

GAMBLING BEHAVIOR AND ITS RELATION TO
IMPULSIVITY, SENSATION SEEKING, AND RISKY
BEHAVIORS IN MALES

LANGEWISCH, MARK WILLEM JAMES

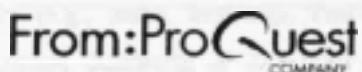
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GAMBLING BEHAVIOR AND ITS RELATION TO
IMPULSIVITY, SENSATION SEEKING, AND
RISKY BEHAVIORS IN MALES

by

Mark W. J. Langewisch, BSc(H)

A Thesis
Submitted to the Faculty of Graduate Studies
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1997



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Abstract

Sensation seeking and impulsivity are two constructs of personality that are generally believed to be associated with risky **behavior**, including gambling. However, little empirical research has investigated this relationship. Similarly, there has been sparse research looking at whether or not gambling is actually related to other risky behaviors. The purpose of this study is to investigate these **relationships**. One hundred and **forty-four** male undergraduate university students completed several inventories measuring sensation seeking, impulsivity, gambling, and risky behaviors. Statistical analyses including correlations and regressions were run to determine the relationship between these constructs. A very high percentage of probable pathological gamblers was found in this study. Also, a significant difference was found between the relationships of sensation seeking, impulsivity, and risky behaviors with gambling when pathological and non-pathological gamblers were examined. Results should guide future research in these areas.

DEDICATION

To Mom and Dad for all their **love** and support over
the years without which I could not have even had the
chance to pursue my goals. I cannot thank you enough
for everything you have done **for me.**

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The completion of my Master's research could not have been achieved without the ~~support~~, knowledge, and patience of a number of people whom I would like to thank.

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TABLE OF CONTENTS

	Page
ABSTRACT	i i
DEDICATION	iii
ACKNOWLEDGMENTS	iv
LIST OF TABLES	vii
CHAPTER	
I INTRODUCTION	1
Sensation Seeking	3
Risky Behavior	10
Impulsivity	11
Gambling	14
Hypotheses	19
II METHOD	21
Participants	21
Measures	23
Administration and Data Collection	31
III RESULTS	33
IV DISCUSSION	58
REFERENCES	61
APPENDIX	
A Consent Form	94
B Multidimensional Personality Quest ionnaire	95
C Basic Personality Inventory	96

TABLE OF CONTENTS **(Continued)**

D	Tridimensional Personality Questionnaire	97
E	Personal Information Questionnaire	98
F	Zuckerman-Kuhlman Personality Questionnaire	99
G	Zuckerman Sensation Seeking Scale - V	100
H	South Oaks Gambling Screen	103
I	General Risk Appraisal Scale	105
J	Gamblers Anonymous Questionnaire	114
K	Debriefing From	115
	VITA AUCTORIS	116

LIST OF TABLES

Table		Page
1	Demographic Characteristics of Participants	23
2	Descriptive Statistics for the Dependant Variable Measures (SOGS and GA20)	34
3	Descriptive Statistics for the Independent Variable Measures (SSS-V, ZKPQ , TPQ , BPI , MPQ , CRAS)	38
4	Bivariate Correlations Between the Independent Variables' Full Scales and Subscales : Sensation Seeking, Impulsivity , and Risky Behavior	41
5	Bivariate Correlations Between Measures of the Dependant Variable, Gambling, and Demographic Characteristics	44
6	Bivariate Correlations Between Independent Variables and Measures of the Dependant Variable	46
7	Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS -Total) on the SOGS - Pathology Measure	52
8	Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS -Total) on the SOGS - Activity Measure: Probable Pathological Sample (GA20 > 6 & SOGS -Path > 4) (n = 25)	56

CHAPTER I

INTRODUCTION

Over the past 10 years, legalized gambling and the number of gambling venues in the United States and Canada has increased at a phenomenal rate. The increase in **accessability** has materialized in an increase in the acceptance of gambling as a social activity (Breen & Zuckerman, 1996). Presumably, more people gambling will lead to an increase in the number of problem or pathological gamblers and elevated interest from medical and academic fields (Abt & Smith, 1984; Rosecrance, 1985).

