increased frequency responses to individual questions. For example, an item frequency response of "Not at all" would earn a score of 0 for the item, a response of "Less than once a week" would earn a score of 1, and a score of "Once a week or more" would earn an individual item response score of 2. Total possible scores on the instrument range

from 0 to 54 with higher scores indicating higher levels of gambling behavior. This scoring method allowed for determination of changes in gambling frequency at each time point.

Gambling Readiness to Change Scale (GRTC). This nine-item scale assesses participant readiness to change when participants indicate level of agreement with a series of questions. Questions on the GRTC relate to the three stages of change known as precontemplation, contemplation, and action. The instrument may be scored three different ways depending on the goal of the research project. The current study will assign weighted scores of -2 to precontemplation items, a score of 1 to contemplation items, and a score of 2 to action items (Neighbors, Lostutter, Larimer, and Takushi, 2002.) The weighted scores will then be summed to yield a total readiness to change score. Possible scores range from -18 to 18 with higher scores indicating a greater readiness to change. This measure has demonstrated good reliability for the combined scale (α= .81) as well as the three subscales that combine to create the composite scale: precontemplation (α= .64), contemplation (α= .80) and action (α = .74) (Neighbors, Lostutter, Larimer, and Takushi, 2002).

Gambling Problem Index (GPI). This instrument utilizes a five-point Likert scale to determine the number of times in the past six months the participant has experienced a negative consequence while gambling or due to his or her gambling behavior. Response choices include never, one to two, three to five, six to ten, and more than ten times (Neighbors, Lostutter, Larimer, and Takushi, 2002). Total GPI score is obtained from summation of individual items in which the participant reported at least one incidence of negative gambling-related consequences in the past six months. Possible scores range

from 0 to 80 with higher scores indicated higher prevalence of gambling related problems. This measure has demonstrated good reliability (α= .84) and convergent validity (.39 to .61) with other gambling measures (Neighbors, Lostutter, Larimer, and Takushi, 2002).

     Gambling Quantity and Perceived Norms Scale (GQPN). This instrument includes 13 questions. Six of the questions with 10 response choices ranging from "less than $5" to "more than $1000"assess money spent gambling. A seventh item measures the participant's disposable income. The six items from this quantity scale are summed, averaged, and residualized on the disposable income to create an overall gambling quantity score. An eighth question measures participant gambling frequency and is utilized as a gambling frequency indicator. This item includes 10 response choices from "never" to "every day". Finally, four questions ascertain the participant's perceived norms for gambling (Neighbors, Lostutter, Larimer, and Takushi, 2002). Possible scores range from 4 to 40 with higher scores indicating beliefs that others gamble at higher levels. The quantity subscale of this measure has demonstrated good reliability (α= .89) and good convergent validity (*r*'s range = .39 to .61). The frequency item of the GQPN also demonstrated good convergent validity (.30 to .54) with other gambling measures (Neighbors, Lostutter, Larimer, and Takushi, 2002).

     Web-based survey. All paper and pencil versions of each measure were converted into the web-based version of the questionnaire which was administered at baseline, one-month follow-up and three month follow-up (see Appendix C.) Thus, the web-based survey administered questions verbatim from the above described SOGS, RTCQ, GPI, and the GQPN. Participants were also provided with the same response choices as found

on the paper-and-pencil version of the survey. Additionally, the web-based survey asked

participants to enter in their unique code number and, at the conclusion of the survey,

participants were asked for their email address and read a page thanking them for their

participation.

CHAPTER V

RESULTS

Data Manipulation

To test whether there were significant differences between the experimental group and the control group at Time 1 for any of the variables of interest, independent samples t-tests were conducted for continuous variables (see Table 2) and chi square goodness-of-fit analyses were conducted for categorical variables (see Table 3). No significant differences were found between the two groups for any demographic or dependent variable used in these analyses.

Given the small number of participants retained for Time 3 of the study, these data were not included in the analyses. Participants were also excluded from the analyses if they did not respond at both Time 1 and Time 2 or had excessive missing data (i.e., more than two-thirds of the questions of any measure were left unanswered). The *a priori* alpha level for this study was set at .025 to partially control for inflating alpha due to multiple statistical tests.

Hypothesis one:

It was hypothesized that participants assigned to the experimental group would decrease both the quantity and frequency of their own gambling to a greater degree than participants in the control group. To test this hypothesis, a 2 (experimental group) x 2 (time) mixed model repeated measures Analysis of Variance (ANOVA) was utilized to

analyze differences between experimental group participants and control group participants. Dependent variables under consideration in this hypothesis were based on the summed quantity score (residualized on disposable income) and response to the frequency question from the GQPN and peak quantity question from the SOGS. See Table 4 for means and standard deviations for each variable by group and time.

With regard to the residualized quantity variable, the analyses revealed no significant main effect for time $F (1, 58) = .226$, $p = .636$, $\eta^2 = .004$ or condition $F (1, 58) = 1.727$, $p = .194$, $\eta^2 = .029$. There was also no significant interaction between time and condition, $F (1, 58) = .049$, $p = .825$, $\eta^2 = .001$. As can be seen in the table of means (see Table 4), the mean quantity of gambling increased slightly (although not statistically significant) from Time 1 to Time 2 for both the experimental group and the control group. There is no evidence of significant differences between the two groups.

Analysis of the frequency variable revealed a significant main effect for time $F (1, 58) = 6.7636$, $p = .012$, $\eta^2 = .104$. An examination of the means (see Table 4) indicates that both groups of participants significantly decreased the frequency of their gambling from Time 1 to Time 2. However, there was not a significant main effect for condition, $F (1, 58) = .226$, $p = .636$, $\eta^2 = .004$. There was also no significant interaction between time and condition, $F (1, 58) = .047$, $p = .829$, $\eta^2 = .001$, suggesting that the intervention did not result in greater decreases in frequency of gambling as hypothesized (see Table 4).

Examination of the analyses for the peak quantity variable revealed no significant main effect for time $F (1, 58) = 4.440$, $p = .039$, $\eta^2 = .071$ or condition $F (1, 58) = .256$, $p = .615$, $\eta^2 = .004$. There was also no significant interaction between time and condition, $F (1, 58) = .055$, $p = .816$, $\eta^2 = .001$. Review of the means table (see Table 4) indicates a

slightly, though not significantly, larger decrease in peak quantity by participants in the experimental group.

Taken together, findings from the three variables under investigation for this hypothesis suggest that the intervention did not result in participants in the experimental group changing the quantity and frequency of their own gambling to a greater degree than participants in the control group.

Hypothesis two:

It was hypothesized that participants assigned to the experimental group would change their perceived gambling norms to a greater degree than would participants in the control group. To test this hypothesis, a 2 (experimental group) x 2 (time) mixed model repeated measures Analysis of Variance (ANOVA) was utilized to analyze differences between experimental group participants and control group participants. Dependent variables under consideration in this hypothesis were participant responses to the four questions on the GQPN which assess perceived norms (items #10-13, See Appendix C). These responses were summed to yield a total Norms score.

Analysis of the norms variable revealed a significant main effect for time F (1, 58) = 9.66, p = .003, η^2 = .143. There was also a significant interaction between time and condition, F (1, 58) = 6.303, p = .015, d = .098. An examination of the means (see Table 4) indicates that, from Time 1 to Time 2, participants in the experimental group decreased their normative perceptions whereas participants in the control group increased their perceptions about how much others gamble. Paired samples t-tests were used to further determine changes as a result of the intervention. Results suggest that the experimental group significantly decreased their normative perceptions (t (29) = 3.807, p = .001, d =

.50) while the control group's perceptions did not significantly change (t (29) = .443, p = .661, d = .03).

These findings are consistent with the hypothesis that this interaction occurred due to control group participants' normative perceptions remaining unchanged whereas experimental group participants changed normative perceptions so that they are more accurate over time.

Hypothesis three:

It was hypothesized that behavior change related to gambling behaviors would be mediated by change in individual participants' normative beliefs regarding gambling. However, the lack of significant findings with regard to behavior change makes analyses of mediation unavailable.

Hypothesis four:

It was hypothesized that participants in the experimental group would increase their readiness to change their gambling behavior. To test this hypothesis, a 2 (experimental group) x 2 (time) mixed model repeated measures Analysis of Variance (ANOVA) was utilized to analyze differences between experimental group participants and control group participants. The dependent variable under consideration in this hypothesis is the composite readiness to change score from the GRTC.

