



January 2012

Delay Discounting Among American Indian And Non-Indian College Students

Angelique Gillis

[How does access to this work benefit you? Let us know!](#)

Follow this and additional works at: <https://commons.und.edu/theses>

Recommended Citation

Gillis, Angelique, "Delay Discounting Among American Indian And Non-Indian College Students" (2012).
Theses and Dissertations. 1288.

<https://commons.und.edu/theses/1288>

This Dissertation is brought to you for free and open access by the Theses, Dissertations, and Senior Projects at UND Scholarly Commons. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of UND Scholarly Commons. For more information, please contact und.common@library.und.edu.

DELAY DISCOUNTING AMONG AMERICAN INDIAN AND
NON-INDIAN COLLEGE STUDENTS

by

Angelique Ashley Gillis
Bachelor of Arts, University of North Dakota, 2003
Master of Arts, University of North Dakota, 2005

A Dissertation

Submitted to the Graduate Faculty

of the

University of North Dakota

In partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

Grand Forks, North Dakota

August
2012

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

Dr. Jeffrey N. Weatherly, Chairperson

Dr. J.Doug McDonald

Dr. Joseph Miller

Dr. Adam Derenne

Dr. LaVonne Fox

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

Dr. Wayne Swisher,
Dean of the Graduate School

Date

Title Delay Discounting Among American Indian and Non-Indian College Students

Department Clinical Psychology

Degree Doctor of Philosophy

In presenting this dissertation in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my dissertation work or, in his absence, by the Chairperson of the department or the dean of the Graduate School. It is understood that any copying or publication or other use of this dissertation or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my dissertation.

Angelique A. Gillis
July 19, 2012

TABLE OF CONTENTS

LIST OF TABLES	v
ACKNOWLEDGMENTS	vi
ABSTRACT.....	vii
CHAPTER	
I. INTRODUCTION	1
Gambling.....	1
Sensation Seeking and Gambling	10
Delay Discounting	13
American Indians and Gambling	20
Present Study Hypotheses.....	29
II. METHODS	31
Participants.....	31
Materials	31
Procedure	36
III. RESULTS	37
Sample Characteristics.....	37
IV. DISCUSSION.....	46
REFERENCES	58

LIST OF TABLES

Table	Page
1. Means and Standard Deviations.....	37
2. SOGS Means and Standard Deviations	38
3. Thousand Dollar AUC	39
4. Hundred Thousand AUC	39
5. Body Image AUC	39
6. Medical Treatment AUC.....	40
7. GFA Sensory.....	41
8. GFA Escape	42
9. GFA Attention	42
10. GFA Tangible	42
11. EAIC Means and Standard Deviations	43
12. AICI Means and Standard Deviations	43
13. SSS-V Boredom.....	44
14. SSS-V Disinhibition.....	44
15. SSS-V Experience Seeking.....	44
16. SSS-V Thrill and Adventure Seeking.....	44

ACKNOWLEDGMENTS

I wish to express my sincere appreciation to the members of my advisory committee for their guidance and support during my time in the doctoral program at the University of North Dakota. I would like to send special thanks to Dr. Doug McDonald and the INPSYDE program, Dr. Jeffrey N. Weatherly, and Dr. Alan King for all their time, patience, and encouragement.

I would also like to express my appreciation to my family. They have each individually helped me in their own special way and I would have had a very difficult time reaching this point had it not been for their support and encouragement. Thank you, Mom, Dad, Dave (Cindy, Savanna, & Nathaniel), Dean (Craig & Victoria), Shannon (Stacy, Hunter, & Stacia), Johnette. Your confidence in me has truly helped get me this far. You never quit believing in me and I deeply love each of you and I am so grateful to have you all in my life. We are a truly blessed family.

ABSTRACT

The primary purpose of this study was to examine the concept of delay discounting among a total 200 participants (150 American Indian college students and 50 non-Indian college students) recruited from the University of North Dakota (UND), Turtle Mountain Community College (TMCC), and Cankdeska Cikana (Little Hoop Community College). All participants completed the South Oaks Gambling Scale (SOGS), Gambling Functional Assessment (GFA), Sensation Seeking Scale-V (SSS-V), and a delay discounting questionnaire. American Indian participants completed an additional form-Northern Plains Biculturalism Inventory-revised (NPBI-R). It was hypothesized that American Indian participants from the reservation sample would have higher SOGS scores than participants from UND. It was further hypothesized that because American Indians from the reservation sample would have higher SOGS scores, that this sample would also discount more steeply. It was also predicted that American Indians from the reservation sample would have higher GFA Escape scores compared to UND participants. It was further predicted that UND American Indian participants would be more bicultural than American Indian participants from the reservation sample. There was a significant main effect found for medical treatment within the delay discounting task. It was also found that UND American Indian participants were more bicultural than American Indian participants from the reservation sample.

CHAPTER I
INTRODUCTION

Gambling

Pathological gambling is a maladaptive pattern of gambling behavior that persists despite substantial adverse consequences. Pathological gamblers tend to spend a significant amount of money, time, and emotional resources on gambling. Gamblers usually then incur substantial debt and experience family and social relationship problems because of gambling. Some pathological gamblers even lose their jobs and/or engage in illegal activities to support their gambling (American Psychiatric Association (APA), 1994). Approximately 2.5 million adults in North America may suffer from pathological gambling, which is between 1 - 2% of the population (Petry, 2005). In addition to these individuals, 5.3 million adults are at risk for the disorder (Welte et al., 2001).

The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; APA, 2000) classifies pathological gambling as an impulse-control disorder because the individual becomes increasingly incapable of resisting his or her impulses to gamble. All of the impulse control disorders share the following characteristics: difficulties to resist an impulse, desire or temptation to perform some behavior that is detrimental for the individual or others; a progressive emotional discomfort or tension before performing the act; pleasurable or gratifying feelings while performing the behavior; in some cases,

negative feelings of guilt, remorse or shame when the act is over. All of these characteristics are recognizable in the pathological gambler.

Similar to substance-abuse disorders, the clinical characteristics for pathological gambling include preoccupation, loss of control, tolerance, withdrawal-like symptoms, and cycles of abstinence and relapse (APA, 2000). Although not a clinical diagnosis, the term *problem gambler* is typically used to describe individuals who exhibit some level of problems ranging from moderate to severe, whereas the term *pathological gambler* is reserved for those who meet DSM diagnostic criteria.

Toce-Gerstein, Gerstein, and Volberg (2003) reported that three of the criteria—preoccupation with gambling, gambling for emotional escape, and repeatedly lying about gambling—share one characteristic and that is an active fantasy element. With this element, the individual's mind is filled with hopes and plans about future gambling, problems are wished away, and stories are made up to disguise an individual's gambling behavior. The authors noted that these three criteria were met more frequently by individuals who could be labeled “problem gamblers” than by individuals who met the full criteria for “pathological gambling” (Toce-Gerstein et al., 2003). This finding suggests that perhaps these three criteria are the main determinants in a person with problematic gambling.

Welte, Barnes, Wieczorek, Tidwell, and Parker (2004) found three factors put a person at risk for pathological gambling. The three factors were gambling versatility, alcohol pathology, and membership in an at-risk sociodemographic group. In their study, a total of 2631 phone interviews were conducted on U.S. residents aged 18 or older across all 50 states. Results showed that any one type of gambling could be associated

with a higher risk of pathological gambling, but that some types of gambling were more associated with a higher risk of pathological gambling than other types. High-event frequency games were more associated with properties that led to problem gambling than were low-event frequency games. Event frequency was defined as the time interval between gambling outcomes. The most at risk sources of gambling pathology for gamblers that were found, in descending order, were pulltabs, casino gambling, bingo, cards (played outside a casino), the lottery, and sports betting. It was noted that pulltabs and casino gambling have the highest event frequency and may predict pathological gambling while lottery and sports betting have the lowest event frequency. This finding led the authors to conclude that pathological gambling is associated with high event frequency games.

Minority status and low socioeconomic status (SES) were also significantly linked to pathological gambling (Welte et al., 2004). African Americans, Hispanics, and Asian respondents were found to be at the highest risk. The authors speculated that perhaps lower SES individuals might have more gambling pathology than higher SES individuals because higher SES individuals have more income and more financial resources to manage the effects of gambling losses. Welte et al. (2004) further suggested that the association between alcohol abuse/dependence and gambling may be due to the fact that the effects of alcohol lead to poor judgment when gambling.

The idea that gender differences play an important role in gambling-related interests and behaviors has also been supported (McDaniel & Zuckerman, 2003). Desai and Potenza (2008) found rates of problem/pathological gambling of 0.7% in men and 0.4% in women. Although females are usually underrepresented in gambling studies, a

study done by Tavares, Zilberman, Beites, and Gentil (2001) suggests that gambling problems among women usually arise at an older age than males and that women who are problem gamblers are more likely to be single than men.

Volberg (2003) has discerned a “feminization” of gambling. This feminization being that women find that casino and lottery gambling permits risk-taking in environments that are otherwise secure. There are an increased number of women drawn to gambling as a result of casinos’ targeting women through advertising and creating gambling venues that specifically appeal to women. With more women gambling, more cases of pathological gambling among women may result. Westermeyer et. al. (2008) found that the rates of pathological gambling were equal among male and female American-Indian veterans. This finding may be an indication of the “feminization” that Volberg predicted in 2003.

Cognitive Approaches to Gambling

Ladouceur (2004) suggested that the fundamental mistake that gamblers make is to rely on previous events to predict a game’s outcome. Problem gamblers seem to have the tendency to create illusory links between independent events in the game of chance. Individuals tend to forget or deny that the only determinant of the outcome is randomness (Benhsain et al., 2004). The thought that deterministic rules could explain the outcome of the game creates erroneous perceptions and an illusion of control (Langer, 1975). Benhsain et al. (2004) suggested that the misunderstanding of the notion of randomness is a main feature in the development and continuance of gambling habits. The development of irrational thinking in a game of chance happens when gamblers do not apply their knowledge of randomness. The ability to maintain rational perceptions about

independence of events while gambling is a factor that may protect against loss of control in gambling.

A number of different theories have been presented to account for the etiology of pathological gambling. The cognitive viewpoint focuses the gamblers' perceptions about gambling and how these perceptions are harmful and erroneous. Most problem/pathological gamblers fail to take into account the negative winning expectancy that is involved in games of chance (Ladouceur, Sylvain, Boutin, & Doucet, 2002). The negative winning expectancy explains that even at high rates of return (e.g., 98%), the return is still less than 100%. Thus, the longer one plays, the more money one is likely to lose. Because of this, it is impossible for the individuals to make gains in the long run. Problem gamblers will continue to gamble believing that the outcome of the game will ultimately be in their favor.

During gambling activity, individuals may entertain a number of erroneous beliefs that are at the center of the individuals' development and maintenance of gambling problems (Ladouceur et al., 2002). These erroneous beliefs may lead the individual to believe that one can control the game and even predict the outcome.

There are hypotheses that emphasize the role of cognitive distortions in the development and maintenance of pathological gambling. Gambling creates an illusion of control in the person and the perception that one is capable of controlling the results (Langer, 1975). At the same time, individuals develop a series of irrational thoughts related to gambling that lead them to make false inferences regarding their possibilities to obtain positive results, and to distort the meaning of the outcome of the gambling. Ladouceur et al. (2002) suggested that this illusion affects disordered gambling because

most games of chance (e.g., blackjack, bingo, horseracing) require the gambler to engage in some behavior despite that behavior having little or no impact on the outcome of the game.