There exists considerable literature on risky behaviors, including gambling. The relationship between risky behaviors, sensation seeking and impulsivity has been researched, although not as thoroughly as one might expect (Moore & Rosenthal, 1993; Wong & Carducci, 1991). Gambling, on the other hand, particularly when it becomes pathological, has been studied in depth and continues to receive attention (Ciarrocchi, 1993; Fisher, 1993).

Similarly, over the past two decades, there has been an abundance of research and theory put forth about the personality constructs known as sensation

seeking and impulsivity (Martin-Doto & Nussbaum, 1991; Zuckerman, 1979a; 1979b). The majority of this research has focused on these constructs **independently**, only briefly investigating the relationship between them (Castellani & Rugle, 1995). A **large** number of studies have focused on what causes people to become sensation seekers or highly **impulsive people**, while relatively little research has focused on what behaviors these traits are associated with. Several theories have been put forth suggesting different biological and/or **environmental** bases for such behaviors and motivational states without thoroughly **addressing** what these behaviors and activities include.

Theorists tend to classify gambling as a risky behavior without providing adequate empirical support for such an inclusion. This is largely due to the lack of a clear definition, or even an **exhaustible** list, of risky behaviors. **Conversely**, sensation seeking and impulsivity are believed to be predisposing factors of, or at least related to, risky behaviors. Before this can be discussed any further, an understanding of these different research areas is required.

Sensation Seeking

Sensation seeking is a personality characteristic based on temperament, arousal, and optimal level of stimulation. It pertains to the degree to which a person's central nervous system requires arousal from external sources. According to Zuckerman, (1979a) sensation seeking is a trait of temperament defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences. A high sensation seeker tends to become bored with routine and is continually in search of ways to increase arousal through exciting experiences. In contrast, a low sensation seeker does not prefer such a continuous level of brain stimulation and tolerates, even prefers, routine.

Research suggests that the sensation seeking construct is a set of interrelated components rather than a unitary construct. Zuckerman (1975) divides sensation seeking into four components in his Sensation Seeking Scale Form-V (SSS-V): 1.) Thrill and Adventure Seeking (**TAS**), 2.) Experience Seeking (**ES**), 3.) Disinhibition, (**Dis**), and 4.) Boredom

4

Susceptibility (BS). TAS incorporates a desire to engage in physical risk-taking activities including outdoor, **non-competitive** activities that involve **danger**, personal **challenge**, and risk. Examples of such activities include **flying**, parachute jumping, scuba diving, driving fast, and mountain **climbing**. ES encompasses a desire to pursue new experiences through the mind and senses including art, **music**, travel, and certain types of drugs. These people usually live a **nonconforming** lifestyle with unconventional types of people. Thirdly, Dis is categorized as a desire to **disinhibit** oneself in social situations in the pursuit of pleasure. This is exemplified by the use of alcohol and **participation** in gambling, sexual variety, and "wild" parties. One would anticipate that this component in particular would be highly related to gambling. Finally, BS is defined as an aversion to routine. This type of person becomes restless and intolerant when things are unchanging or routine.

Arguments have been **made**, by Eysenck (1967) in particular, that sensation seeking is a component of extraversion. While each component of the SSS-V is related to extraversion, Zuckerman insists that there

are several reasons, physiological and **behavioral**, that sensation seeking should be considered a distinct and separate construct. Early research suggested that individual differences in sensation seeking were attributable to the **reticulocortical** arousal system (Eysenck, 1967). However, researchers such as **Zuckerman** are now focusing their attention on the catecholamine systems of the brain as the primary basis for such differences (Zuckerman, 1984).