The analyses revealed no significant main effect for time F (1, 56) = 2.056, p = .157, η^2= .035 or condition F (1, 56) = 1.664, p = .202, η^2 = .029. There was also no significant interaction between time and condition, F (1, 56) = .001, p = .974, η^2 = .000.

This indicates that participants had no significant change in readiness to change either the quantity or frequency of his or her gambling behavior (see Table 4). Individual

subscales of the GRTC were also examined (See Table 5). The analyses of the pre-contemplation subscale revealed no significant main effect for time F (1, 58) = 2.165, p = .147, η^2= .036 or condition F (1, 58) = .952, p = .333, η^2 = .016. There was also no significant interaction between time and condition, F (1, 58) = .259, p = .612, η^2 = .004. The analyses for the contemplation subscale revealed a significant main effect for time F (1, 56) = 17.530, p = .000, η^2= .238 but none for condition F (1, 56) = .786, p = .379, η^2 = .014. There was also no significant interaction between time and condition, F (1, 56) = .000, p = 1.000, η^2 = .000. The analyses of the action subscale of the RTCQ revealed no significant main effect for time F (1, 58) = .392, p = .534, η^2= .007 or condition F (1, 58) = 1.158, p = .286, η^2 = .020. There was also no significant interaction between time and condition, F (1, 58) = .159, p = .692, η^2 = .003.

Statistical Power and Estimated Sample Size

It was determined *a priori* that a sample size of 60 should produce adequate power for determining medium effect sizes and thus this number of participants were recruited. Given this study's sample size of sixty participants, it seems likely that there was enough power to truly determine differences between groups.

CHAPTER VI

DISCUSSION

Though not as prevalent or well known as alcohol abuse, problematic gambling can have disastrous effects on individuals, their families, friends, and communities. Gambling may be described as "an attempt to win money by staking money on an uncertain event" (Toneatto & Ladouceur, 2003, p. 284) Though Platz, Knapp, and Crossman (2005) reported that as many as 92.5% of participants over 21 years of age have had at least one previous experience of casino gambling, problematic gambling is much less prevalent. Individuals may be said to have crossed the line into problem gambling when their behavior begins to result in negative consequences such as guilt, loss of time from work or school or difficulty controlling amount of gambling (Engwall, Hunter, and Steinberg, 2004).

Estimates for the prevalence rate for adult pathological gambling range from between 1% and 2% (Toneatto & Ladouceur, 2003) to 12% reporting at least weekly or daily gambling (Winters, Bengston, Dorr, and Stinchfield, 1998). Furthermore, Winters et al. (1998) found that the 12% gambling rate held true for a larger percentage of men (19%) than women (5%). Whatever the exact prevalence of problematic gamblers may be, it has been reported that only 10% of problematic gamblers seek treatment (Ladouceur, 2005). Furthermore, it has been argued that problematic gambling exists to a greater degree on college campuses than in the general population and younger adults experience more severe problems as a consequence of gambling (Petry, 2002a). With

regard to college students, increased negative consequences may come as the result of being more likely to engage in a number of risky behaviors including: drug use, alcohol use, high-risk sexual behavior, eating disorders, and tobacco use (Engwall et al., 2004). Perhaps most concerning is the possibility that increased exposure to gambling venues and marketing targeted at younger gamblers may be leading to an increase in the prevalence rate (Petry, 2002b). Thus, it is essential that the issue of college gambling be addressed.

Unfortunately, despite the development of numerous gambling interventions over the past 30 years, there remains minimal knowledge about effective interventions for gambling (Ladouceur et al., 2003). Perhaps this is attributable to many methodological limitations which render those studies uninterpretable (Ladouceur et al., 2003; Petry, 2002b).

Despite the scarcity of treatment outcome literature for interventions targeted specifically at college gamblers, Takushi and colleagues (2004) have suggested that elements effective for alcohol treatment may also be useful for gambling treatments. Within the alcohol use literature, numerous studies have supported the effectiveness of brief interventions including effectiveness for feedback-only interventions (Walters, Bennett, & Miller, 2000; Neighbors, Larimer & Lewis, 2004). Crafting a similar intervention for problematic gambling, Hodgins, Currie, el-Guebaly, and Peden found a 77% improvement rate for a brief intervention at two year follow-up and Takushi et al. (2004) found some support for a brief intervention targeting college gamblers.

Normative feedback concerning the problematic behavior is a common element to many alcohol interventions. Injunctive norms, also known as subjective norms, and

descriptive norms are the two types of norms which have been hypothesized to influence

an individual's behavior (Larimer & Neighbors, 2003; Cialdini, 2003). Furthermore, both

injunctive and descriptive norms have been found to be related to gambling behavior

(Larimer & Neighbors, 2003). With regard to alcohol use, Korcuska and Thombs (2003)

assert that the norms literature provides evidence for two things: (a) most students

overestimate the drinking norms of their peers and (b) these misperceptions create an

environment which is permissive of alcohol use. Similarly, Larimer and Neighbors

(2003) found the same findings hold true within the gambling literature. This permissive

environment may come as a result of feelings of discomfort and alienation, and a

tendency to move in the direction of the group despite whether the perception is accurate

or not (Prentice & Miller, 1993). Although individuals may employ a number of

strategies to reduce the distress associated with normative misperceptions, it appears that

change of personal attitudes to be more consistent with the perceived norm is probably

the easiest and most often utilized (Prentice & Miller, 1993). Furthermore, the

contemporary trend of increased availability and marketing for gambling may lead at-risk

gamblers to believe that frequent gambling is much more common than is actually the

case and consequently alter their behavior to be more consistent with the perceived norm.

Personalized normative feedback, which has been associated with reported

decreased alcohol consumption in the general population (Carter & Kahnweiler, 2000),

may be considered more effective than a general norms campaign because it personalizes

the information for each individual participant, highlighting discrepancies in the actual

norm and that individual's behavior (Neighbors, Larimer, & Lewis, 2004). In fact,

Neighbors, Larimer & Lewis (2004) have found that personalized feedback alone is an

effective intervention for decreasing alcohol consumption. With regard to gambling, some support has been found for normative interventions, used as a component of a larger intervention, for college gamblers (Takushi et al., 2004).

The purpose of the present study was to further research in the area of college gambling. More specifically, it was designed to determine if a brief electronic personalized normative intervention would be effective at producing significant changes in the gambling behaviors, normative perceptions, and readiness to change gambling behaviors among participants. In line with this purpose, four hypotheses were proposed. First, it was hypothesized that participants assigned to the experimental group would decrease both the quantity and frequency of their own gambling to a greater degree than will participants in the control group. Second, it was hypothesized that participants assigned to the experimental group would change their perceived gambling norms to a greater degree than would participants in the control group. Third, it was hypothesized that behavior change related to gambling behaviors would be mediated by change in individual participants' normative believes regarding gambling. Finally, it was hypothesized that participants in the experimental group would increase their readiness to change their gambling behavior.

A baseline, one-month, three-month design was utilized to test for changes in behaviors and attitudes across time. Participants were recruited at baseline based upon their responses to a screening questionnaire which assessed for problematic gambling behaviors. Additional participants were recruited based on response to a flyer posted on campus. Participants were then assigned to either the experimental or control group. Both sets of participants were asked to complete an on-line questionnaire composed of the

51

SOGS, GRTC, GPI, and GQPN questionnaires in addition to demographic questions. This questionnaire was used for all three time points. In addition to the measures, participants in the experimental group were provided with normative feedback about their typical quantity of gambling, peak quantity of gambling, and frequency of gambling and how this compared to the gambling behavior of other students at Oklahoma State University. Unfortunately, however, a large attrition rate from the Time 3 assessment prevented this data from being analyzed. Thus, the sample used for analysis consisted of the data from sixty participants at Time 1 and Time 2.

With regard to hypothesis one, no significant differences were found across time between the experimental group and the control group for quantity, peak quantity or frequency of gambling. This suggests that, in contrast to the hypothesis, the normative intervention was unsuccessful at altering the problematic gambling behavior of its participants.