Not all research has supported this view. For instance, Dannewitz and Weatherly (2007) did not find evidence to support the illusion of control. Their study found that participants gambled most when they were given no control over how the game would be played. In this study, they had not control over what cards would be held when participants played video poker. The finding that the amount of money gambled increased as control over the game decreased appears to contradict the illusion of control. This finding was replicated by Whitton and Weatherly (2009).

Regular gamblers tend to have more irrational thoughts than occasional gamblers and therefore, they engage in more risky behaviors (Gaboury & Ladoucer, 1989). When the individual wins, his/her beliefs about his/her chances of winning again and about the role of good luck are reinforced. Losses are interpreted as a sign of imminent gain because the bad luck has to end at some point. Supporting this idea, a study by Leopard (1978) found that 60% of gamblers risk more money after having lost instead of after having won. The act of going back to try and win money that has already been lost is termed “chasing the bet” and is one of the DSM criteria.

Another distorted thought is related to the assessment of the results. Gamblers tend to remember and overestimate their gains, and they tend to forget, underestimate or rationalize their losses (Ladoucer et al., 1987). It is possible that these kinds of distortions explain the histories of initial gains, prior to the onset of the disorder, described by many patients.

Behavioral Approaches to Gambling

The behavioral viewpoint has concentrated on monetary or financial gain as a way to set up explanatory hypotheses (Ladoucer et al., 2002). The occasional monetary gain serves as intermittent reinforcement and thus leads to persistence in gambling for some individuals. It is also thought that in addition to monetary gain, excitement, and stimulation may act as a reinforcer that contributes to the development and maintenance of problem gambling (Ladoucer et al., 2002).

Weatherly and Dixon (2007) proposed a behavioral model that updated the approach mentioned above. The authors suggest that there are likely three mechanisms that lead to or sustain pathological gambling. The first is the presence of an establishing operation that alters the efficacy of the consequence maintaining gambling behavior. Establishing operations such as SES, gender, cultural identity, age, and verbal “rules” increase how steeply individuals discount delayed rewards. This discounting will then encourage gambling and leads to problem or pathological gambling.

The second mechanism stated by the authors to lead to pathological gambling, is the consequence that is maintaining the gambling behavior. The model proposes that individuals who gamble for monetary gain will be prone to pathological behavior. Individuals who gamble for excitement or as an escape, on the other hand, should be less prone to pathological gambling.

The third mechanism is verbal rules that serve as discriminative stimuli for gambling. If these rules are erroneous, then they may not only encourage gambling, but also alter the consequences maintaining the gambling behavior. If these rules lead to

losses, the person may try harder to win back the money and this may serve to promote pathological gambling.

Blaszczynski, Wilson, and McCognahy (1986) have hypothesized that what is essential in the etiology of pathological gambling is the “behavior completion mechanism.” According to this theory, once a behavior becomes a habit, any stimulus associated with that behavior, either internal or external, creates a need in the person to perform that behavior, so that if it is not completed the person experiences an intense feeling of discomfort. So, completion of the behavior is then reinforced by the removal of the feeling of discomfort.

Cognitive-Behavioral Approach to Gambling

Yet an even more commonly held viewpoint is the cognitive-behavioral viewpoint. There are two types of positive reinforcement that are taken into account: monetary gain and physiological activation to explain how gambling is developed and maintained. Once an individual experiences intermittent gains he or she is encouraged to believe that it is possible to make substantial wins. These wins will, in turn, give rise to erroneous beliefs or cognitions about gambling and reinforce the determination to gamble (Ladouceur et al., 2002). During the gambling session, there are two types of triggering elements found: internal elements such as, physiological activation and cognitions about gambling and external elements such as, situations, locations and times. Problem gamblers are unable to control erroneous thoughts or postpone the decision to gamble. This inability will then lead to more gambling. In addition to the events that occur during the gambling session such as wins and losses are the erroneous thoughts that are associated and the gambler returning to win back lost money which will then increase the

frequency of gambling and contribute to problem gambling (Ladouceur et al., 2002).

However, non-problem gamblers also experience these erroneous thoughts (Petry, 2005), suggesting that these thoughts are not sufficient for gambling problems, nor are they the cause of them.

A second way to understand gambling from the cognitive-behavioral viewpoint is to look at the individual's need to escape. Hand (1998) suggested that pathological gamblers engage in gambling in order to avoid or reduce unbearable mental states. In his model, these negative mental states arise because of environmental distress, coping deficits, psychiatric disorders, or other daily life problems in the individual. If the person stops gambling, the negative mental state will arise again, and the person feels the need to engage in the behavior repeatedly. So the behavior of gambling is used as an avoidance mechanism.

Models of Gambling Behavior

Along with the theories that describe gambling behavior, there have also been three types of models of problem gambling that have emerged. The first model is a general predisposition to develop addictive behaviors (Orford, 2001). Often associated with this approach are studies of impulsivity and genetic markers for problem gambling which seek to identify biological vulnerability to the development of gambling problems.

The second type is descriptive models of the phases in the "career" of pathological gamblers developed by Lesieur and Custer (1984). The terms that are used are the winning phase, the losing phase, and the desperation phase. These phases are hypothesized to occur in a developmental sequence.

Lesieur and Custer (1984) identified two central features of problem gambling as chasing, the range of behaviors associated with attempting to recover previous losses, and action, the whole range of processes associated with gambling, not just the gamble itself. The processes of compulsive gambling were reported to result from the sensation after action, and the chase to recoup losses.

The third type of model focuses on identifying specific coping skills deficits in the problem gambler (Ricketts & Macaskill, 2003). These include the ability to control automatic arousal, challenge irrational gambling related cognitions, delay reinforcement, and utilize problem-solving skills to deal with gambling related cues.

Sensation Seeking and Gambling

The arousal theory or sensation seeking has been a theory used to explain pathological gambling. Zuckerman (1979) suggested that a person's arousal level plays an important role in maintaining gambling activity. According to Zuckerman (1994), sensation seeking is the "need for varied, novel, and complex sensations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experience" (p. 27).

The trait of high sensation seeking has been linked to such highly exciting activities as adventure sports, exotic meals, intake of drugs, sex, and illegal activities (Aluja, Garcia, & Garcia, 2003). The trait of sensation seeking has also been linked with different aspects of human life such as social and marital relationships, vocational preferences and choices of eating habits (Bratko & Butkovic, 2003). Sensation-seeking behaviors are often attributed to extraverted and impulsive individuals. High sensation

seekers need more stimulation to maintain an optimal level of arousal, while low sensation seekers manage themselves better in relatively less stimulating settings.

The general trait of sensation seeking is composed of four components (Rosenbloom, 2003): the first component is Thrill and Adventure Seeking (TAS), which relates to attraction to thrill and dread; the second is Experience Seeking (ES), which relates to the aspiration to undergo a variety of novel and unconventional experiences; the third is Disinhibition (Dis), which relates to loss of self-control; and the fourth is Boredom Susceptibility (BS), which relates to intolerance toward monotonous, repetitious or predictable people and events.

Zuckerman (1979) suggested that gambling is a form of sensation seeking “in which individuals risk loss of money for the positive reinforcement produced by states of high arousal during the period of uncertainty, as well as the positive arousal of winning” (pg. 69). So the risk and uncertainty that are associated with betting along with the potential of winning or losing one’s money can be highly arousing. One important characteristic of high sensation seekers is the fact that they tend to evaluate many types of situations as having a lesser degree of risk than low sensation seekers (Dickerson, 1984). Dickerson (1984) also suggested that pathological gamblers view their bets as less risky and may experience less anxiety while betting than social gamblers.

Various gambling activities also provide individuals with diverse gambling experiences and thus, varying levels of arousal. Dynamics of the different forms of gambling such as skill, chance, and payoffs offer exchanges that are likely to influence a person’s gambling behavior (McDaniel & Zuckerman, 2003). The varying dynamics of gambling activities then provide various reasons or motivations that influence an

individual's gambling behavior. These reasons or motivations would determine if that individual would decide to gamble or not based on the level of arousal that person is seeking and would also determine what form of gambling that person would decide to participate in to help meet his/her desired level of arousal (McDaniel et al., 2003).

McDaniel et al. (2003) administered a telephone survey to 783 randomly selected males and females between the ages of 18 and 87. Participants were placed into categories of high, medium, and low sensation seekers. High sensation seekers showed significantly higher levels of gambling interest compared to the other two groups (low and medium).

McDaniel et al. (2003) reported that high sensation seekers participated in a significantly greater variety of gambling activities than those in the medium or low sensation seeking groups. The authors of this study concluded that while individuals' main motivation for their behavior may be the arousal associated with risk and/or winning money, they also have the tendency to seek out variety in their gambling activities. So, sensation seekers have a preference for certain gambling forms over others based on the associated risk and/or arousal potential (McDaniel et al., 2003).

A study done by Gillis, McDonald, and Weatherly (2008) examined the relationship between sensation seeking and gambling behavior among a sample of college students. The sample was split into high sensation seekers and low sensation seekers and then played a slot-machine simulation. A difference in gambling behavior between high sensation seeking individuals and low sensation seeking individuals was not found. It was thought by the authors that perhaps the high sensation seeking individuals did not find this form of gambling stimulating. Coventry and Brown (1993)

suggested that high sensations seekers may only engage in certain types of gambling such as casino games and race track betting, while low sensation seekers prefer less stimulating forms of gambling.

Powell, Hardoon, Derevensky, and Gupta (1999) studied sensation seeking by surveying 58 college-aged gamblers. The Arnett Inventory of Sensation Seeking (AISS) and the Zuckerman Sensation Seeking Scale form V were employed. The AISS scale consists of two subscales: Intensity Seeking-the desire for intense sensory experiences; and Novelty Seeking-the quest for new, different, spontaneous experiences. Results showed that problem and pathological gamblers scored higher than their peers on two forms of sensation seeking: Thrill-and-Adventure Seeking and Intensity Seeking. The authors concluded that these individuals are using stimulating environments, in part, to achieve higher physiological arousal.

Delay Discounting

Delay discounting or temporal discounting represents the extent to which consequences or outcomes decrease in effectiveness to control behavior. This decrease is usually a function of there being a delay to their occurrence. So, if given a choice, more valuable delayed outcomes are often not chosen over less-valuable, non-delayed options.

The value of the outcome is said to have been “discounted” as a function of the delay. A greater tendency to discount value in this way is said to be an index of impulsivity because of choices that fail to optimize on more valuable outcomes (Reynolds & Schiffbauer, 2005). Even though discounting is correlated with impulsivity, there is not a perfect correlation (Reynolds et. al., 2005). Consequences become

increasingly less effective in controlling behavior when delayed. Higher rates of delay discounting are often operationalized as an index of impulsivity.

People often encounter situations in which they have to choose between two outcomes that differ in both magnitude and delay. It is obvious that the subjective value of an outcome decreases as time until its occurrence increases. For example, most individuals would prefer to receive \$1,000 now rather than in a month.