Extraversion, on the other hand, is believed to be linked to **limbic** system arousal. Eysenck and Zuckerman (1978) conducted a study comparing **Eysenck's** dimensions of personality with **Sensation Seeking**. They concluded that **Sensation Seeking** represents a trait that lies between the **Extraversion** and **Psychotocism** dimensions of **Eysenck's** dimensions of personality. They also suggested that the SSS-V measures something not **included** in the Eysenck Personality **Questionnaire**. Recently, research has found that **sensation seeking** **lies** closer to the **Psychoticism** dimension than **Extraversion** (Zuckerman, 1994). Similarly, Corulla (1988) suggests that the SSS-V measures something that neither **impulsivity** or extraversion measures do, indicating that these

traits are indeed different. However, more recent theories view sensation seeking as part of a broader trait called **impulsive-sensation seeking (ImpSS)** (Zuckerman, 1994).

With respect to the search for new **experiences**, the sensation seeker is always looking for new activities to obtain external sources of increased **stimulation**. An example is sex experience. Sensation seekers tend to report a greater variety of activities in heterosexual relations and report sexual encounters with a greater number of partners. Sexual frequency and variety are correlated with all five of the SSS-V components (Zuckerman, Bone, Neary, Mangeldorf, & Brustman, 1972; Zuckerman, Tushup, & Finner, 1976).

Another example seems to be the use of drugs. Drugs provide the sensation seeker with a quick elevation in his or her level of arousal. They can also produce new **experiences**, such as **hallucinations**, **disinhibit** risky behavior, and serve as a means of escape from boredom. Several studies have found a significant relationship between drug use and sensation seeking in adults as well as adolescents (Caces, Stinson, & Harford, 1991; Castellani & Rugle,

1995).

Sensation seekers are much more likely to participate in risky activities such as driving fast and recklessly (Zuckerman & Neeb. 1980), dangerous sports such as parachuting and skydiving (Zuckerman, 1983), gambling (Coventry & Brown. 1993; Dickerson, Hinchy, & Fabre. 1987) and financial risk taking (Wong & Carducci. 1991). However. Zuckerman (1994) points out that while risk-taking behavior is a correlate of sensation seeking, it is not necessarily an essential part of the definition.

Various theories have been put forth about why sensation seekers behave the way they do. Horvath and Zuckerman (1993) suggest that sensation seekers value these forms of arousal more than non-sensation seekers, with the rewarding effects outweighing the risks. Risk may in fact serve as the reward, although very few sensation seekers attempt to maximize risk (Zuckerman, 1994). Another hypothesis is that sensation seekers, seeing themselves as less at risk and having less chance of a negative outcome, espouse what is referred to as the "optimistic bias" (Weinstein, 1980). O. Dahlback (1990) suggests that those who are cautious (i.e. unwilling to take

risks), give greater weight to an unfavourable outcome than to favourable outcomes and vice versa. Cautious individuals are therefore more likely to participate in activities with lower risks in order to avoid a potential negative outcome. Research shows that the more experience one has doing **something**, the less risky that activity is perceived to be (Zuckerman, 1979b). However, the opposite does not necessarily apply (i.e., lack of personal experience with an activity does not necessarily make it seem **risky**).

Farley (1986) suggests that stimulation seeking (presumably the same construct as sensation seeking) is the basis for what he has termed Type T, or Thrill Seeking Personality. He proposes that Big T people are high in stimulation seeking and risk-taking due to unusually low **arousability**. Their lower level of arousability requires that these people need more stimulation to maintain an optimal or comfortable level of arousal. **Farley** submits that this difference in arousability is biologically based although the etiology of which is uncertain. He also sees socioeconomic class as the primary determinant of which sensation seeking activity is engaged in.

(Farley, 1981).

In relation to gambling behavior, Brown (1986) in his arousal theory of gambling reports that people who gamble on a regular basis typically lead a lifestyle that does not adequately stimulate them.