Findings from the analysis of hypothesis two, however, do suggest significant change in the normative perceptions of participants in the experimental group. While the participants in the control group demonstrated no change in normative perceptions over time, experimental group participants appear to have decreased their normative perceptions over time. It is our understanding that individuals often form normative misperceptions in the form of over-estimating the frequency and quantity with which others engage in problematic behaviors. It is further our understanding that participants' often alter their own behavior to be more in-line with their perceptions of others' behavior. Therefore, although actual behavior change was not demonstrated in the

analysis of hypothesis one, changes in normative perceptions to become more accurate are promising.

Unfortunately, large attrition rates from the study prevent examination of the mediation proposed in hypothesis three. There are several possible reasons why attrition might have been so high in the present study. First, many of the students received class credit for participation in times one and two of the study and a raffle entry for participation in time three of the study. It is possible that they did not find the raffle ticket to be incentive enough to complete the third time point. Second, for both waves of participants, a majority of participants were asked to complete the third time period after the completion of the semester that they agreed to participate in the study. Therefore, it may be the case that students no longer accessed the email accounts they used during the semester. Anecdotal accounts suggest that this is true. Third, it is possible that, because the third time period often fell during a period of time when school was not in session or the semester had just started, that participants were busy with other commitments and unable to find the time to complete the study.

Finally, analysis of hypothesis four also produced no significant changes. Therefore, contrary to the hypothesis that the intervention would be effective at changing participants' readiness to change their gambling behaviors, no such advances in readiness to change were demonstrated in either the control or the experimental group. The same also held true for the subscales of the questionnaire. Perhaps, despite the fact that the intervention resulted in some normative changes for the participants, enough time did not elapse for these norms to shape their attitudes about their own behavior.

Overall, it appears that findings from the present study provide some minimal support for the use of a brief, electronic, personalized normative intervention targeting problematic gambling behaviors. Although no actual behavior change was evidenced, there were significant changes in normative perceptions by the participants of the experimental group. Given the supported link between perceived norms and behavior (and normative changes and behavior change), it seems likely that if this intervention were administered on a large scale, eventual changes in behavior could be possible. In addition to the cost and time efficiency and ease of dissemination that are associated with computerized interventions, it is further possible that computer based assessment encourages clients to disclose information that they might be uncomfortable disclosing to another person (Squires & Hester, 2002). Yet another advantage to computer administered interventions is the fidelity with which the treatment is delivered. These factors may make it an ideal intervention for college campuses. Further investigation of this intervention on large scale may produce meaningful changes in attitude and behavior.

There are multiple limitations to the current study. First, a large number of the people who participated in Time 1 did not continue participation in Time 3. Furthermore, not all of the participants initially recruited completed the baseline portion of the study. It is possible that there were differences between those who chose not to complete the questionnaire at all. It is also possible that addition of additional time points of data would indicate meaningful change as a result of the intervention. Second, data for this study was collected during two distinct waves. Therefore, it is possible that historical events produced significant differences between the responses of participants in the first wave and participants in the second wave. Third, all of the measures used in this

questionnaire were self-report measures. It is possible that participants did not accurately recall their own behavior or were otherwise motivated to report levels inconsistent with their actual behavior. It would be beneficial to obtain objective or reports from others as a measure of the participants' gambling in future studies. Fourth, it cannot be ruled out that changes seen in participant gambling behavior and normative gambling perceptions from one time point to another were not simply a reaction to their awareness of ongoing assessment of these variables. It is possible that participants, in the absence of true change, altered their responses to assessment items due to apprehension about being evaluated negatively. Finally, the sample was largely male. Though this may be representative of the general population of problematic gamblers, a larger female participant sample would provide the opportunity to test for gender based differences in the intervention.

Future studies should attempt to obtain additional longitudinal time points. Additional longitudinal data may provide important information about the effectiveness of this intervention. It would also provide information about the longevity of normative changes seen at one-month follow-up. Previous literature would suggest that the normative changes seen in the present study will eventually begin to influence attitudes about own behavior as well as lead to changes in participants' own behavior. Inclusion of a larger sample size is also warranted. This would allow future researchers to examine more minute changes. It would also allow researchers to examine if the intervention is more effective for high level gamblers or low level gamblers. Future studies should also aim to include more participant variability. This would allow for analysis of effectiveness differences based on demographic differences.

In summary, despite the troubling problem of pathological gambling and the consequences it brings for individuals, the research has been sparse in this area. Related research in the field of alcohol use has indicated that personalized normative feedback is a potentially effective intervention for changing normative misperceptions and consequently changing harmful behavior. Based on this, the present study created a brief electronic personalized normative intervention aimed at decreasing problematic levels of gambling among college students. Contrary to the hypotheses, the intervention did not lead to significant gambling related behavior change. However, participants of the intervention group did demonstrate a significant change of their normative perceptions related to gambling. Therefore, despite the lack of significant behavior change, previous literature about the mechanism behind change related to normative change leaves room for optimism that this intervention is a step in the right direction.

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APPENDIX A

RESEARCH SCREENER

Please print clearly (All information will remain confidential)
Name:_____   **Age**:_____   **Sex: M F**

Email Address:_____   **Phone**: (   )
_____

Best time to call:_____ **Instructor**:_____ **Course # :**
_____   **Section #:**_____

1. Do you have any medical conditions (e.g., heart problems)? If yes, please specify:

_____

2. Do you ever drink any alcohol?   Yes   No   **If NO, skip questions 3-7**

3. On an average week, how many drinks (12 oz. Beer, 10 oz. Wine Cooler, or standard mixed drink) do
you consume? _____

4.   In the last month, have you had 5 or more drinks (for women, 4 or more drinks) in a single episode?
Yes   No

5. If YES to question #4, how many drinks did you have on your heaviest drinking episode in the last 6
months?   _____

6. Do you typically drink every weekend?   Yes   No

7. Do you have a cell phone that can receive text messages?   Yes   No

8. Approximately how often do you gamble? (in past six months) **If Never, skip questions 9-12**

      Never   2-3 times   Once Per Month   2-3 Times Per Month
      Weekly

      More Than Once Per Week   Every Other Day   Every Day

9. What is the largest amount of money you have ever gambled with, on any one day, in the past 6 months?

      Less than $25 $25 to $50 $51 to $100 $101 to $200 $201 to $300 $301 to
$500 $501 to $700

      $701 to $1,000 $1,001 to $2,000   More than $2,000

10. On average, how much money do you spend (lose) gambling per month?

      Less than $5 $5 to $10 $11 to $20 $21 to $40 $41 to $60 $61 to
$100

      $101 to $200 $201 to $500 $501 to $1,000 $1,000 or more

11. In the past 6 months, have you ever gambled more than you intended to?   Yes   No

12. Sometimes I think I should cut down on my gambling: Yes   No

13. Have you, in the past 6 months, used prescription stimulant medication (for example, Adderall or

Ritalin) for any reason (e.g., used it on a prescribed basis, taken more than prescribed or altered the

medication to get a high, or used it without a prescription)?   Yes   No

14. Do you often have difficulty sustaining attention during class or when studying?   Yes   No

15. Do you often make decisions impulsively or fail to think things through before deciding?   Yes

No

16. Do you often feel sluggish or drowsy during the daytime?   Yes   No

17. Do you often have difficulty falling asleep or staying asleep during the nighttime?   Yes   No

18. Do you use any dietary supplements (e.g., energy supplements, weight-lifting supplements, and/or weightlifting supplements)?

      Yes   No

      If so, what do you use? _____

19. Are you right or left-handed?   ____right-handed ____left-handed

20. Do you have any left-handed relatives in your immediate family (biological relatives only)?   Yes

     No

Phone Script

"Hi, may I please speak with _____?"

"Hi _____, this is _____ calling from the Behavior Change Lab at OSU. I am calling because, based on your responses to a screener you filled out at the beginning of the year, you are eligible for a research study called Attitudes About Gambling. There are several benefits to participation in the study. In exchange for participation, you will receive two research credits for one of your courses. You will also have your email addresses entered into a raffle for a portable DVD player. The study takes about 15 minutes to complete three different times but you can do it at home or anywhere you have computer access because it is all done online. Are you interested in this study?"

If no "If I might ask, what about this study does not sound appealing to you?" record response "Thank you for your time."