If individuals are offered a choice between two rewards that differ only in amount, they generally choose the larger rather than the smaller reward. If offered a choice between two rewards that differ only on delay, individuals tend to choose the reward available sooner rather than the one available later. These general principles apply to both humans and other animals (Madden, Ewan, & Lagario, 2007).

One possible operational definition of impulsivity is the choice of a smaller, more immediate reward over a larger reward delayed in time (Petry, 2001); the analysis of delay discounting is one method to measure this construct of impulsivity (Green, Fristoe, & Myerson, 1994). In studies such as these, participants would choose between smaller rewards delivered immediately and larger rewards delayed in time.

Individuals often sacrifice a large delayed reward in order to receive a smaller, but sooner reward. Making such a choice may be viewed as impulsive. The opposite choice may be viewed as self-control (Mischel, Shoda, & Rodriguez, 1989). For example, drug-dependent individuals often choose the immediate short-lived rewards of the drug effect over the delayed, yet more valuable, outcomes such as better health, relationships, employment, and so forth (Mischel et al., 1989)

Problems arise when choice options differ on more than one dimension. This scenario would occur when, for example, when the individual must choose between a smaller reward available sooner and a larger reward available later. Delay-discounting then refers to the reduction in the present value of a future reward as the delay to that reward increases. The more remote a future reward is, the lower its present value, and, therefore, the less likely the reward is to be chosen among current alternatives. The discount rate determines the steepness of the reduction in present value with increases in delay. Individuals have different discount rates (Kirby, 1997), and higher the rate at which a person discounts future rewards, the lower the present values of future rewards and the less impact those rewards will have on current choices.

It is suggested that rewards obtained following unpredictable delays are more valuable than rewards obtained following predictable delays (Madden, Ewan, & Lagario, 2006). According to the delay discounting model, individuals that discount delayed rewards a high rate, such as pathological gamblers, perceive unpredictably delayed rewards to be more valuable than predictable rewards. An example of this would be individuals perceiving a gambling win as more valuable than a paycheck that is received every two weeks. This win would thus reinforce gambling even more.

Studies that have examined delayed discounting have uncovered interesting differences across subpopulations of humans. For instance, Green, Fry, and Myerson (1994) found that children discount delayed rewards more than college students, who discount the same rewards more than older adults. Such results are consistent with the perspective that an increase in the ability to exhibit self-control (i.e., delay gratification) comes with increasing age.

It is also thought that some variability in the rate of discounting among individuals can be accounted for by the person's temperament. It has been shown that extraverts discounted delayed rewards more steeply than did introverts and high impulsive individuals discounted more steeply than low impulsive individuals (Ostaszewski, 1996).

Reynolds (2006) did a review of the literature looking at delay discounting and pathological gambling. He identified five studies. Each study compared rate of delay discounting between gamblers and non gamblers, and one study looked at relations between pathological-gambling severity and rate of delay discounting.

The first study was published by Petry and Casarella (1999). In the study, three groups were compared: substance-abusing problem gamblers, substance-abusing nonproblem gamblers, and non-problem-gambling/non-substance-abusing controls. All the participants completed the question-based hypothetical delay-discounting measures for two different delayed standard amounts (\$100 and \$1,000). The authors found that substance-abusing, non-problem gamblers discounted significantly more than controls with both delayed monetary amounts. Substance-abusing problem gamblers also discounted more than controls with both delayed amounts, and they discounted more by delay than the substance-abusing, non-problem gamblers with the \$1000 delayed standard. An effect between the substance-abusing problem and non-problem gamblers was not present for delay discounting using the \$100 delayed standard. Reynolds (2006) stated that the pattern of these findings across groups suggests additional associations for delay discounting between substance abuse and problematic gambling.

In the five studies identified by Reynolds (2006), it was found that Petry (2001) replicated the above findings. Individuals were initially selected for a primary diagnosis of pathological gambling and were then subdivided into those with and without drug-use problems. In addition, a control group with no history of drug-use or gambling problems was included. The pathological gamblers without drug-use problems discounted more by delay than controls, and the pathological gamblers with drug-use problems discounted more by delay than pathological gamblers with no drug-use problems. Again, this finding suggests gambling and drug-use problems combine additively with delay discounting.

Reynolds (2006) found two studies that had inconsistent findings for the relationship between gambling behavior and delay discounting: Dixon, Marley, and Jacobs (2003); Holt, Green, and Myerson (2003). Dixon et al. (2003) found that gamblers discounted the value of monetary rewards more by delay than non gamblers on a hypothetical question-based measure. Holt et al., however, found that gamblers did not differ from non gamblers on a similar measure of delay discounting. Both studies used that South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) as an index of problem-gambling.

Reynolds (2006) found one more study that showed a relationship between problem-gambling severity and rate of delay discounting using a question-based hypothetical measure: Alessi and Petry (2003). Participants ranging in SOGS scores from 6 to 20 were divided into those with more extreme gambling problems (SOGS > 13) and less extreme gambling problems (SOGS < 13). The more-extreme gamblers discounted significantly more by delay than the less-extreme gamblers. This finding

provides evidence for a close link between rate of delay discounting and problem-gambling severity, similar to some relationships found between delay discounting and drug use.

However, evidence is mixed regarding whether pathological gamblers are impulsive, which appears a bit ironic considering pathological gambling is an impulse-control disorder in the DSM. This conclusion is because there tends to be disconnect between discounting and traditional ideas of “impulsivity.” There have been some studies demonstrating that gamblers score higher than control participants on personality inventories assessing impulsivity (Blaszczynski, Steele, & McConaghy, 1997), whereas there are other studies that have not found a difference between groups (Allcock & Grace, 1988). One reason for the discrepancy in the findings could be that impulsivity is a multidimensional construct. The number of dimensions vary from 2 (Eysenck, Pearson, Easting, & Allsop, 1985) to 15 (Gerbing, Ahadi, & Patton, 1987).

Measurement of Discounting

The most widely accepted form of discounting is a hyperbolic equation that is derived from the matching law (Davison & McCarthy, 1988):

$$V = A / (1 + kD)$$

Where V is the time-discounted value of the reward, A is the subjective present value, D is the total delay to delivery, and k is a discounting coefficient (Mazur, 1987). The constant, 1, is added in the denominator in order to ensure that the curve does not extend to infinity at very short intervals. A higher value of k is associated with steeper discounting.

Most studies employ an estimate of k as the primary criterion. However, there are a number of problems with using k as the criterion (Smith & Hantula, 2008). First, k is an appropriate measure index of discounting only in situations in which the obtained discount curve is accurately described by hyperbolic decay. Second, Myerson, Green, & Warusawitharana (2001) argued that by analyzing k values using traditional inferential statistics can be inappropriate because of extreme violations of normality in distributions of k that have been documented in the literature. Third, k values are highly heterogeneous across different types of commodities, and k can theoretically range from zero to infinity, making comparisons across studies hard.

Myerson et al. (2001) suggested *area under the curve* (AUC) as an alternative approach to delay-discounting data analysis. To calculate the area under the curve, we began by normalizing the delay and subjective value for each data point. That is, the subjective value divided by the actual, delayed amount. These normalized values are used as x coordinates and y coordinates, respectively, to construct a graph of the discounting data. Vertical lines are then drawn from each data point to the x axis, subdividing the graph into a series of trapezoids. The area under the empirical discounting function is equal to the sum of the areas of these trapezoids. The equation for the area of the trapezoids is: $x_2 - x_1 [(y_1 + y_2)/2]$. The steeper the discounting (i.e., the lower the subjective value of delayed rewards), the smaller the area under the curve. Because the x and y values are both normalized, the area under the curve can vary between 0.0 (steepest possible discounting) and 1.0 (no discounting).

The proposed area measure has several advantages. First, AUC is designed to handle multiple measurements across time, this allows for a more comprehensive picture

of how the value of delayed rewards changes across time. Second, the distribution of area measures, unlike distributions of estimates of the parameters, is not skewed. This means that one can use parametric statistics with area measures, whereas the parameter estimates require the use of nonparametric statistics. Also, unlike k values, AUC has an upper and lower boundary and has a limited range, which allows for domain comparisons using a common scale.

American Indians and Gambling

There seems to be a scarcity of information regarding gambling behaviors and compulsions among American Indians and their communities. The literature that exists suggests a high degree of correlation between alcoholism and the potential for gambling addiction (Zitzow, 1996). Unemployment, poverty, and depression also play a role in increasing gambling problems among American Indians (Zitzow, 1996). Due to these predisposing factors, there is the assumption that gambling would become problematic and occur at higher rates for American-Indian populations.

Petry (2005) also identified six known risk factors for pathological gambling. The most outstanding of these factors being substance use and abuse. The other factors include socio-economic status (SES), minority membership, gender, age, and marital status. So, a young male who is Native American, who is poor, single, and an alcoholic, could potentially be at the highest risk for becoming a pathological gambler.

Although these risk factors are known to be associated with pathological gambling, the factors are not causal. An individual can speculate as to why each might be related to pathological gambling, but the true nature of the relationships has not been established. However, the Gambling Functional Assessment (GFA; Dixon & Johnson,

2007) does attempt to identify four potential consequences maintaining gambling behavior, which will be beneficial in the treatment of pathological gambling.

The availability of gambling opportunities is also a factor for American Indians. There are increased opportunities to gamble due to the fact that many American Indian tribes own and operate their own casinos. Currently, there are 233 tribes in 28 states that operate 411 gaming facilities (National Indian Gaming Association, 2009). These gaming facilities include casinos, bingo halls, and pull tabs. The relevant literature also indicates that the greater the time of exposure to gambling, the greater the addictive potential for individuals (Livingston, 1974)

Recent studies to date have indicated that veterans and American Indians may be prone to gambling problems. For instance, Westermeyer, Canive, Thuras, Thompson, Kim, Crosby, and Garrard (2008) found a significantly higher rate of pathological gambling among American-Indian veterans compared to Hispanic veterans. Their hypothesis that the highest rates of pathological gambling are observed in areas proximate to legalized gambling was supported. The American Indian rate of pathological gambling was 9.9%, with 9.8% in the southwest region and 10.0% in the north central region. Westermeyer et al. (2008) suggested that the role of access to gambling as an etiological factor in the development of pathological gambling.

According to Zitzow (1996), there are conditions that place American-Indian adults who live on a reservation at greater risk for problematic gambling behaviors than those who do not live on reservations. The first is low socioeconomic status. According to his study, individuals at the lowest level of income were at significantly greater risk than all other socioeconomic groups for developing problematic gambling behaviors.

The second is unemployment and lack of financial resources, American Indians may look for “quick fix” solutions to their money troubles by going after a “big win.” The third is exposure to gambling. American Indians who live within the reservation have had a longer, more intense, and recent legacy of exposure to modern gambling. This exposure was both directly and through exposure to gambling activities. American-Indian individuals are also exposed vicariously through other adults within the family.

The fourth is mental illness. For instance, depression may provide a pre-condition for gambling addiction among rural, reservation communities. Gambling is correlated with adverse health measures including alcohol and substance abuse/dependence and depression (Desai & Potenza, 2008). Gambling may then be used as a means to avoid or escape depression (Blaszcznski, Wilson, & McConaghy, 1986). However, Dannewitz & Weatherly (2007) did not find a difference in gambling between depressed and non-depressed participants.