Accordingly, gambling activities increase arousal to a preferable level (Leary & Dickerson, 1985), regardless of the possibility of winning money.

However, placing larger bets, and therefore risking more, results in an even higher level of arousal which sensation seekers enjoy (Zuckerman, 1994).

Kuley and Jacobs (1988) found that sensation seeking was significantly correlated with gambling behavior including time and money spent gambling and problems associated with gambling. Breen and Zuckerman (1996) found that people who scored high on a measure of sensation seeking and impulsivity were more likely to keep gambling even following successive losses.

Kuley and Jacobs (1988) showed that sensation seeking was associated with high frequency of gambling and the admission of problems caused by gambling. They also found that problem gamblers (people who scored seven or greater on the Gamblers Anonymous 20 Questionnaire) reported higher sensation seeking than

social gamblers.

Risky Behavior

At present there is no complete list of behaviors that are considered to be "risky", and the few definitions that have been put forth are not all in agreement. Presumably, a "risky" behavior would involve any behavior that puts one at risk, be it physical, emotional, social, or financial. Depending on the perspective, the list could be virtually infinite. Examples not already mentioned include sun tanning (at risk for skin cancer) (Carmel, Shani & Rosenberg, 1994), and eating disorders (Black, Goldstein, Noyes, & Blum, 1994). Several risky behaviors seem to be highly related, such as substance abuse and risky sexual practices (Desiderato & Crawford, 1995).

Zuckerman (1979b) hypothesizes that in their search for novel and intense sensations and experiences, sensation seekers take various types of risks. In addition to those aforementioned, these include dangerous vocations (Zaleski, 1984) and driving recklessly or intoxicated (Donovan, Quiesser, Salzberg, & Umlauf, 1985). Zuckerman also reports that they tend to drink too heavily (Zuckerman, 1987)

and smoke tobacco (Zuckerman, Ball, & Black, 1990).

Risk taking may also involve **impulsivity**.

Impulsive people are prone to act quickly and without forethought in a variety of **activities**, including risky **ones**. The Diagnostic and Statistical Manual of Mental **Disorders-IV (DSM-IV)** (American Psychiatric Association, 1994), under diagnostic criteria for Borderline Personality Disorder, listed "impulsivity in at least two areas that are **self-damaging**" such as spending, sex, substance **abuse**, shoplifting, reckless driving, binge eating as a main criteria. Many of these behaviors fall into the category of risky behaviors. This would lead one to conclude that the relationship between risky behaviors and impulsivity should be extremely high.

Research has shown that sensation seeking and impulsivity tend to be moderately related (Zuckerman, 1979a). Assuming this relationship is valid, it may be expected that risky behavior can be predicted by sensation seeking as well.

Impulsivity

The concept of impulsivity remains an elusive and controversial construct among researchers (Martin-Doto & Nussbaum, 1991). **Impulsivity**, in

general, is thought of in terms of spontaneous, unplanned, or **unpremeditated** behavior (Martin-Doto & Nussbaum, 1991). The **DSM III-R** (American Psychiatric Association, 1987) and the **DSM-IV** (American Psychiatric Association, 1994) include it as a **symptom** in a wide range of psychological disorders including Pathological Gambling (**DSM III-R**) and Borderline Personality (**DSM IV**). The **DSM-IV** actually has a section **outlining** Impulse Control Disorders that do not fall into any other category of psychological disorders. **Impulsivity** has been conceptualized cognitively, **behaviorally**, and as a personality trait. Some studies have suggested it is related to other constructs such as risk taking (Steiner, 1972; Moore & Rosenthal, 1993), and sensation seeking (Zuckerman, 1983). Eysenck and Eysenck (1977) actually view sensation seeking as one component of **impulsivity**.