If yes "Great, I'm glad to hear that. Before I can get your contact information, I need to ask you a few questions. First, approximately how often have you gambled in the past six months?" Allow response. "Next, what is the largest amount of money you have ever gambled with on any one day in the past six months?" Allow response "Okay, have you ever gambled more than you intended to?" Allow response. "One last question, do you ever think sometimes that you should cut down on your gambling?" Allow response.

In order to be eligible must have one of the following responses: gamble at least 2-3 times per month OR have spent at least $50 gambling on the occasion gambled most in the past six months OR ever gambled more than intended OR sometimes thinks should cut down on gambling.

If participant qualifies, collect information from him/her (name, email address, phone number, address, best time to call).

"Thank you for your time, someone will be contacting you via email shortly"

Step 1. Complete Informed Consent.
Carefully read the information below before deciding whether or not to participate in this study. If you choose to continue, your consent will be presumed.

Click here to continue:
Go to study

No thanks

Step 1. Complete Informed Consent.
Carefully read the information below before deciding whether or not to participate in this study. If you choose to continue, your consent will be presumed.

```
                              Informed Consent
                              Attitudes about Gambling

What is this project? Who is responsible for the project?
This project is designed to understand the association between
attitudes about gamblng, normative perceptions of others' gambling
and personal gambling. The project is titled "Attitudes About
Gambling" and is being conducted by Rachael Horton, a graduate
student in the Department of Psychology at Oklahoma State University
and Thad Leffingwell, Ph.D., Assistant Professor. This project is
approved by OSU's Institutional Review Board.
```

Click here to continue:
**I have read the above conditions and
agree to participate in this study.**

No thanks

[optional - printable consent information for your records]

Informed Consent
Attitudes about Gambling

What is this project? Who is responsible for the project?
This project is designed to understand the association between attitudes about gamblng, normative perceptions of others' gambling and personal gambling. The project is titled "Attitudes About Gambling" and is being conducted by Rachael Horton, a graduate student in the Department of Psychology at Oklahoma State University and Thad Leffingwell, Ph.D., Assistant Professor. This project is approved by OSU's Institutional Review Board.

Why might I be asked to participate?
You have been asked to participate becuse you currently engage in some form of gambling and are at least 18 years of age.

What will I be asked to do?
If you choose to participate, you will complete a brief questionnaire on three occasions. Questionnaires taken at all three time periods will be on-line questionnaires. You will be contacted via email one month and again three months after you complete this intial questionnaire. At those times, you will be provided a link to the online questionnaire. These questionnaires will include questions about your gambling, your attitudes toward gambling, and your estimate of others' gambling.

What are the risks of participating in this project?
The risks of this study are minimal and do not exceed those ordinarily encountered in daily life.

What about my privacy and confidentiality?
You will be asked to create a unique id number that you will use instead of your name each time you complete this questionnaire. This password will keep your response anonymous. Use the following rubric to create your id number: last 4 digits of social securty number-birth month-birth date. Example, if your social security number is 123-45-6789 and you were born on March 17, 1986, your id number would be 6789-03-17. Your individual responses to the questionnaire will only be seen by the researchers, and will not be seen by anyone else involved at Oklahoma State University, legal authorities, or your parents.

What are the benefits of participating?
In exchange for participation of all time points in the survey, you will receive one research credit each for completion of the intial questionnaire and the one month follow-up questionnaire. For completion of all three time points, you email address will be entered into a raffle for a portable DVD player. After completing the surveys, you will be directed to a seperate page that will ask you to submit your name, student number, and other information to make sure you are given appropriate credit for your participation. This information will be kept seperate from the data provided on the survey.

What are the alternatives?
The alternative is to not participate. Your participation is voluntary. There is no penalty for choosing to not participate. If you are eligible for research credit in a course due to your participation, the instructor of that course will make optional comparable activities available. You may choose to not participate now, or at any time during your participation without penalty.

What if I have other questions or concerns about my participation?
If you have any questions or need to report an effect about the research procedures, you may contact Thad R. Leffingwell, Ph.D. at (405) 744-7494 or 215 North Murray, Stillwater, OK 74078. If you have questions about your rights as a research participant, you may take them to the Dr. Carol Olson, IRB Chair of OSU's Institutional Review Board at (405) 744-1676 or 415 Whitehurst, Stillwater, OK 74078.

ATTITUDES ABOUT GAMBLING

department of psychology   behavior change laboratory

ⓘ **You must answer all questions to successfully submit the survey!**

Step 1. Complete the questionnaire.

To create your unique code number please use the following formula

Last 4 digits of social security number -- birth month -- birth date

(For example, if your social security number is 123-45-6789 and your birth date is Feb. 17, your unique code number would be 6789-02-17.)

Unique code number: [   ] - [   ] - [   ]

Age: [   ]

Marital Status: [▼]

Year in college: [▼]

Income: [▼]

Ethnicity: [▼]

High School Grade Point Average (estimate is ok): [   ]

College Grade Point Average (estimate is ok): [   ]

Number of children: [   ]

Please 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 or more."

Played cards for money ▢

Bet on horses, dogs, or other animals (in off-track betting, at the track, or with a bookie) ▢

Bet on sports (parlay cards, with a bookie, or at jai alai) ▢

Played dice games (including craps, over and under, or other dice games) for money ▢

Went to a casino (legal or otherwise) ▢

Played the numbers or bet on lotteries ▢

Played bingo ▢

Played the stock and/or commodities market ▢

Played slot machines, poker machines, or other gambling machines ▢

Bowled, shot pool, played golf, or played some other game of skill for money ▢

What is the largest amount of money you have ever gambled wit hon any one day? ▢

Do (did) your parents have a gambling problem? ▢

When you gamble, how often do you go back for another day to win back money you lost? ▢

Have you ever claimed to be winning money gambling but weren't really? In fact, you lost? ▢

Do you feel you have ever had a problem with gambling? ▢

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Did you ever gamble more than you intended to?

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

Have you ever felt like you would like to stop gambling but didn't think you could?

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?

Have you ever argued with people you live with over how you handle money?

If you answered yes to previous question: Have money arguments ever centered on your gambling?

Have you ever borrowed from someone and not paid them back as a result of your gambling?

Hae you ever lost time from work (or school) due to gambling?

If you borrowed money to gamble or pay gambling debts, who or where did you borrow from? (check yes or no for each).

From household money

From your spouse

From other relatives or in-laws

From banks, loan companies, or credit unions

From loan sharks (Shylocks)

You cashed in stocks, bonds, or other securities

You sold personal or family property

You borrowed on your checking account (passed bad checks)

You have (had) a credit line with a bookie

You have (had) a credit line with a casino

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How many times did the following things happen to you while you were gambling or beacuse of your gambling during the last 6 months?

Not able to do your homework or study for a test?   [▼]

Got into fights, acted badly, or did mean things?   [▼]

Missed out on others things because you spent too much money on gambling?   [▼]

Caused shame or embarrassment to someone?   [▼]

Neglected your responsibilities?   [▼]

A relative avoided you?   [▼]

Felt that you needed to gamble more frequently or place higher wagers than you used to use in order to get the same effect?   [▼]

Tried to control your gambling by trying to gamble only at certain times of the day or in certain places?   [▼]

Had withdrawal symptoms, that is, felt sick or irritable because you stopped or cut down on gambling?   [▼]

Noticed a change in your personality?   [▼]

How many times did the following things happen to you while you were gambling or beacuse of your gambling during the last 6 months?

Felt that you had a problem with gambling?   [▼]

Missed a day (or part of a day) of school or work?   [▼]

Tried to cut down or quit gambling   [▼]

Had a fight, argument, or bad feelings with a friend?   [▼]

Had a fight, argument or bad feelings with a family member?   [▼]

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Kept gambling when you promised yourself not to? [dropdown]

Felt you were going crazy? [dropdown]

Had a bad time? [dropdown]

Felt physically or psychologically dependent? [dropdown]

Was told by a friend or neighbor to stop or cut down gambling? [dropdown]

The following questionnaire is designed to identify how you personally feel about your gambling right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements.

I enjoy my gambling, but sometimes I gamble too much. [dropdown]

Sometimes I think I should cut down on my gambling. [dropdown]

It's a waste of time thinking about my gambling. [dropdown]

I have just recently changed my gambling habits. [dropdown]

Anyone can talk about wanting to do something about gambling, but I am actually doing something about it. [dropdown]

My gambling is a problem sometimes. [dropdown]

There is no need for me to think about changing my gambling. [dropdown]

I am actually changing my gambling habits right now. [dropdown]

Gambling less would be pointless for me. [dropdown]

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Please read each of the following questions carefully and choose your answer.