The fifth is cultural factors or factors that are unique to American-Indian cultures that may lead those individuals closer to mystical or magical thinking. This magical thinking may more readily become generalized into acceptance of “fate” or “luck.” Also, traditional value systems might minimize material wealth which may allow one to waste money because the possession of money may not be that important anyway.

The sixth factor is that many American Indians are dependent on welfare systems and this may encourage them to look more to the opportunity for immediate need gratification associated with winning and less to the consequences of losing. Related to this is the seventh factor that there appears to be a cycle of “feast or famine” among American-Indian communities that is often observed in a monthly cycle and parallels the

availability of finances. Living “with” and later “without” may become an accepted norm and gambling addiction fits into this pattern that is often experienced by American Indian communities.

Eighth, American Indians have experienced a higher prevalence of historical trauma incidences, and because of this, may render them more apt to develop pathological gambling characteristics, related to trauma (Jacobs, 1989). The ninth condition is that a one’s low self-esteem that is experienced may be easily boosted by the “high” that one experiences from winning.

The tenth condition that may put American Indians at risk is the fact that there are limited social/recreational options within rural reservation communities which makes casinos that much more appealing to individuals. Gambling provides secondary social benefits that an individual may crave. The eleventh condition according to Zitzow (1996) is a general theory of addiction that supports the notion that maladaptive behaviors that can exist in the family environment (Jacobs, 1989; e.g., alcoholism, food addiction, sexual addiction) may be generalized to the maladaptive and addictive behaviors associated with gambling.

Social-learning theory suggests that individuals learn, model, and maintain behaviors that are observable and reinforced. Cultural beliefs and values are passed on to family members or other members of an individual’s cultural group often through learning and modeling. Values and beliefs can also be passed on indirectly to members. Values that are passed on indirectly are done by showing approval and/or tolerance of behaviors and by sharing historical stories or myths that show approval and/or tolerance. Raylu and Oei (2004) suggested that it is possible that members of a collectivistic culture

may have greater influence on members' behavior than members of an individualistic cultural group. These variables may all promote acceptance and maintain gambling behavior within American Indian communities.

Studies are now being conducted that look at gambling differences between American Indians and non Indians. Abbott and Volberg (1996) conducted a study comparing gambling behaviors between American Indians and non Indians. They found that regular participation in gambling, young age, unemployment, and low educational attainment have all been shown to be strong predictors of problem gambling in the general population. They suggested that further studies should be done to determine to what extent higher prevalence rates among American Indian populations are a consequence of these factors rather than other factors more specifically related to cultural differences.

Cozzetto and LaRocque (1996) conducted a case study of two American Indian tribes in North Dakota – the Devils Lake Sioux of the Fort Totten reservation and the Chippewa of the Turtle Mountain reservation. Both reservations owned and operated a casino on reservation land. The authors compared the rates of pathological gambling activity in the American-Indian population to the rates in the general population of North Dakota, as well as to the rates for the general population of Fort Totten, North Dakota and Belcourt, North Dakota. Results showed that the general population of North Dakota displayed pathological gambling at a rate of 6%. The rate for Fort Totten's general population was 14%. It was 29% for the Sioux. The rate of problem gambling for Belcourt's general population was 10%. It was 23% for the Chippewa. This study

indicated a significant difference in problem gambling behavior in the American-Indian population in comparison to the rates in North Dakota's general population.

Contrary to the studies that have shown a difference in American Indian and non Indian gambling habits, several studies have failed to find that gambling differs between American Indians and non Indians when studying gambling in a laboratory situation. Gillis, McDonald, and Weatherly (2008) studied the gambling behavior of American Indian and non Indian participants who were high or low sensation seekers. Participants played a slot-machine simulation in three different sessions, across which the simulation paid out at three different rates. No differences were found in gambling behavior between American Indians and non Indians.

Similarly, McDougall, McDonald, and Weatherly (2008) had non-pathological American Indian and non Indian participants play a slot-machine simulation in the presence or absence of an American Indian or non Indian confederate. Again, no significant differences were observed in the gambling behavior of the American Indian and non Indian participants, nor were there significant differences in how they were influenced by the presence or actions of the confederate.

Whitton and Weatherly (2009) had American Indian and non Indian participants gamble on a slot-machine simulation and video poker. American Indian participants played fewer poker hands than non Indians. Although there was not a difference on most measures between American Indian participants and non Indian participants, when a difference was found, the American Indian participants played fewer hands, but they bet just as much.

These studies would suggest that ethnicity is not directly related to the high rates of pathological gambling. Because all three results represent the null, interpretation is difficult. However, it would seem to be consistent with the speculation that other factors on the reservation are playing a role in pathological gambling. Another possibility is that cultural factors, such differences in beliefs and norms, may influence a person's gambling habits. Yet another possibility is that other intervening factors such as drug use or socioeconomic status, which are also related to both ethnic minority status and pathological gambling, account for the increase in prevalence rate among American Indians (Petry, 2005).

Biculturalism

The concept of biculturalism remains both obscure and universally accepted as important by cross-cultural researchers interested in minority populations (McDonald, Morton, & Stewart, 1993). Biculturalism is believed to be an important concept when it comes to understanding an individual's level of understanding, acceptance, and psychological well-being (Lafromboise, Coleman, & Gerton, 1993; McDonald et al., 1993; Oetting & Beauvais, 1990). Accordingly, the more bicultural one is, particularly an ethnic minority group member, the better one can relate to, and feel more competent in both cultural realms.

Oetting and Beauvais (1990) proposed the Orthogonal Theory of Biculturalism, which has become widely accepted. The theory suggests a member of one culture attains some degree of cultural competence not only in his or her own culture, but also in another (majority) culture. This degree of cultural competence in more than one culture reflects the individual's bicultural competence, or *Biculturalism*. The two dimensions of cultural

competence are proposed to be unrelated, or orthogonal. Others further suggest that higher degrees of Biculturalism are positively correlated with increased mental health and other life-successes (Lafromboise, 1988).

According to the Orthogonal Theory of Biculturalism, an individual's level of bicultural identification may be defined within one of four quadrants. The first quadrant, *Bicultural*, would define an individual displaying cultural competence in both cultural domains. The second quadrant, *Traditional*, is reserved for individuals displaying high degrees of cultural competence in their culture of origin, but low degrees of cultural competence in another. The third quadrant, *Marginal*, defines an individual with low cultural competence in both realms. The fourth quadrant, *Assimilated*₂, is reserved for those displaying high cultural competence in their adopted culture and low competence in their culture of origin.

Raylu and Oei (2004) suggested that in relation to acculturation or biculturalism, problem gambling could be attributed to two processes. It is possible in one process that problem gambling is attributable to a successful acculturation process or to a person successfully adapting to a culture that has a high acceptance and practice of gambling. Problem gambling could also be attributed to problems with the acculturation process, in other words, difficulties adapting to the new culture. The authors stated that both of these processes have played a role in development and maintenance of mental-health problems and could also possibly play a role in development and maintenance of problem gambling.

Measurement of Biculturalism

Northern Plains Biculturalism Inventory (NPBI): Allen and French (1994) created a scale measuring biculturalism among Northern Plains American Indians derived from Lafromboise, Gerton, and Coleman's (1993) alternation model of biculturalism and Oetting and Beauvais' (1990) orthogonal theory of cultural identification. The 30-item NPBI assesses areas of social behavior related to attitudes, beliefs, worldviews and acculturation relative to Northern Plains American Indian culture and European American Midwestern culture. The authors identified three factors within the NPBI including American Indian Cultural Identification (AICI), European American Cultural Identification (EACI), and Language. Reliability and construct validity of the NPBI have been called into question. Baker (2005) attempted to analyze the factor structure and validity of the NPBI and developed subsequent validation of a new scale based on the information rendered from the analysis.

Northern Plains Biculturalism Inventory-Revised (NPBI-R): Baker (2005) improved upon this inventory by developing a presumably more valid and reliable instrument that was more efficient in measuring cultural identification among Northern Plains American Indians. The NPBI-R consists of twenty-items. The two factors or subscales are American Indian Cultural Identification (AICI) (subscale 1) and European American Cultural Identification (EACI) (subscale 2). Scores are analyzed for the subscales thereby providing information about one's level of identification with American Indian culture in the Northern Plains region. A low score on the AICI scale and a high score on the EACI indicate European American Cultural Identification. A high score on the AICI scale along with a low score on the EACI scale indicates

American Indian Cultural Identification on the dimensions of cultural immersion. If both AICI and EACI score are above the median, the individual is identified as bicultural and, if both scores are below the median, the individual is identified as marginal (Baker, 2005).

Present Study Hypotheses

For the present study, I recruited 200 participants. The sample consisted of 50 American Indian individuals recruited from Spirit Lake Indian reservation who were attending college at Little Hoop Community College (Cankdeska Cikana), 50 American Indian individuals from the Turtle Mountain Indian reservation who were attending college at Turtle Mountain Community College, 50 American Indian individuals from the University of North Dakota (UND) and 50 non-Indian individuals from the UND.

The following hypotheses were made based on prior research. The first hypothesis was that American Indian participants from the reservation sample would have higher SOGS scores than participants from UND. Factors such as low SES, unemployment, increased alcohol use, depression, historical trauma, and lack of social alternatives are thought to have an influence on the prevalence of gambling problems within the American Indian communities (Zitzow, 1996). This prevalence of gambling problems will be reflected by the higher scores on the SOGS, which is an instrument designed to identify pathological gambling.

It was also predicted that because American Indians from the reservation sample would have higher SOGS scores, that this sample will also discount more steeply. This hypothesis was made based on research by Alessi and Petry (2003). Their study found a relationship between rate of delay discounting and problem-gambling severity.

Specifically, that the more-extreme gamblers discounted significantly more by delay in comparison to the less-extreme gamblers.

Because it is thought that there are other intervening factors such as drug/alcohol use, SES, lack of social alternatives that are related to ethnic minority status and pathological gambling, it was further predicted that American Indians from the reservation sample would have higher GFA Escape scores compared to UND participants. Hand (1998) suggested that pathological gamblers engage in gambling in order to avoid or reduce unbearable mental states. The action of gambling is used as an avoidance mechanism.

It was further predicted that UND American Indian participants would be more bicultural than American Indian participants from the reservation sample. Raylu and Oei (2004) stated that problem gambling could be attributed to problems with the acculturation process. Difficulties with the acculturation process have played a role in development and maintenance of mental-health problems and could also possibly play a role in development and maintenance of problem gambling.

CHAPTER II

METHODS

Participants

The sample consisted of 50 American Indian individuals recruited from Spirit Lake Indian reservation who were attending college at Little Hoop Community College (Cankdeska Cikana), 50 American Indian individuals from the Turtle Mountain Indian reservation who were attending college at Turtle Mountain Community College, 50 American Indian individuals from the University of North Dakota (UND) and 50 non-Indian individuals from the UND. Total sample was 200 individuals. All participants were asked to first read and sign the informed consent sheet. After the informed consent, American Indian participants were asked to complete the demographic sheet, SOGS, NPBI-R, GFA, DD task, and SSS-V. Non-Indian participants were asked to complete the demographic sheet, SOGS, GFA, DD task, and SSS-V. After all assessments were completed, participants were compensated for their time with \$5.00. Participants recruited from UND were compensated for their time with extra credit for their psychology class.