The lack of **an** integrated concept of **impulsivity** may be largely due to the variety of different definitions it has been labelled with. Barratt and Patton (1983) define impulsivity as "a tendency to act without planning or forethought" while Goldstein (1981) defines it as "a lack of control over

impulses." Buss and Plomin (1975) include **impulsivity** as one of their four basic temperaments in their theory of personality. They suggest that impulsivity is comprised of two main components: giving into impulses and/or motivational states, and the idea of impetuous, rather than planned, responding. Some researchers actually conceptualize impulsivity as "risk taking." Cognitively, studies have found that **impulsives** are more likely to respond to test items rapidly with little reflection or thought (Drake, 1970). Kendall, Hooke, Rymer, and Finch (1980) found that **impulsives** report being more concerned with speed of responding than with success or correctness of their responses.

Self-report measures are the most commonly used method for measuring **impulsivity** and there are many of them. However, most of these **questionnaires** have been found to have no significant intercorrelatedness despite the fact that they all profess to measure impulsivity. The conception of impulsivity is often thought to include measures of risk-taking and sensation seeking. For example, Barratt (1985) views impulsivity as a "higher order" dimension encompassing the inability to plan **ahead**, acting

without thinking, speed of response, and risk taking. Eysenck and Eysenck (1980) demonstrated that impulsivity may consist of two different components: Impulsiveness, which correlates with their Psychoticism dimension of personality, and Venturesomeness, which correlates with their Extraversion dimension of personality.

This study used a variety of measures to investigate the degree of relationship between the various tests supposedly measuring the same construct.

Gambling

The DSM-IV estimates that 1-3% of the adult population in the United States are pathological gamblers, with this estimate varying from group to group (American Psychiatric Association. 1994). For example, people with other addictions have been found to have a significantly higher rate of gambling problems (pathological and problem) (Lesieur & Blume, 1993; Steinburg, Kosten, & Rounsville, 1992). The DSM-IV diagnostic criteria describe pathological gambling as a disorder of "impulse control", and are modelled after the criteria for substance abuse. These include preoccupation with gambling.

successively increasing doses of the activity, unsuccessful efforts to stop the **behavior**. restlessness and irritability when **gambling**, gambling to escape problems or relieve **depression**. "chasing" losses, lying to significant others about gambling, **commission** of illegal **acts**, jeopardizing or losing significant relationships or employment, and reliance on others for **bailouts**.

While there are many models of why people gamble and become **addicted**, no one model as yet fully explains the complexity of gambling behavior. For this reason, most theories combine assumptions from several areas of psychology. There are countless hypotheses about why people gamble, ranging from historical to **contemporary**, biological to social, behavioral to **psychoanalytic**, and so on. Of the most relevance to this study are theories that investigate the relationship between personality, arousal and **gambling**.

Brown (1986), in his social learning model, views arousal as the central phenomena driving the initiation and persistence of normal or social gambling. Gambling raises the level of arousal which is perceived as pleasant and therefore **rewarding**.

especially to an individual whose normal **level** of **arousal** is lower than usual. He proposes that individual differences in sensation seeking influence the drive for arousal and **consequently** the desire to **gamble**. He believes that under certain circumstances even moderate sensation seekers could potentially become addicted to gambling if their work or **personal lives** are **dull**.

Jacobs (1986) in his general theory of addictions posits that some individuals are predisposed to develop a pattern of addictive behavior such as compulsive gambling. He believes that there are two sets of predisposing factors, both of which must be **present**, in order for such a pattern to form. The first is that the person must have a "unipolar psychological state" (Jacobs, 1986; pp. 17) that is continuously either depressed or excited. In other **words**, the individual is in a chronic state of either high or low arousal. The stress produced by such a state is relieved by the addictive activity. Secondly, the individual experiences persistent feelings of inadequacy or inferiority resulting from social and developmental experiences in childhood and adolescence. Such feelings are coped with through

fantasy and potentially one of a number of dissociative states made possible by the addictive activity. **Addiction**, therefore, serves to self-medicate the individual in that they can function normally with respect to their level of arousal and also have a means for escape from their aversive feelings of inferiority. This theory is supported by the findings that gamblers often score high on scales of sensation seeking indicating their desire for increased arousal. Arousal has also been related to other risky behaviors including alcohol consumption (Donovan & **Chaney**, 1985), smoking (Stepney, 1980), eating problems (Brown & Perry, 1990; as cited in Brown, 1993) and both legal and illegal drug use (Brown, 1993).