Approximately how much spending money (not devoted to bills) do you have each month? [dropdown]

Approximately how often do you gamble? [dropdown]

How often do you think the average college student gambles? [dropdown]

Approximately how much money have you spent (lost) gambling in the PAST YEAR? [dropdown]

Approximately how much money have you spent (lost) gambling in the PAST MONTH? [dropdown]

On avearge how much money do you spend (lose) gambling PER MONTH? [dropdown]

Approximately how much money have you won gambling in the PAST YEAR? [dropdown]

Approximately how much money have you won gambling in the PAST MONTH? [dropdown]

On average how much money do you win gambling per month? [dropdown]

How much money do you think the average college student spends (loses) gambling PER YEAR? [dropdown]

How much money do you think the average college student spends (loses) gambling PER MONTH? [dropdown]

How much money do you think the average college student wins gambling PER YEAR? [dropdown]

How much money do you think the average college student wins gambling PER MONTH? [dropdown]

Did you read the information sent to you? [dropdown]

You're finished!

Click the "Submit" button below to submit your answers. **Do NOT click the "Submit" button more than once.**

[Submit]   [Reset Form]

ATTITUDES ABOUT GAMBLING

department of psychology   behavior change laboratory
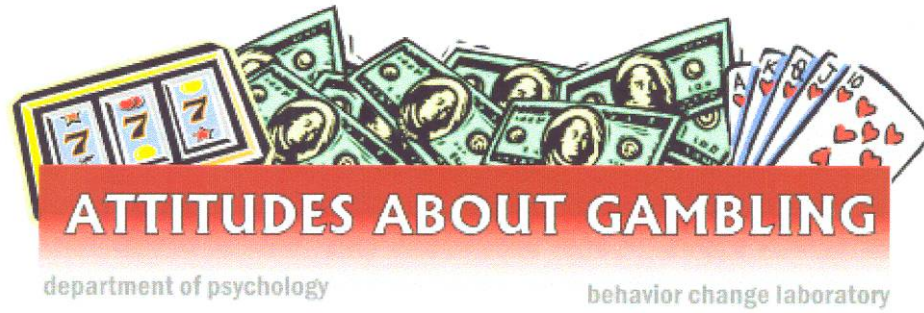
Thank you!

Your submission has been accepted.
You have just completed Part 1 of this study.

We will contact you in one month for Part 2 of this study.

You may want to print this page for your records
to confirm your participation in this study.

Thursday, September 21, 2006

ATTITUDES ABOUT GAMBLING

department of psychology   behavior change laboratory
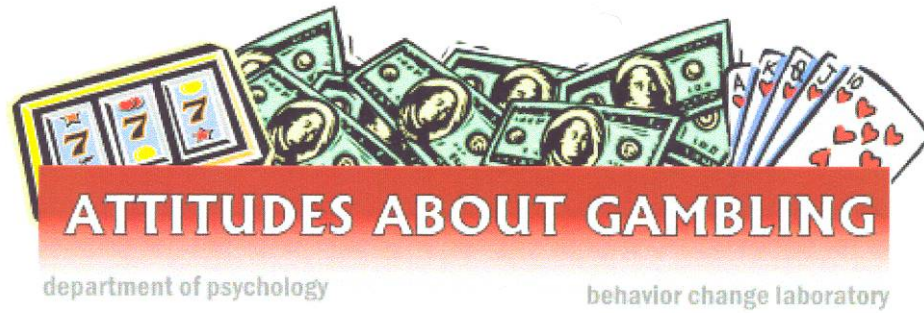
Thank you!

Your submission has been accepted.

You have just completed Part 3 of this study.

This concludes the study.

You may want to print this page for your records
to confirm your participation in this study.

APPENDIX D

Dear John,

Thank you for your recent participation in the *Attitudes About Gambling Study.*
Thank you again for your participation. You will be contacted in one month for the first
follow-up portion of the study. Please contact me with any questions.

Sincerely,

Rachael A. Hopper

Dear John,

Thank you for your recent participation in the *Attitudes About Gambling Study.* The information below is based on the responses you provided during the computer assessment that you recently completed.

Time Spent Gambling

Days Per Month Spent Gambling

How often the average OSU student ACTUALLY gambles	1
Your estimation of how often the average OSU student gambles	12
How often you gamble	6

Your responses to the computer assessment indicated that you gamble 6 days per month. You also responded to some questions about how often you believe others gamble. You indicated that you believe that the average Oklahoma State University Student gambles 12 days per month. The actual time spent gambling norm for the average Oklahoma State University student is 1 day per month.

Your percentile rank (which compares you to other students on the OSU campus) is XX% which suggests you gamble more than XX% of other college students.

Usual Amount of Money Spent Gambling

Bar chart titled "Usual Amount of Money Spent Gambling." Y-axis labeled "Amount in Dollars Spent Gambling on Average Occasion" ranging from 0 to 60. Three bars:
- "How much the average OSU student ACTUALLY typically spends on a gambling occasion" = 5
- "Your estimation of how much the average OSU student typically spends on a gambling occasion" = 50
- "How much you typically spend on a gambling occasion" = 30

Your responses to the computer assessment indicated that you spend around $30 on average when you gamble. You also responded to some questions about how much you believe others typically spend when they gamble. You indicated that you believe that the average Oklahoma State University Student typically spends $50. The actual typical amount spent gambling norm for the average Oklahoma State University student is $5 per gambling occasion.

Your percentile rank (which compares you to other students on the OSU campus) is XX% which suggests you spend more money gambling than XX% of other college students.

Highest Amount of Money Spent on One Gambling Occasion

Y-axis: Amount Spent in Dollars (0, 100, 200, 300, 400, 500, 600)

- How much the average OSU student ACTUALLY spent on the occasion he/she gambled most: **30**
- Your estimation of how much the average OSU student spent on the occasion he/she gambled most: **500**
- How much you spent on the occasion you gambled most: **200**
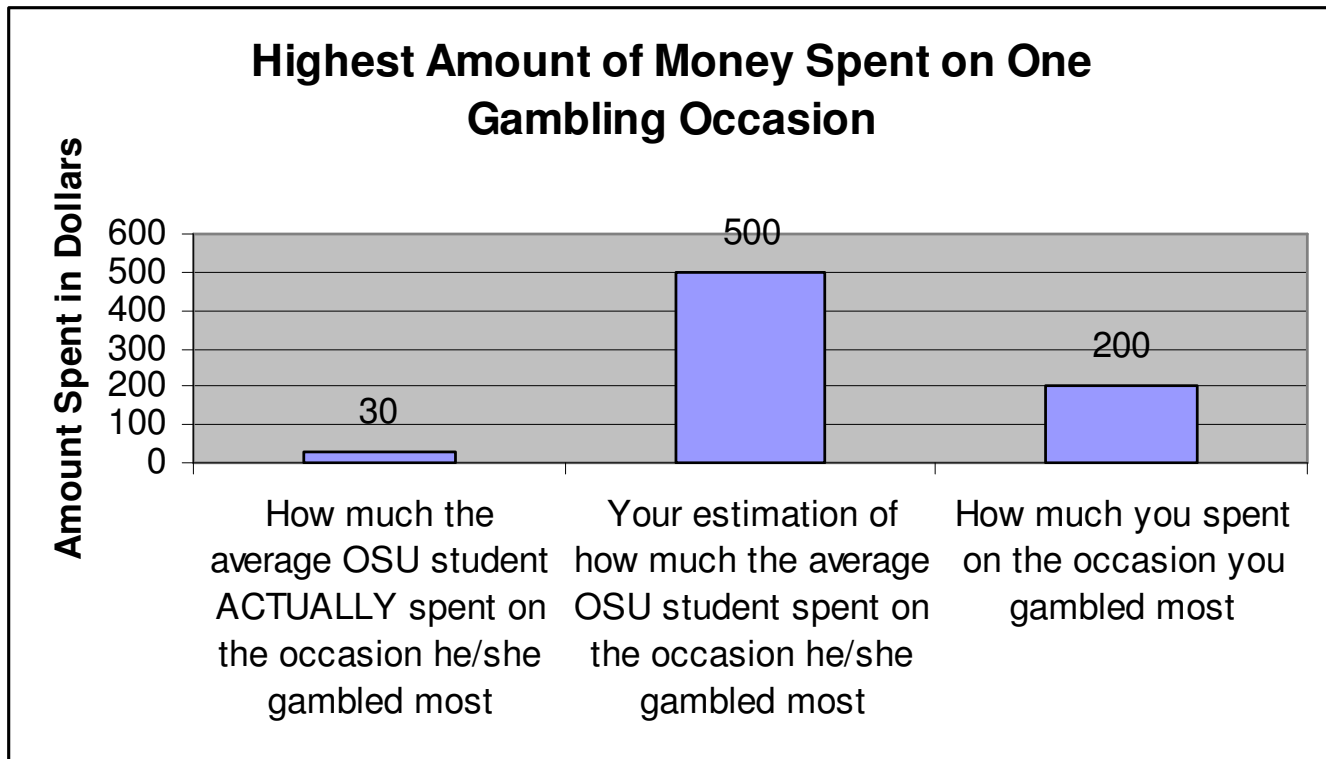
Your responses to the computer assessment indicated that you spent around $200 on the occasion in which you gambled most in the past month. You also responded to some questions about how much you is the most you believe others spent. You indicated that you believe that the average Oklahoma State University Student spent a peak amount of $500. The actual peak amount spent gambling norm for the average Oklahoma State University student is $30 per gambling occasion.