Materials

All participants were given an informed consent and administered the following assessment measures: a) Demographic Questionnaire, b) the South Oaks Gambling

Screen, c) the Northern Plains Biculturalism Inventory-Revised, d) Gambling Functional Assessment, e) Delay Discounting task, and f) Sensation Seeking Scale, form V (SSS-V).

Informed Consent

Participants' identities in this study were anonymous. The participants were coded numerically on the informed consent form and databases. Forms were secured and maintained in the Indians in Psychology Doctoral Education (INPSYDE) program office to ensure security and confidentiality. Potential risks and benefits were listed on the form. It was also explained to the participants' that their participation was to be completely voluntary and they were free to withdraw at any time without consequence.

Demographic Page

The items on the demographic page assessed the participants' background, age, gender, education, and tribal affiliation. The variables were examined to provide information about the sample.

Northern Plains Biculturalism Inventory-Revised (NPBI-R)

The Northern Plains Biculturalism Inventory-Revised (NPBI-R: Baker, 2005) is a 20- item questionnaire that assesses an individual's cultural competence in either their culture of origin or the majority culture. American Indian Culture Identification (AICI) and European American Culture Identification (EACI) are the two subscales of the NPBI-R based on the Orthogonal Theory of Biculturalism (Oetting & Beauvais, 1990). All participants obtain a score on each subscale reflecting the degree to which they identify with the culture. A median-split procedure is used to determine high and low subscale scores on the NPBI-R. A high score on the AICI scale along with a low score on the EACI is suggestive of culture of origin immersion, while a low score on the AICI scale

and a high score on the EACI indicate European American Cultural Identification. If both AICI and EACI scores are above the median, the individual is identified as bicultural. If both AICI and EACI scores are below the median, the individual is identified as marginal. The NPBI-R is a reliable measure, accurately identifying an individual's cultural orientation of either American Indian ($\alpha=.85$) or European American Midwestern ($\alpha=.68$) culture (Baker, 2005).

South Oaks Gambling Screen (SOGS)

The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) is a 20-item scale derived from the psychiatric criteria for pathological gambling. The instrument has been found valid and reliable in identifying pathological gambling in clinical and general populations. Reliability of the scale for the general population is .69, while reliability for individuals seeking gambling treatment is .86. A score of 3 or more would indicate problem gambling and a score of 5 or more would indicate probable pathological gambling. A score of five or more in the SOGS has been shown to be a reliable indicator of pathological gambling behavior (Lesieur & Blume, 1987).

Gambling Functional Assessment (GFA)

The Gambling Functional Assessment (GFA; Dixon and Johnson, 2007) is a brief, 20-item, Likert-type response inventory designed to assess likely consequences that may be maintaining the respondent's gambling behavior. An overall score can be derived from the total of all 20 items, while four content scores (Sensory, Attention, Escape, and Tangible) are derived from the five unique items designed to assess each possible consequence. Respondents can endorse an item with a score of 0-6. Thus, the total score in any one content area can range between 0 and 30. Theoretically, the content area that

receives the highest cumulative score represents the primary consequence maintaining that person's gambling. Reliability statistics were derived from a large nonclinical sample with overall internal consistency (α) of .92 (N=949) and test-retest reliability of .74 (N=124) over a 12-week interval (Miller, Meier, & Weatherly, 2009). A factor analysis (Miller, Meier, Muehlenkamp, & Weatherly, 2009) indicated that the grouping of the twenty GFA items involved two factors. The first factor being suggestive of positive reinforcement functions, correlating highly with Sensory ($r = .79$), Tangible ($r = .84$) and Attention ($r = .85$) content scores, while the second reflected negative reinforcement functions, correlating highly ($r = .95$) with the Escape content score. The two factors did not correlate with one another ($r = .06$).

Delay Discounting Task

Delay discounting measures the relative value of immediate versus delayed rewards. The task will employ a fill-in-the-blank method. Fill-in-the-blank tasks present participants with a hypothetical reward scenario in which the rewards will become available after various delay periods. The procedure asks the participant to indicate for each delay period the equivalent present value of some larger-later reward. The participant would be asked to specify a smaller amount of money that would be as desirable as the larger-later amount if it were delivered immediately instead of after the proposed delay period. The fill-in-the-blank method is more feasible time-wise. It only takes a fraction of the time to gather the information in comparison to a binary-choice method. Another benefit is the minimization of respondent fatigue effects.

One way to analyze delay-discounting data is to calculate the area under the curve (AUC) created by the indifference points across the different delays using the following equation (Myerson, Green, & Warusawitharana, 2001):

$$x_2 - x_1 [(y_1 + y_2)/2] \text{ (Equation 1)}$$

The measure of temporal discounting in Equation 1 is the result of summing the AUC across the trapezoids calculated across the different delays. The result is a proportion that can vary between 0.0 and 1.0. Small AUC values represent steep discounting of that outcome (i.e., a willingness to take a small amount of the outcome rather than waiting); large AUC values represent little discounting of that outcome (i.e., a willingness to wait for the full amount). Again, it is important to note that AUC measures discounting across all of the tested delays and summarizes discounting as a single value. As noted above, this conversion is typical within the field because delay discounting is considered a process, not a single decision at any given delay.

Zuckerman's Sensation Seeking Scale, Form V (SSS-V)

The Sensation Seeking Scale (SSS: Zuckerman, 1994) is a 40-item forced-choice questionnaire ($r = .86$) and produces four subscales in addition to the total score: Thrill and Adventure Seeking (TAS) associated with a tendency to engage in sports or physically dangerous pursuits; Experience Seeking (ES) involving changes in life-style and stimulation of the mind; Disinhibition (Ds) marked by outgoing social behaviors; and Boredom Susceptibility (BS) characterized by an instability to tolerate repeated experiences and monotony.

Procedure

Approval was first secured from the Institutional Review Board (IRB). Upon IRB approval, primary recruitment efforts began by identifying public institutions as well as local events in recruitment areas. Permission was sought by these institutions within their facilities. The principal investigator administered and collected the packets. Participants were assigned identification numbers which were attached to each part of the research packet to ensure proper and accurate coding during data analysis.

CHAPTER III

RESULTS

Sample Characteristics

There were a total of 200 participants in the study. There were 100 college students from UND: 50 American Indian, 50 non-Indian. There were 50 American Indian college students from the Turtle Mountain Community College located on the Turtle Mountain Indian reservation and 50 American Indian college students from Little Hoop Community College (Cankdeska Cikana) located on the Spirit Lake Indian reservation. Of the sample, 41% (83) were males and 58% (117) were females. Table 1 shows the mean age and GPA of the total sample.

Table 1. Means and Standard Deviations.

	Mean	Std. Dev
Age	25.2	8.4
GPA	3.01	.56

Data Analysis

There were four main hypotheses in the study. The first hypothesis was that American Indian participants from the reservation sample would have higher SOGS scores than American Indian participants from UND. Table 2 shows the mean SOGS

Table 2. SOGS Means and Standard Deviations.

SOGS	Mean	Std. Dev
UND AI	1.48	2.7
Tribal Colleges	1.92	2.4

scores as well as the standard deviations for the American Indian UND participants and the participants from the two tribal community colleges. Table 2 shows that the tribal-college participants did have higher SOGS scores than UND participants, but the difference was not large. To test the hypothesis, the SOGS scores were analyzed by conducting a univariate analysis of variance (ANOVA). SOGS scores were the dependent variable and on versus off reservation was the independent variable. Non-Indian UND participants were not included in the table or the analysis. A significant main effect was not found $F(1, 148) = 1.023, p = .314$, partial eta squared = .007. This result indicates that American Indian participants from the reservation sample did not have significantly higher SOGS scores than the American Indian participants from UND.

The second hypothesis was that because American Indians from the reservation sample would have higher SOGS scores than participants from UND, this sample would discount more steeply than the UND American Indian participants on the four different outcomes. Tables 3, 4, 5, and 6 shows the means AUC values, standard deviations, and sample sizes for each outcome that participants discounted. Higher AUC values represent less delay discounting than lower AUC values. To determine if American Indians from the reservation sample would discount more steeply, AUC scores were analyzed by

Table 3. Thousand Dollar AUC.

ThousandAUC	Mean	Std. Dev	N
UND AI	.66	.23	50
Tribal Colleges	.65	.29	100
UND non-AI	.67	.21	50

Table 4. Hundred Thousand AUC.

HunThousandAUC	Mean	Std. Dev	N
UND AI	.69	.30	50
Tribal Colleges	.55	.36	100
UND non-AI	.70	.27	50

Table 5. Body Image AUC.

Body Image AUC	Mean	Std. Dev	N
UND AI	.72	.19	50
Tribal Colleges	.68	.27	100
UND non-AI	.71	.17	50

Table 6. Medical Treatment AUC.

MedTrtAUC	Mean	Std. Dev	N
UND AI	.80	.14	50
Tribal Colleges	.75	.22	100
UND non-AI	.79	.13	50

conducting a series of ANOVAs on the AUC values for the different outcomes that were discounted and location of the participants. The main effect for the outcome of winning \$1000 was not significant. $F(1, 198) = .074, p = .786$, which would indicate that the \$1000 value was not discounted more steeply by the American Indian tribal college participants than the American Indians at UND. The main effect for the outcome of winning \$100,000 was not significant $F(1, 198) = .151, p = .698$, which would indicate that the \$100,000 value was not discounted more steeply by the tribal-college American Indian participants than the American Indian sample from UND. There was also not a significant main effect found for body image. $F(1, 198) = .734, p = .393$, which would indicate that body image was also not discounted more steeply by the tribal-college American Indian participants in comparison to the UND sample. There was a significant main effect found for medical treatment $F(1, 198) = 5.519, p = .020$. This significance would indicate that the participants from the UND sample were willing to wait longer for fully successful medical treatment compared to the reservation sample.

The third hypothesis was that American Indians from the reservation sample would have higher GFA Escape scores compared to UND participants. Tables 7, 8, 9,

and 10 show the means and standard deviations for each subscale of the GFA. A two-way (Location X Subscale scores) ANOVA was conducted on the four GFA subscales (Sensory, Attention, Tangible, and escape) and location of the participants (UND or reservation) to test the hypothesis. A significant main effect of location was found, $F(1, 148) = 4.654, p = .033$, partial eta squared = .031. This significance would indicate that scores on the GFA varied as a function of whether or not the participant attended UND. A significant interaction was also found $F(1, 148) = 57.030, p = .000$, partial eta squared = .280. Overall, a significant difference was found between subscales $F(1, 148) = 177.796, p < .001$, partial eta squared = .547. A follow-up univariate analysis was conducted on only Escape scores and a significant difference was found $F(1, 148) = 4.744, p = .031$, partial eta squared = .031. This significance would indicate that American Indian participants from the reservation did have higher GFA Escape scores compared to UND American Indian participants.

Table 7. GFA Sensory.

Sensory	Mean	Std. Dev
UND AI	5.3	5.2
Tribal Colleges	5.6	5.5
UND non-AI	8.4	6.5

Table 8. GFA Escape.

Escape	Mean	Std. Dev
UND AI	1.9	3.3
Tribal Colleges	3.6	4.8
UND non-AI	2.9	4.4

Table 9. GFA Attention.