The Canadian Foundation of Compulsive **Gambling** (1993) found that 65% of adults in Ontario who have gambling problems reported they gambled for excitement. For regular players, the most important reasons for gambling seem to be escape and excitement (and consequently arousal), the latter being the predominant factor in adolescent populations.

Gambling among adolescents is widespread and is on the rise (Ladouceur, Dube, & **Bujold**, 1994; Fisher,

1993). Research demonstrates that as many as 4% of adolescents in Ontario compared to only 0.9% of adults are pathological gamblers (Canadian Foundation on Compulsive Gambling, 1994). Govoni, Rupcich, and Frisch (1996) found that the estimated level of problem or at risk gambling in adolescents in a town with casinos ranged as high as 17.5%. For these reasons, identifying and studying causes and predisposing factors of gambling in youths/adolescents is becoming increasingly important.

Finally, gambling has been widely shown to be highly comorbid with other risky behaviors such as substance abuse (Ciarrocchi. 1993; Griffiths, 1994; Lesieur & Blume, 1993; Steinberg, Kosten, & Rounsville. 1992).

The goal of this study was to attempt to clarify the relationship between gambling and risky behavior and the possible relationship between these behaviors with sensation seeking and impulsivity. In doing so, this study looked at whether there was a relationship between sensation seeking and impulsivity and the extent to which different measures/scales of each construct relate to each other. Very high

correlations were expected in that the scales supposedly measure the same construct.

Hypotheses

The first five hypotheses of this study deal with the relationship between the different measures of the variables and how the different variables are related. The final two hypotheses consider the primary goal of this study: the relationship between and the ability of sensation seeking, **impulsivity** and risky behaviors to predict gambling pathology and **activity**.

#1. The number of risky behaviors engaged in would be positively correlated with **impulsivity** and sensation seeking.

#2. In that the research suggests the traits measured by the impulsivity scales and the sensation seeking scales are part of the same larger personality construct or dimension, impulsivity would be positively correlated with sensation seeking.

#3. Impulsivity scores on the **BPI** and **TPQ** would correlate positively with each other and negatively with scores on the **MPQ** (since all of the impulsivity scales presumably measure the same **trait**, and high

scores on the MPQ coincide with low impulsivity).

#4. Sensation seeking scores on the SSS-V would correlate positively with scores on the ZKPQ ImpSS (since the ImpSS scale includes SSS-V items while eliminating specific activities, they should correlate very highly).

#5. Scores on the SOGS and the GA20 would correlate strongly in a positive direction, not only with each other, but also with the number of gambling behaviors, assuming gambling behavior is related to gambling pathology.

H6. The number of gambling behaviors and the degree of gambling pathology would be positively correlated with sensation seeking, impulsivity and risky behaviors.

#7. Sensation seeking, impulsivity, and risky behavior scores may be significant predictors of gambling behavior and pathology scores. However, because they were all expected to be highly correlated with each other this may not be the case due to what should be considerable covariance between the three independent variables.

CHAPTER II**METHOD****Participants**

One hundred and forty-four male undergraduate university students voluntarily participated in this study. These individuals were recruited from first, second and third year undergraduate courses at the University of Windsor. They were given one percent bonus towards their final grade in the course. The mean age of participants was 23.15 years ($SD = 3.92$) with a range of 19 to 45 years. Eighty one percent ($n = 117$) of participants identified themselves as Caucasian. Ethnicities of the remaining respondents included Asian, African American, **Chinese**, and East Indian.