Your percentile rank (which compares you to other students on the OSU campus) is XX% which suggests you spend more money gambling than XX% of other college students.

Thank you again for your participation. You will be contacted in one month for the first follow-up portion of the study. Please contact me with any questions.
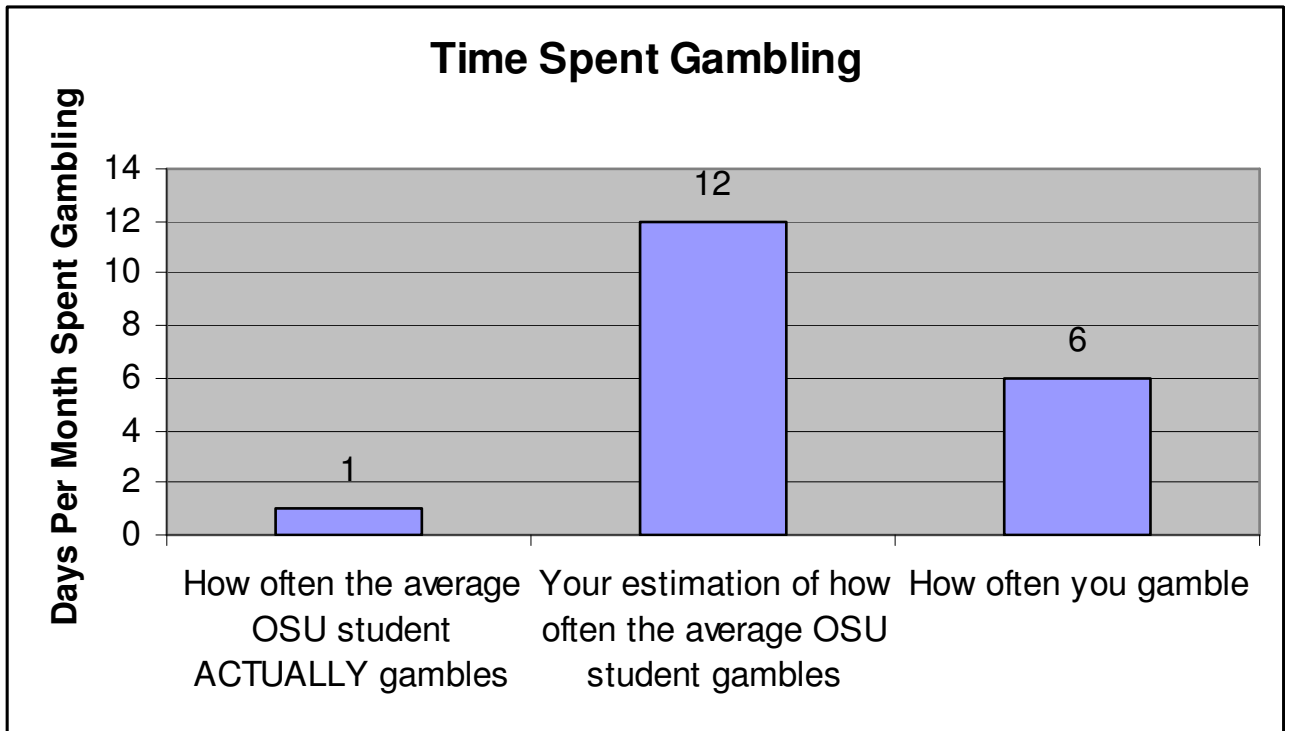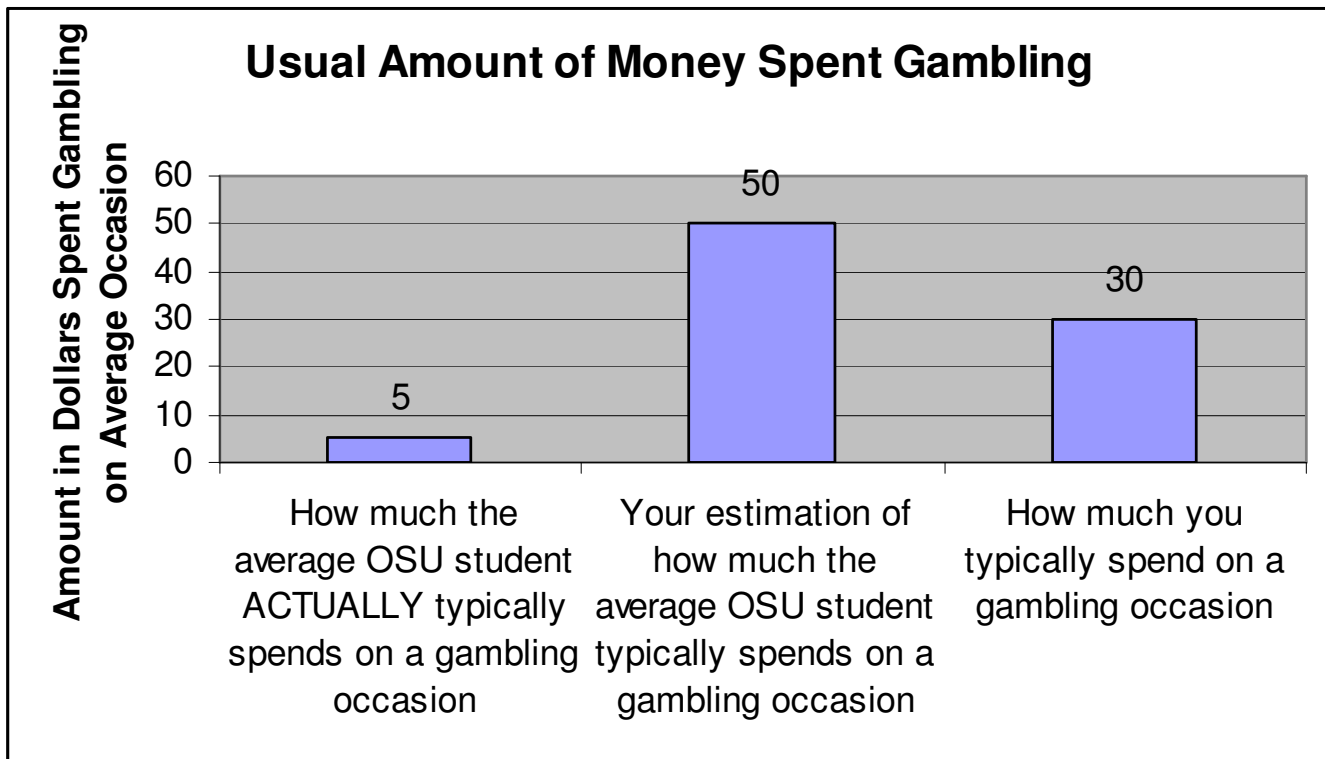
Sincerely,