Attention	Mean	Std. Dev
UND AI	8.4	6.8
Tribal Colleges	6.7	6.1
UND non-AI	14.1	8.2

Table 10. GFA Tangible.

Tangible	Mean	Std. Dev
UND AI	7.7	6.5
Tribal Colleges	7.1	6.8
UND non-AI	11.26	8.05

The fourth hypothesis was that UND American Indian participants would be more bicultural than American Indian participants from the reservation sample. Tables 11 and 12 show the mean scores and standard deviations for the EACI and AICI subscales. To test this hypothesis, a two-way (Location X Subscale scores) ANOVA was conducted. A significant main effect was found for whether or not the American Indians attended UND, $F(1, 148) = 264.821, p = .001$, partial eta squared = .641. This significance would indicate that on both the EACI and AICI, UND participants scored significantly higher than non-UND participants. A significant interaction was not found $F(1, 148) = .893, p = .346$, partial eta squared = .006. There was a significant main effect of subscale found $F(1, 148) = 288.726, p = .001$, partial eta squared = .663. This result indicates that participants scored higher on the AICI than on the EACI.

Table 11. EAIC Means and Standard Deviations.

EAIC	Mean	Std. Dev
UND	23.56	3.35
Tribal Colleges	21.86	4.82

Table 12. AICI Means and Standard Deviations.

AICI	Mean	Std. Dev
UND	41.58	12.16
Tribal Colleges	37.98	10.13

Table 13. SSS-V Boredom.

SSBoredom	Mean	Std. Dev
UND	2.32	1.58
Tribal Colleges	2.55	1.74

Table 14. SSS-V Disinhibition.

SSDisinhibition	Mean	Std. Dev
UND	3.58	2.05
Tribal Colleges	3.97	2.33

Table 15. SSS-V Experience Seeking.

SSExperienceSeeking	Mean	Std. Dev
UND	5.94	2.05
Tribal Colleges	5.11	2.02

Table 16. SSS-V Thrill and Adventure Seeking.

SSTAS	Mean	Std. Dev
UND	6.8	2.68
Tribal Colleges	6.28	2.93

There was no specific hypothesis made related to sensation seeking. However, analyses were conducted to see if there was a difference between American Indian UND participants and participants from the reservation. There was a significant main effect found for the subscales $F(1, 148) = 335.254, p < .001$, partial eta squared .694. Univariate analyses were conducted on each of the four subscales. There was not a significant main effect found for the Boredom Susceptibility scale $F(1, 148) = .613, p = .435$, partial eta squared .004. There was not a significant main effect found for Disinhibition $F(1, 148) = 1.007, p = .317$, partial eta squared = .007. There also was not a significant main effect found for Thrill and Adventure Seeking $F(1, 148) = 1.106, p = .295$, partial eta squared = .007. There was a significant main effect found for Experience Seeking $F(1, 148) = 5.530, p = .020$, partial eta squared = .036. This significance suggests that the only subscale that the participants differed on was the Experience Seeking subscale and that UND participants scored higher on this subscale in comparison to non-UND participants.

CHAPTER IV

DISCUSSION

The present study was undertaken to address four main hypotheses about delay discounting among American Indian college students who attended community colleges on two reservations in North Dakota and American Indian and non-Indian college students at UND. The first hypothesis was that American Indian participants from the reservation sample would have higher SOGS scores than American Indian participants from UND. The second hypothesis was that because American Indians from the reservation sample would have higher SOGS scores, this sample would also discount more steeply. It was predicted that American Indians from the reservation sample would have higher GFA Escape scores compared to UND participants. It was further predicted that UND American Indian participants would be more bicultural than American Indian participants from the reservation. These predictions were based on past research. However, not all of the hypotheses were supported.

The first hypothesis that American Indian participants from the reservation sample would have higher SOGS scores than participants from UND was not supported. Based on past research, it is thought that American Indians are exposed to certain factors on the reservation that would predispose them to higher rates of problematic gambling such as unemployment, poverty, and depression (Zitzow, 1996). Other risk factors such as substance abuse and minority membership (Petry, 2005) are thought to also play a

contributing role in a person being more susceptible to problem gambling. Further, proximity to a casino is thought to be a contributing factor for higher rates of pathological gambling (Westermeyer et al., 2005). Still further, young adults are also thought to be at high risk for pathological gambling (Abbott & Volberg, 1996). However, a difference was not found in this study.

One explanation for not finding a difference may be due to the fact that the participants in the sample were college students and were recruited on the community college campuses. Perhaps a better indicator of problem/pathological gambling rates would be to use a sample taken from the community and not limit the study to only college students. By expanding where the sample is recruited from (on-campus vs. off-campus) the participants may be more representative of the general population in that area (i.e., their respective reservation or university).

A second explanation for not finding a difference may be because the SOGS was not a sensitive enough instrument to truly measure differences that do exist. A study conducted by Fortune and Goodle (2010) found that another instrument, Diagnostic Interview for Gambling Severity (DIGS), was a better screen for research purposes, specifically in a college student population. This instrument could possibly be used in future studies. However, the SOGS is currently the most widely used instrument and that was the reason the SOGS was administered in this study.

Third, Abbott and Volberg (1996) explained that not just young age, but also unemployment and low educational attainment combined would be sound predictors for pathological gambling, however, this sample recruited from colleges which may account for some of the reason that there was not a significant finding. A fourth explanation for

not finding a difference may be that a difference does not exist between the college students at the tribal community colleges and UND.

The second hypothesis was only partially supported. Statistical significance was not found for discounting of the hypothetical outcomes of \$1,000, \$100,000, or body image. This non-significance would suggest that American Indian participants from the reservation did not discount the above mentioned three outcomes more than the UND American Indian participants. However, there was a significant effect found for medical treatment. This statistical significance would suggest that these individuals would discount more steeply when it comes to their health. In other words, the person would wait longer for good medical treatment.

One reason that a difference may not have been found for the three factors is perhaps because the participants were answering a questionnaire. In another context, such as gambling, more cues are provided to the participant and could be a better estimate of a person's discounting behavior. American Indians differ from non-Indians in many areas related to health and mental health, including substance abuse, pathological gambling, and psychopathology (McDonald & Chaney, 2003). Research has also shown that delay discounting differs as a function of disorders such as pathological gambling (Dixon et al., 2003) and substance abuse (Petry, 2001). One would have expected to find a difference given past research findings. However, given that there was not a difference found with each of the three hypothetical outcomes, the results would suggest that the higher rates of pathology among the American Indian population on the reservations is likely an outcome of some other factors. These results also show that American Indian

participants in this study place different values on different outcomes in comparison to the non-Indians.

A second reason a difference was not found could be attributed to the fact that the participants in this study were not problem or pathological gamblers. SOGS scores were analyzed and there was not a difference found between the UND sample and the reservation sample. According to the literature, individuals who are pathological gamblers tend to discount hypothetical rewards more steeply than do individuals who do not gamble pathologically (Dixon, Marley, & Jacobs, 2003). The lack of significant findings with this particular study suggests that delay discounting does not vary as a function of culture or ethnicity. Similar rates of delay discounting were found between American Indians and non-Indians in this study.

A study conducted by Weatherly and McDonald (2010) found similar results. Their study examined delay discounting between American Indians and non-Indian college participants. The two different groups of American Indian participants completed discounting tasks on a set of five outcomes (hypothetical money rewards, cigarettes, perfect partner, and ideal body image). The results of their study showed that the only difference that was found between American Indian and non-Indian participants was that American Indian participants discounted an ideal body image significantly less than did a matched non-Indian sample, suggesting that this outcome had a greater value for the American Indian participants than for the non-Indian participants. This finding would suggest that the higher rates of pathology and disordered behavior among American Indian populations are more than likely the outcome of other factors not directly related

to decision-making characteristics. These other factors could include SES, degree of biculturalism, education, etc. or a combination of factors.

Because of the risk factors mentioned above (unemployment, substance abuse, minority membership, etc.) it was hypothesized that American Indians from the reservation sample would have higher GFA Escape scores compared to UND participants. In a sense, there are more things to “escape” from on the reservation in comparison to living in Grand Forks, ND. This hypothesis was supported. This outcome would suggest that the American Indian participants recruited for my study are gambling in order to escape, avoid, or reduce unbearable mental states (Hand, 1998). Escape gamblers are often times depressed or anxious and use gambling to numb or cheer themselves (Ladoucer et al., 2002).

According to Jacobs’ (1986) addictive behavior patterns result when people use a substance or activity to modify their arousal level so that they can escape from their reality. Jacobs (1986) suggested that people will occasionally use substances and/or activities to control mood states (e.g., alcohol, coffee, sport), however, a problem gambler may come to rely on gambling to maintain their desired mood or arousal level. Nower, Derevensky, and Gupta (2004) suggested that gambling may be used as an alternative method of coping and that some will use gambling to distract themselves from having to deal with problems they are facing in their lives. They also purported that when the gambling behavior ends, the person is faced with the prospect of dealing with those re-occurring problems (Nower et al., 2004).

These studies suggest that problem gamblers may use gambling as a means of coping with everyday stressors, so, they cope by using gambling as a means of altering

their arousal levels and mood states. Looking at it from this angle, gambling may at times help them to escape from their everyday lives and/or problems. Wood and Griffiths (2007) conducted a study that investigated escape as a coping strategy for problem gamblers. They reported that their study was in accordance with Jacobs' (1986) theory in which the participants used gambling as a means to alter their mood states to the point where they could escape from their reality and/or problems (Wood & Griffiths, 2007). For some of the problem gamblers in their study they found that the arousal of gambling was secondary to the need to fill a void in their lives created either through boredom or a lack of social alternatives (Woods & Griffiths, 2007). The authors suggested that these gamblers used escape strategies (i.e., gambling) to not really avoid negative mood states, but as a way to socialize and fill the void. Further, some other gamblers in their study used gambling as a way to deal with everyday problems and responsibilities-avoid non-gambling problems through gambling behavior (Woods & Griffiths, 2007).

Because the first hypothesis of this study was not supported and problem gamblers were not specifically recruited, one can only speculate as to why the reservation sample had higher GFA Escape scores. However, it is reasonable to assume that the above mentioned studies provide valid reasons why the reservation sample had higher GFA Escape scores. First of all, due to the fact that there is a high rate of depression and substance abuse on reservations, Jacobs' (1986) theory would provide reason as to why the reservation sample would score higher. It could be suggested that some individuals on the reservation are using gambling as a means to alter their arousal level as a way to escape from their reality. These same individuals will come to rely on gambling to

maintain these desired moods or arousal levels. Second, there is a lack of social alternatives on the reservation. Due to this lack of alternatives, individuals on the reservation may be using gambling as a way to fill a void that was created through either boredom or a lack of social interaction. Third, gambling may be used as a coping strategy for some individuals on the reservation. Gambling may be a way to deal with everyday problems and responsibilities. This study showed that even though there was not a difference in gambling pathology with these participants, American Indians from the reservation sample are at a higher risk for developing pathological gambling.