Rachael A. Hopper

Table 1

Demographic Information

	Mean	Standard Deviation	Range
Age	21.40	4.27	18-44
High School GPA	3.56	.41	2.5-4.4
College GPA	2.93	.47	1.5-3.9
Children	.17	.74	0-5
	Response	% Frequency	*N*
Designation	Freshman	28.3	17
	Sophomore	25	15
	Junior	13.3	8
	Senior	31.7	19
	Graduate	1.7	1
Ethnicity	Caucasian	85	51
	African American	1.7	1
	Native American	8.3	5
	Hispanic	1.7	1
	"Other"	1.7	1
	No Response	1.7	1
Gender	Male	90	54
	Female	10	6
Marital Status	Single	90	54
	Married	6.7	4
	Divorced	1.7	1
	Co-Habitating	1.7	1
Income	Less than $10,000	66.7	40
	$10,000-$20, 000	16.7	10
	$20,000-$30,000	1.7	1
	$30,000-$40,000	5.0	3
	$40,000-$50,000	3.3	2
	No Response	6.7	4

Table 2

Examination of Baseline Differences Between Experimental and Control Group

Participants

	Participants				
Variable	Experimental ($n = 30$)	Control ($n = 30$)	t	$p \leq$	D
Quantity	6.26 (6.05)	7.91 (8.32)	-.881	.382	.23
Frequency	6.67 (1.32)	6.53 (1.38)	.382	.704	.10
Peak Quantity	3.70 (.75)	3.63 (.62)	.377	.708	.10
Norms	13.60 (6.31)	13.40 (6.29)	.12	.903	.03
GRTC	5.76 (9.95)	2.03 (11.38)	1.33	.190	.35
Age	21.27 (4.83)	21.53 (3.71)	.240	.811	.06
High School GPA	3.55 (.42)	3.56 (.40)	.063	.950	.08
College GPA	2.91 (.52)	2.95 (.41)	.357	.722	.08
Children	.23 (.97)	.10 (.40)	.694	.490	.18

Note: Standard deviations are reported in parentheses. Quantity refers to the sum of 6 quantity items from the GQPN questionnaire residualized onto the participant's disposable income. Norms refers to the summed total of four norms questions from the GQPN. GRTC refers to the composite readiness to change score from the GRTC.

Table 3

Examination of Baseline Differences Between Experimental and Control Group

Participants for Categorical Variables

	Participants			
	Experimental	Control	χ^2	$p \leq$
Variable	($n = 30$)	($n = 30$)		
Designation			1.18	.882
Freshman	9 (30%)	8 (26.7%)		
Sophomore	8 (26.7%)	7 (23.3%)		
Junior	4 (13.3%)	4 (13.3%)		
Senior	9 (30%)	10(33.3%)		
Graduate	0 (0%)	1 (3.3%)		
Ethnicity			4.22	.518
Caucasian	26(25.5%)	25(25.5%)		
African American	0 (0%)	1 (3.3%)		
Native American	3 (10.0%)	2 (6.7%)		
Hispanic	0 (0%)	1 (3.3%)		
"Other"	0 (0%)	1 (3.3%)		
No Response	1 (3.3%)	0 (0%)		
Marital Status			2.00	.572
Single	27 (90%)	27 (27%)		
Married	2 (6.7%)	2 (6.7%)		
Divorced	0 (0%)	1 (3.3%)		

Co-habitating	1 (3.3%)	0 (0%)		
Income			5.83	.323
Less than $10,000	17(56.7%)	23(76.7%)		
$10,000 to $20,000	7 (23.3%)	3 (10%)		
$20,000 to $30,000	1 (3.3%)	0 (0%)		
$30,000 to $40,000	1 (3.3%)	2 (6.7%)		
$40,000 to $50,000	2 (6.7%)	0 (0%)		
No Response	2 (6.7%)	2 (6.7%)		

Note: Percentages for each group are listed in parentheses.

Table 4

Variable Means and Standard Deviations

Variable	Experimental Group		Control Group		Time X Treatment Interaction		
	Time 1	Time 2	Time 1	Time 2	F	p	η^2
Quantity	6.25 (6.05)	6.52 (4.60)	7.91 (8.32)	8.64 (7.92)	.049	.825	.001
Frequency	6.67 (1.32)	6.30 (1.77)	6.53 (1.38)	6.10 (1.42)	.047	.829	.001
Peak Quantity	3.70 (.75)	3.57 (.73)	3.63 (.62)	3.47 (.68)	.055	.816	.001
Norms	13.60 (6.31)	10.47 (5.98)	13.40 (6.29)	13.07 (6.20)	6.303	.015	.098
GRTC	5.75 (9.95)	4.24 (12.89)	2.03 (11.38)	.59 (11.91)	.001	.974	.000

Note: Standard deviations for each time difference are listed in parentheses. Quantity refers to the sum of 6 quantity items from the GQPN questionnaire residualized onto the participant's disposable income. Norms refers to the summed total of four norms questions from the GQPN. GRTC refers to the composite readiness to change score from the GRTC.

Table 5

Variable Means and Standard Deviations for subscales of GRTC

Variable	Experimental Group		Control Group		Time X Treatment Interaction		
	Time 1	Time 2	Time 1	Time 2	F	p	η^2
Precontemplation	-19.00 (4.57)	-19.57 (5.64)	-19.90 (5.27)	-21.07 (5.58)	.259	.612	.036
Contemplation	8.17 (2.99)	7.10 (2.94)	7.52 (3.10)	6.45 (2.87)	.000	1.000	.000
Action	16.13 (4.78)	16.27 (6.38)	14.53 (4.90)	15.13 (5.45)	.159	.692	.003

Note: Standard deviations for each time difference are listed in parentheses.