The hypothesis that UND American Indian participants would be more bicultural than American Indian participants from the reservation was supported, in a sense. In this case, UND American Indian participants scored statistically higher on the two subscales of the NPBI-R: EACI and AICI. Scores are analyzed for each subscale for each participant, which provides information about the person's identification with the American Indian culture and the European American culture. This finding would not be surprising. Participants at UND are not living on the reservation and are in a sense removed from some of the traditions that takes place on a reservation and there is a need to incorporate more of the majority culture lifestyle while they are attending UND. By doing so, the person becomes more bicultural and will feel more competent in both cultures (McDonald et al., 1993): American Indian culture and non-Indian (majority) culture. On the flip side, if a person was not bicultural, it is suggested that they may have an increase in mental health related problems and decrease in other life-successes (Lafromboise, 1988).

Although the participants from the reservation in this study did not statistically have higher levels of problem gambling scores on the SOGS in comparison to the UND sample, the reservation sample did have higher GFA Escape scores. These higher GFA Escape scores would put them at a higher risk for developing problem gambling. Raylu and Oei (2004) suggested that problem gambling is related to a person's level of biculturalism through two processes. One possibility is that problem gambling is attributable to a person's successful acculturation process or successful adaptation to a culture's high acceptance and practice of gambling. The second process would be more likely for this study's participants, difficulties adapting to a new culture. So, the participants from the reservation sample may be having a more difficult time adapting to an environment that is in a sense new to them-the casino environment where gambling is now a common practice on the reservation. Add lower levels of biculturalism to the problems already prevalent on the reservation such as substance abuse problems, low SES, lack of social alternatives, mental health problems, and unemployment rates and one could speculate that a person is at a higher risk for developing problem gambling on the reservation.

A specific hypothesis was not made regarding sensation seeking for this study. However, data were collected using the Sensation Seeking Scale-V. Zuckerman (1979) suggested that a person's arousal level plays an important role in maintaining gambling activity. The general trait of sensation seeking is composed of four components (Rosenbloom, 2003): the first component is Thrill and Adventure Seeking (TAS), which relates to attraction to thrill and dread; the second is Experience Seeking (ES), which relates to the aspiration to undergo a variety of novel and unconventional experiences; the

third is Disinhibition (Dis), which relates to loss of self-control; and the fourth is Boredom Susceptibility (BS), which relates to intolerance toward monotonous, repetitious or predictable people and events.

Sensation-seeking behaviors are often attributed to extraverted and impulsive individuals. High sensation seekers need more stimulation to maintain an optimal level of arousal, while low sensation seekers manage themselves better in relatively less stimulating settings. Zuckerman (1979) suggested that gambling is a form of sensation seeking “in which individuals risk loss of money for the positive reinforcement produced by states of high arousal during the period of uncertainty, as well as the positive arousal of winning” (pg. 69). So the risk and uncertainty that are associated with betting along with the potential of winning or losing one’s money can be highly arousing.

This study found significant results for the American Indian sample for one component of the SSS-V: Experience Seeking. Experience Seeking relates to the drive to undergo a variety of interesting and unique experiences. Statistics were not conducted for the non-Indian sample. This significance would suggest that this sample of American Indians is searching for interesting experiences. For the UND American Indian sample moving to Grand Forks and attending UND may be the interesting experience they are looking towards experiencing. The reservation sample, on the other hand, is looking for and finding other ways to aspire towards unique experiences. For the reservation sample, this Experience Seeking component may be related to the GFA Escape scores. The participants in this sample may be looking for something to fill the void and avoid monotony. However, the Boredom Susceptibility component did not reach significance so one can only speculate.

There were some limitations to this study. The most obvious limitation being that the participants were not able to make “real” decisions, but instead answered a questionnaire about various delayed outcomes. If given the actual opportunity to choose between the options from the questionnaire, one would suspect that the participants’ responses would be different. Without participants having the sense that they are making “real” decisions, one cannot safely say that the way the participants answered would actually be the case if they were making “real” decisions.

There is also the limitation of using a college sample. A future study would recruit participants from the general population both on and off the reservation. That way the results would better reflect gambling and discounting behavior among American Indians and non-Indians both on and off the reservation.

This study did have strengths as well. The most prominent strength of the study was the large sample size. This study had 200 participants. Of the 200 participants, 100 participants were from two reservations. With this size of a sample, one would expect to find differences if differences did exist.

Another strength of this study is the fact that it is the only study found that examined college participants’, both on and off the reservation, delay discounting behavior. Future research may want to look at expanding the number of studies that focus on American Indians who live on the reservation and delay discounting. It would also be important for these studies to diversify the sample and not limit the sample to just community colleges.

Cross-culturally, there needs to be a lot more research conducted within the American Indian population, gambling behavior, and discounting behavior. This

research needs to be conducted to address the issue of problem gambling on the reservation. There were few differences found between American Indians (on and off the reservation) and non-Indians that it calls into question the real reason for the high problem/pathological gambling rates on the reservation.

The findings of this study support the need for further research within the American Indian population on reservations. Specifically because there were not differences found between American Indian participants from the reservation and American Indian participants from UND. The only difference found was that American Indian participants from the reservation were less likely to wait for better health care. However, this difference perhaps reflects a part of what is termed “historical trauma” within American Indian culture. A part of that historical trauma relates back to the Indian Health Service (IHS) and the possible reason why American Indians from the reservation were less likely to wait for better health care.

There has been a cycle that has been perpetuated for many, many years where American Indians had to take what they were given. This cycle has been ongoing up until now and will continue until something within the tribes or the system changes. Healthcare has been one of the “benefits” offered to American Indians through IHS. However, IHS is severely underfunded by the government. There are currently individuals in administrative positions attempting to alleviate this problem, but it is definitely a struggle to secure enough funding to provide appropriate services. For many American Indians, especially those on reservations, IHS is the only form of healthcare, be it physical or mental. Not many individuals on the reservations have the resources to travel to a city where better healthcare would be provided. Nor do many have any other

form of healthcare insurance besides what is provided through IHS. The system provides what it can, but at the same time debilitates many American Indians. This study found that participants in the reservation sample were less likely to wait for better healthcare and this is possibly a reflection of the perpetuated cycle that is experienced daily on reservations.

Future studies need to focus on how systems are functioning within tribes. These studies would include, but not limited to mental/physical healthcare and substance abuse/gambling treatment programs. The high GFA Escape scores for American Indians within this study show that this population is at a high risk for pathological gambling. However, the lack of findings for three of the delay discounting outcomes add support to the fact that there are other issues playing a role in the development and maintenance of problem gambling and other mental health disorders.

REFERENCES

- Abbott, M. W., & Volberg, R. A. (1996). The New Zealand National survey of Problem and Pathological Gambling. *Journal of Gambling Studies, 12*, 143-160.
- Ainslie, G., & Haslam, N. (1992). Hyperbolic discounting. In G. Lowenstein & J. Elster (Eds.), *Choice over time* (pp. 57-92). New York: Russell Sage.
- Alessi, S. M., & Petry, N. M. (2003). Pathological gambling severity is associated with Impulsivity in a delay discounting procedure. *Behavior Processes, 64*, 345-354.
- Allen, J., & French, C. (1994). *Northern plains biculturalism inventory: A preliminary manual*. Unpublished manual available from the authors. University of South Dakota, Vermillion.
- Allcock, C. C., & Grace, D. M. (1988). Pathological gamblers are neither impulsive nor sensation seekers. *Australian and New Zealand Journal of Psychiatry, 22*, 307-311.
- Aluja, A., Garcia, O., & Garcia, L. F. (2003). Relationships among extraversion, openness to experience, and sensation seeking. *Personality and Individual Differences, 35*, 671-680.
- Anderson, G., & Brown, R. J. F. (1984). Real and laboratory gambling, sensation-seeking and arousal. *British Journal of Psychology, 75*, 401-410.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

- Baker, L. I. (2005). Bicultural identification among Northern Plains American Indians: Scale development and validation. Unpublished Master's thesis, University of North Dakota at Grand Forks.
- Bergh, C., Eklund, T., Sodersten, P., & Nordin, C. (1997). Altered dopamine function in pathological gambling. *Psychological Medicine, 27*, 473-475.
- Berns, G. S., Laibson, D., & Loewenstein, G. (2007). Intertemporal choice-toward an integrative framework. *Trends in Cognitive Science, 11*, 482-488.
- Blanco, C., Oresanz-Munoz, L., Blanco-Jerez, C., & Saiz-Ruiz, J. (1996). Pathological gambling and platelet MAO activity: a psychological study. *American Journal of Psychiatry, 153*, 119-121.
- Blaszczynski, A. P., Steel, Z., & McConaghy, N. (1997). Impulsivity in pathological gambling: The antisocial impulsivist. *Addiction, 92*, 75-87.
- Blaszczynski, A. P., Wilson, S. W., & McConaghy, N. (1986). Plasma endorphin levels in pathological gambling. *Journal of Gambling Behavior, 2*, 3-14.
- Blaszczynski, A. P., Wilson, S. W., & McConaghy, N. (1986). Sensation seeking and pathological gambling. *British Journal of Addiction, 81*, 113-117.
- Bratko, D., & Butkovic, A. (2003). Family study of sensation seeking. *Personality and Individual Differences, 35*, 1559-1570.
- Brown, R. (1986). Arousal and sensation-seeking components in the general explanation of gambling and gambling addictions. *International Journal of Addiction, 21*, 1001-1016.
- Caron, A., & Ladoucer, R. (2003). Erroneous verbalizations and risk taking at video lotteries. *British Journal of Psychology, 94*, 189-194.

- Coventry, K., & Brown, R. I. F. (1993). Sensation seeking, gambling, and gambling addictions. *Addiction, 88*, 541-554.
- Crean, J. P., de Wit, H., & Richards, J. B. (2000). Reward discounting as a measure of impulsive behavior in a psychiatric outpatient population. *Experimental and Clinical Psychopharmacology, 8*, 155-162.
- Custer, R. L. (1984). Profile of a pathological gambler. *Journal of Clinical Psychiatry, 45*, 35-38.
- Dannewitz, H., & Weatherly, J. N. (2007). Investigating the illusion of control in mildly depressed and nondepressed individuals during video-poker play. *The Journal of Psychology, 14*, 307-320.
- Davison, M., & McCarthy, D. (1988). *The matching law: A research review*. Hillsdale, NJ: Erlbaum.
- Desai, R. A., & Potenza, M. N. (2008). Gender differences in the associations between past-year gambling problems and psychiatric disorders. *Social Psychiatry and Psychiatric Epidemiology, 43*, 173-183.
- Dickerson, M. G. (1984). *Compulsive gamblers*. New York: Longman Group Limited.
- Dickerson, M., Hinchy, J., Legg England, S., Fabre, J., & Cunningham, R. (1992). On the determinants of persistent gambling behaviour on high-frequency poker machine players. *British Journal of Psychology, 83*, 237-248.
- Dixon, M. R., Marley, J., & Jacobs, E. A. (2003). Delay discounting by pathological gamblers. *Journal of Applied Behavior Analysis, 36*, 449-458.

- Eysneck, S. B. G., Pearson, P. R., Easting, G., & Allsop, J. F. (1985). Age norms for impulsiveness, venturesomeness, and empathy in adults. *Personality and Individual Differences, 6*, 516-619.
- Fortune, E. E. & Goodle, A. S. (2010). Comparing the Utility of a Modified Diagnostic Interview for Gambling Severity (DIGS) with the South Oaks Gambling Screen (SOGS) as a Research Screen in College Students. *Journal of Gambling Studies, 26*, 639-644.
- Gaboury, A., & Ladoucer, R. (1989). Erroneous perceptions and gambling. *Journal of Social Behavior and Personality, 4*, 411-420.
- Gerbing, D. W., Ahadi, S. A., & Patton, J. H. (1987). Toward a conceptualization of impulsivity: Components across the behavioral and self-reports domains. *Multivariate Behavioral Research, 22*, 357-379.
- Gillis, A., McDonald, J. D., & Weatherly, J. N. (2008). American Indians and non-Indians playing a slot-machine simulation: Effects of sensation seeking and payback percentage. *American Indian and Alaska Native Mental Health Research, 15*, 18-32.
- Green, L., Fry, A., & Myerson, J. (1994). Temporal discounting and preference reversals in choice between delayed outcomes. *Psychonomic Bulletin and Review, 1*, 383-389.
- Hand, I. (1998). Pathological gambling: a negative mood state model and its implications for behavioral treatments. *CNS Spectrums, 3*, 58-71.

- Holt, D. D., Green, L., Myerson, J. (2003). Is discounting impulsive? Evidence from temporal and probability discounting in gambling and non-gambling college students. *Behavior Process, 31*, 355-367.
- Jacobs, B. L. (1991). Serotonin and behavior: emphasis on motor control. *Journal of Clinical Psychiatry, 52*, 17-23.
- Jacobs, D. (1989). A general theory of addictions: A new theoretical model. *Journal of Gambling Behavior, 2*, 15-31.
- Kirby, K. N. (1997). Bidding on the future: Evidence against normative discounting of delayed rewards. *Journal of Experimental Psychology: General, 126*, 54-70.
- Kuley, N. B. & Jacobs, D. F. (1988). The relationship between dissociative-like experiences and sensation seeking among social and problem gamblers. *Journal of Gambling Behavior, 4*, 197-207.
- Ladouceur, R., Sylvain, C., Boutin, C., & Doucet, C. (2002). *Understanding and Treating the Pathological Gambler*. West Sussex, England: John Wiley & Sons, LTD.
- Lafromboise, T. D. (1988). American Indian mental health policy. *American Psychologist, 43 (5)*, 388-397.
- Lafromboise, T. D., Coleman, H. L. K., & Gerton, J. (1993). Psychological impact of biculturalism: Evidence and theory. *Psychological Bulletin, 114 (3)*, 395-412.
- Leopard, D. (1978). Risk preference in consecutive gambling. *Journal of Experimental Psychology: Human Perception and Performance, 4*, 521-528.

- Lesieur, H. R. & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144*, 1184-1188.
- Lesieur, H. R., & Blume, S. B. (1993). Pathological gambling, eating disorders, and the psychoactive substance use disorders. *Journal of Addictive Diseases, 12*, 89-102.
- Lesieur, H. R., & Custer, R. L. (1984). Pathological gambling: Roots, phases, and Treatment. *Annals of the American Academy of Political and Social Sciences, 474*, 146-156.
- Livingston, J. (1974). *Compulsive gambling: Observations on action and abstinence*. New York, NY: Harper Torchbooks.
- Madden, G. J., Ewan, E. E., & Lagario, C. H. (2006). Toward an animal model of gambling: Delay discounting and the allure of unpredictable outcomes. *Journal of Gambling Studies, 23*, 63-83.
- Mazur, J. E. (1987). An adjusting procedure for studying delayed reinforcement. In M. L. Commons, J. E. Mazur, J.A. Nevin, & H. Rachlin (Eds.), *Quantitative analysis of behavior: Vol. 5. The effect of delay and intervening events on reinforcement value*. (pp. 55-73). Hillsdale, NJ: Erlbaum.
- McClure, S. M., Laibson, D. I., Loewenstein, G., & Cohen, J. D. (2004). The grasshopper and the ant: Separate neural systems value immediate and delayed monetary rewards. *Science, 306*, 503-507.
- McDaniel, S. R., & Zuckerman, M. (2003). The relationship of impulsive sensation seeking and gender to interest and participation in gambling activities. *Personality and Individual Differences, 35*, 1385-1400.

- McDonald, J. D., Morton, R., & Stewart, C. (1993). Clinical concerns with American Indian patients. *Innovations in Clinical Practice: A Source Book*, 12, 437-454.
- McDougall, C. L., McDonald, J. D., & Weatherly, J. N. (2008). The gambling behavior of American Indian and non-Indian participants: Effects of the actions and ethnicity of a confederate. *American Indian and Alaska Native Mental Health Research*, 14, 59-74.
- Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106, 3-19.
- Miller, J. C., Meier, E., Muehlenkamp, J., & Weatherly, J. N. (2009). Testing the construct validity of Dixon and Johnson's (2007) Gambling Functional Assessment. *Behavior Modification*, 33, 156-174.
- Miller, J. C., Meier, E., & Weatherly, J. N. (2009). Assessing the reliability of the Gambling Functional Assessment. *Journal of Gambling Studies*, 25, 121-129.
- Mischel, W. (1966). Theory and research on antecedents of self-imposed delay of reward. In B. A. Maher (Ed.), *Progress in experimental personality research*. (Vol. 3). New York: Academic Press.
- Mischel, J. M., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science*, 244, 933-938.
- Moran, E. (1970). Clinical and social aspects of risk-taking. *Proc Roy Soc Med*, 63, 1273-1275.
- Myerson, J., Green, L., & Warusawitharana, M. (2001). Area under the curve as a measure of discounting. *Journal of the Experimental Analysis of Behavior*, 76, 235-243.

National Indian Gaming Association Report: The Economic Impact of Indian Gaming

In 2008. (2009, July 15). Retrieved August 19, 2009, from

<http://www.indiangaming.org/info/pr/press-releases->

[2009/NIGA_08_Econ_Impact_Report.pdf](http://www.indiangaming.org/info/pr/press-releases-2009/NIGA_08_Econ_Impact_Report.pdf)

Nower, L., Derevensky, J., & Gupta, R. (2004). The relationship of impulsivity, sensation seeking, coping, and substance use in youth gamblers. *Psychology of Addictive Behaviors, 18*, 49-55.

Oetting, E. R., & Beauvais, F. (1990). Orthogonal cultural identification theory: The cultural identification of minority adolescents. *The International Journal of the Addictions, 25* (5A & 6A), 655-685.

Orford, J. (2001). Addiction as excessive appetite. *Addiction, 96*, 15-31.

Ostaszewski, P. (1996). The relation between temperament and rate of temporal discounting. *European Journal of Personality, 10*, 161-172.

Ostaszewski, P. (2007). Temporal discounting in “Gain Now-Lose Later” and “Lose Now-Gain Later” conditions. *Psychological Report, 100*, 653-660.

Petry, N. M. (2001). Pathological gamblers, with and without substance use disorders, Discount delayed rewards at high rates. *Journal of Abnormal Psychology, 110*, 482-487.

Petry, N. M. (2005). *Pathological gambling: Etiology, comorbidity, and treatment*. Washington, DC: American Psychological Association.

Petry, N. M., & Casarella, T. (1999). Excessive discounting of delayed rewards in substance abusers with gambling problems. *Drug and Alcohol Dependence, 56*, 25-32.

- Powell, J., Hardoon, K., Derevensky, J. L., & Gupta, R. (1999). Gambling and risk taking behavior among university students. *Substance Use and Misuse, 34*, 1167-1184.
- Raylu, N., & Po Oei, T. (2004). Role of culture in gambling and problem gambling. *Clinical Psychology Review, 23*, 1087-1114.
- Reynolds, B., & Shiffbauer, R. (2005). Delay of gratification and delay discounting: a Unifying feedback model of delay-related impulsive behavior. *Psychology Rec, 55*, 439-460.
- Reynolds, B. (2006). A review of delay-discounting research with humans: Relations to drug use and gambling. *Behavioural Pharmacology, 17*, 651-667.
- Ricketts, T., & Macaskill, A., (2003). Gambling as emotion management developiong a grounded theory of problem gambling. *Addiction Research and Theory, 11*, 383-400.
- Rosenthal, R. J., & Lesieur, H. R. (1992). Self-reported withdrawal symptoms and pathological gambling. *American Journal of Addictions, 1*, 150-154.
- Roy, A., Dejong, J., & Linnoila, M. (1989). Extraversion in pathological gamblers. *Archival General Psychiatry, 46*, 679-681.
- Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1999). Estimating the prevalence of Disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89*, 1369-1376.
- Skinner, B. F. (1953). *Science and Human Behavior*. New York: McMillan Publishing Co.

- Smith, C. L., & Hantula, D. A. (2008). Methodological considerations in the study of delay discounting in intertemporal choice: A comparison of tasks and modes. *Behavior Research Methods, 40*, 940-953.
- Tavares, H., Zilberman, M. L., Beites, F. J., & Gentil, V. (2001). Gender differences in gambling progression. *Journal of Gambling Studies, 17*, 151-159.
- Toce-Gerstein, M., Gerstein, D. R., & Volberg, R. (2003). A hierarchy of gambling disorders in the community. *Addiction, 98*, 1661-1672.
- Trope, Y., & Liberman, N. (2003). Temporal Construal. *Psychological Review, 110*, 403-421.
- Trope, Y., & Liberman, N. (2000). Temporal construal and time-dependent changes in preference. *Journal of Personality and Social Psychology, 79*, 876-889.
- Van Boven, L., & Ashworth, L. (2007). Looking forward, looking back: Anticipation is more evocative than retrospection. *Journal of Experimental Psychology: General, 136*, 289-300.
- Volberg, R. A. (2003). Has there been a “feminization” of gambling and problem gambling in the United States. *Electronic Journal of Gambling Issues, 8*, 1-33.
- Weatherly, J.N., and McDonald, J.D. (2011). Delay discounting of different outcomes in a sample of American Indian and non-Indian college students. *American Indian and Alaska Native Mental Health Research: The Journal of the National Center, 17*, 43-55.
- Welte, J., Barnes, G., Wieczorek, W., Tidwell, M. C., & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns, and comorbidity. *Journal of Studies on Alcohol, 62*, 706-712.

- Welte, J., Barnes, G., Wieczorek, W., Tidwell, M. C., & Parker, J. (2004). Risk factors for pathological gambling. *Addictive Behaviors, 29*, 323-335.
- Westermeyer, J., Canive, J., Thuras, P., Thompson, J., Kim, S. W., Crosby, R. D., Garrard, J. (2008). Mental Health of non-gamblers versus “normal” gamblers among American Indian veterans: A community survey. *Journal of Gambling Studies, 24*, 193-205.
- Wise, R. A., Bozrath, M. A. (1987). A psychomotor stimulant theory of addiction. *Psychological Review, 94*, 469-492.
- Wood, R. A. T., & Griffiths, M. D. (2007). A qualitative investigation of problem gambling as an escape-based coping strategy. *Psychology and Psychotherapy: Theory, Research and Practice, 80*, 107-125.
- Zitzow, D. (1996). Comparative study of problematic gambling behaviors American Indian and Non-Indian adults in a northern plains reservation. *American Indian and Alaska Native Mental Health Research, 7*, 27-41.
- Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. New Jersey: Lawrence Erlbaum Associates.
- Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. Cambridge, England: Cambridge University Press.