Figure1: Study Design.

```
                    ┌──────────────────┐
                    │  Recruited Sample│
                    │    (n= 76)       │
                    └──────────────────┘
                             │                    ┌──────────────────┐
                             │                    │ Excluded (n= 8)  │
                             │                    │                  │
                             ├───────────────────▶│ Did not complete │
                             │                    │ Time 1           │
                             │                    │ questionnaire    │
                             │                    └──────────────────┘
                             │
                             │                    ┌──────────────────┐
                             │                    │ Excluded (n= 6)  │
                             │                    │                  │
                             ├───────────────────▶│ Did not complete │
                             │                    │ Time 2           │
                             │                    │ questionnaire    │
                             │                    └──────────────────┘
                             │
                             │                    ┌──────────────────┐
                             │                    │ Excluded (n= 1)  │
                             │                    │                  │
                             ├───────────────────▶│ Did not provide  │
                             │                    │ enough data for  │
                             │                    │ analyses         │
                             │                    └──────────────────┘
                             │
                             ▼
                    ┌──────────────────┐
                    │Included in Analyses│
                    │    (n = 61)      │
                    └──────────────────┘
```
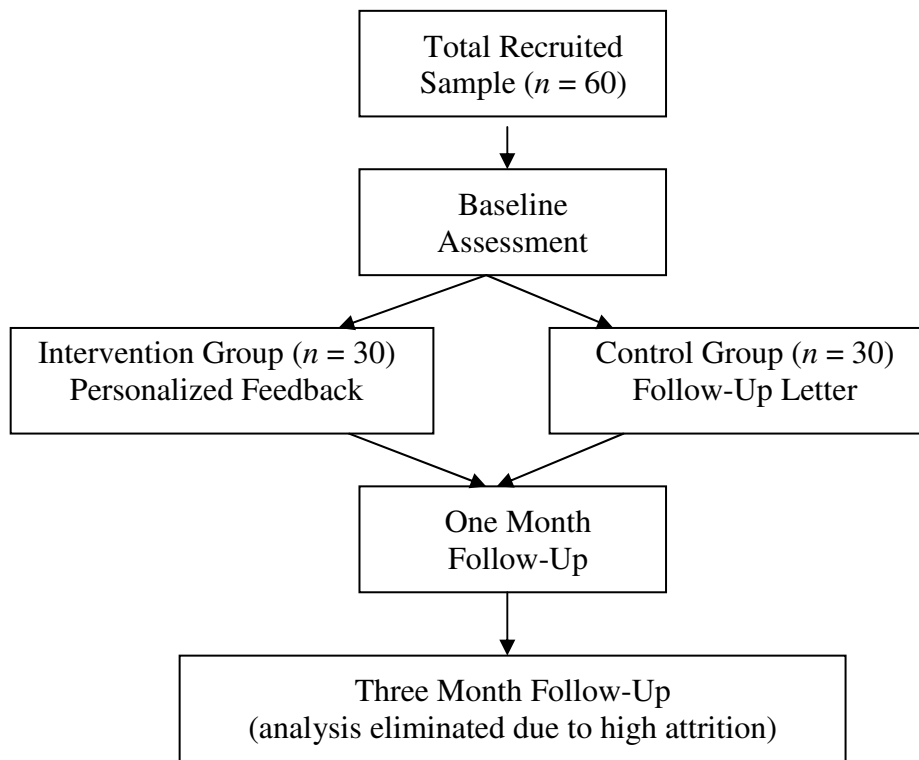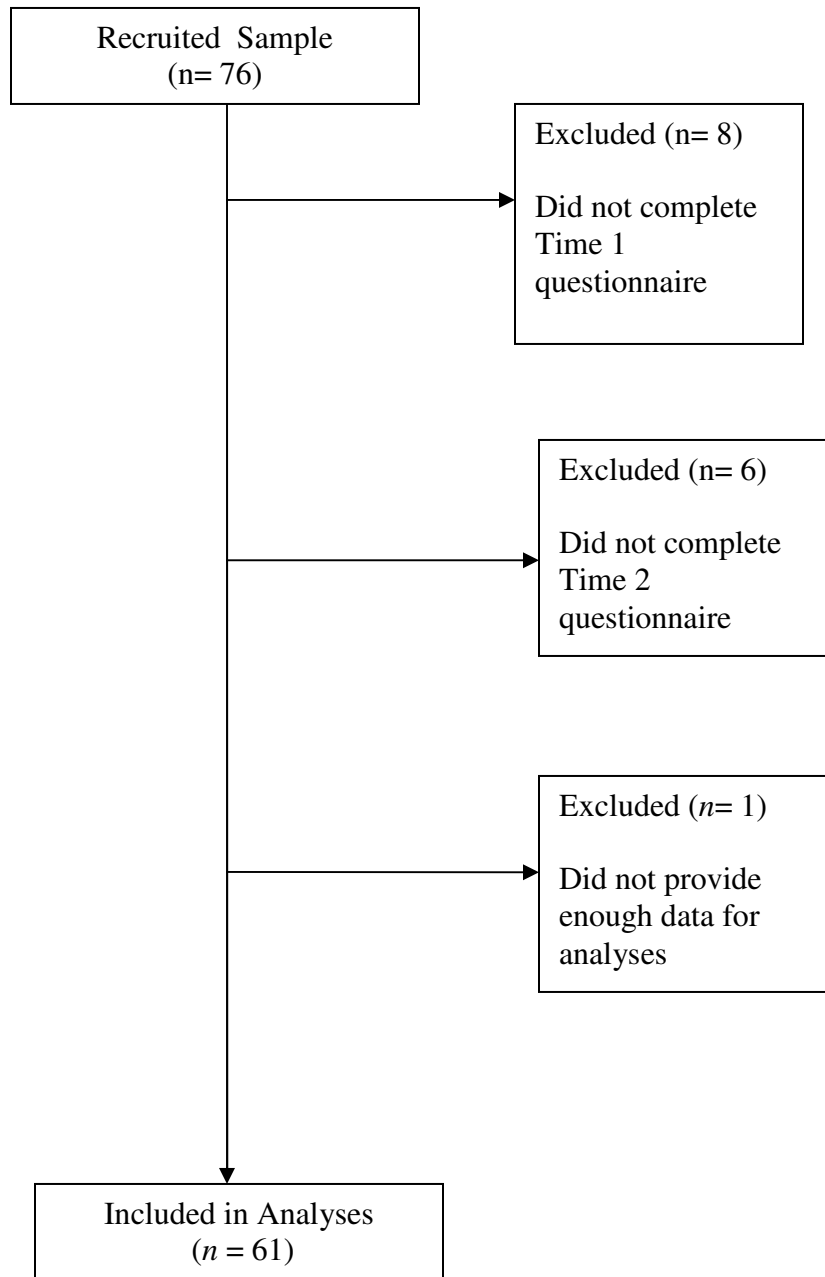
Figure 2: Sample size changes as a result of data manipulation.

Oklahoma State University Institutional Review Board

Date: Tuesday, October 24, 2006

IRB Application No   AS06125

Proposal Title: Attitudes About Gambling

Reviewed and   Expedited
Processed as:

Status Recommended by Reviewer(s): Approved   Protocol Expires: 10/22/2007

Principal
Investigator(s)

Rachel Hopper   Thad Leffingwell
215 North Murray   215 N. Murray
Stillwater, OK 74078   Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☑ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C. Jacobs, Chair
Institutional Review Board

86

VITA

Rachael Ann Horton

Candidate for the Degree of

Master of Science

Thesis: A BRIEF ELECTRONIC PERSONLIZED NORMATIVE FEEDBACK
INTERVENTION FOR THE TREATMENT OF PROBLEMATIC
GAMBLING

Major Field: Clinical Psychology

Biographical:

  Personal Data: Born in Mena, Arkansas on July 29, 1979, the daughter of
      Randy and Becky Horton. Married on October 7, 2006 to Linden
      Hopper.

  Education: Graduated from Mena High School, Mena, Arkansas in May 1997;
      received Bachelor of Arts degree in Psychology from Henderson State
      University, Arkadelphia, Arkansas in December 2000; received Master
      of Arts degree in Psychology from Southeastern Louisiana University in
      May 2003; received Master of Science degree with a major in Clinical
      Psychology at Oklahoma State University in May, 2005. Completed
      requirements for Doctor of Philosophy degree with a major in Clinical
      Psychology at Oklahoma State University in July 2008.

  Experience: Clinical experience includes Arkansas State Hospital, Oklahoma
      State University Marriage and Family Clinic, Oklahoma State University
      Psychological Services Center, Hammond Addictive Disorders Clinic,
      Southeastern Louisiana University Counseling Center, Courage House
      Shelter for Women and Children in Crisis, and Covenant House Shelter
      for Women and Children in Crisis; employed by Southeastern Louisiana
      University, Department of Psychology as graduate teaching and research
      assistant, 2001 to 2003; employed by Oklahoma State University,
      Department of Psychology as graduate teaching assistant 2003 to 2005,
      as graduate research assistant 2005-2006, and as assistant director of
      Psychological Services Center 2006-2007. Employed as psychology
      intern at Arkansas State Hospital 2007-2008.

Professional Memberships: Association for Behavioral and Cognitive Therapies,
Arkansas Psychological Association

Name: Rachael Ann Horton Hopper

Date of Degree: July, 2008

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: A BRIEF ELECTRONIC PERSONALIZED NORMATIVE FEEDBACK

INTERVENTION FOR THE PREVENTION OF PROBLEMATIC

GAMBLING AMONG COLLEGE STUDENTS

Pages in Study: 94

Candidate for the Degree of Doctor of Philosophy

Major Field: Psychology

Scope and Method of Study: The purpose of this study was to examine relationships between perceived norms and high risk gambling behaviors among college students. Participants in the study were 68 undergraduate students at Oklahoma State University. Students whose gambling behavior was considered problematic based on responses to a screener were invited for participation in the study. Participants completed an online questionnaire designed to assess individual gambling behavior and perceptions of other's gambling behavior at three time points: baseline, one month follow-up, and three month follow-up. Participants in the experimental group were provided with personalized normative electronic feedback regarding how their gambling behaviors compared with other students at Oklahoma State University. Due to high attrition rates, only analyses of data from time points one and two were included in the study.

Findings and Conclusions: No significant differences were found across time between the experimental group and control group for quantity, peak quantity, or frequency of gambling. This suggests the normative intervention was unsuccessful at altering the problematic gambling behavior of its participants. Similarly, contrary to the hypothesis, no advances in readiness to change gambling behavior were seen in either the control or experimental group. However, there was a significant change in the normative perceptions of participants in the experimental group. It is understood that participants' often alter their own behavior to be more in-line with their perceptions of others' behavior. Therefore, although actual behavior change was not demonstrated in this study, changes in normative perceptions to become more accurate are promising.

ADVISER'S APPROVAL: Thad R. Leffingwell, Ph.D.