Eighty-eight percent ($n = 127$) of participants reported that they had been to a casino in Windsor while only fifty four percent ($n = 78$) reported that they had been to a casino outside of Windsor. Seventy three percent ($n = 105$) of participants reported their major areas of study to be in the Faculty of Arts and Science (for example, psychology, **sociology**, and english majors). The remaining participants were studying primarily nursing or

engineering.

Sixty seven percent ($n = 96$) of participants reported that they **currently** either rented an apartment/house or owned their own **home**. Eleven percent ($n = 17$) reported that they were currently living in a University residence while the remaining twenty two percent ($n = 31$) stated that they lived with their parents. The relatively small number of subjects living in university residents may be attributable to the fact that the majority **of** recruiting was conducted in the summer at which time most students no longer live in a university residence. Also, many of the participants were upper year students: the average student lives in a university residence for their first year only.

Descriptive statistics for the remaining demographic **characteristics** can be found in Table 1.
Materials

The following is a summary of the inventories used in this study. All inventories are self-report measures and may be found in full in Appendices B to J.

Risky Behavior: GRAS

For measuring risky behaviors, **Horvath's &**

Table 1

Demographic Characteristics of Participants

Characteristic	M	SD	Range
Age	23.15	3.92	19-45
Annual Income*	13.49	14.20	0-115
Parents Annual Income*	85.59	67.76	17-600
Time Living in Windsor**	76.68	92.70	6-300

* - in thousand dollars units

** - in monthly units

Zuckerman's (1993) General Risk Appraisal Scale

(GRAS) was used. The GRAS was designed to measure 30 risky activities along four dimensions: A: OWN RISK, personal risk appraisal (chances of negative outcome given the subjects **themselves** engage in the activity) B: OWN BEHAVIOR, number of times the subjects engaged in the risky behavior. C: PEER RISK, chance of negative outcome given a peer engages in the activity and D: PEER BEHAVIOR, estimate of the percentages of the subjects' peers who engage in the activity.

(Incidentally, Horvath and Zuckerman found that OWN and PEER RISK were correlated so highly that they could be regarded as redundant measures and that OWN and PEER behavior were also very highly **correlated**).

Horvath and Zuckerman ran a factor analysis which resulted in four factors regarding "types" of risky behavior: Crime risk, identified by items such as driving while drunk, selling or buying drugs, **shoplifting**, and vandalizing; Financial risk, identified by items such as loss of money at a casino, betting on horses, **lottery**, losing money in business ventures; Minor violations risk, including being towed away from no parking **zone**, injured in speeding **accident**, being expelled from a party or

club; and Sports risk, including injury while sailing, scuba diving, ballooning, or surfing.

The questions on the GRAS are structured along a gradient of risk potential coinciding with five responses. For example, with the smoking question for OWN BEHAVIOR:

How often do you smoke per day?

- 1. Never
- 2. 1-2 times
- 3. 3-5 times
- 4. 6-9 times
- 5. 10+ times

The full scale can be found in Appendix I. This study used just the OWN behavior scores as our focus was on what individuals themselves do, not on peer behavior or risk appraisal. However, participants filled out the entire questionnaire in order to maintain the scales validity. Each question for OWN behavior was scored from zero to four; zero if the individual never participated in the listed behavior ranging up to four if they indicated the highest risk potential. Scores were calculated for each individual for the entire scale as well as for each subscale.

Impulsivity: MPQ, BPI, and TPQ

To measure impulsivity, the following three scales were used: Multidimensional Personality

Questionnaire (Control/Impulsiveness scale) (Tellegen. 1982; as cited in Parker & Bagby. 1991). Basic Personality Inventory (BPI), (Jackson. 1989). and the Tridimensional Personality Questionnaire (TPQ) (**Impulsiveness Scale**) designed by Cloninger (1987). The MPQ is a 300-item self-report inventory developed through factor analysis. It incorporates measures for 11 different personality dimensions, one of which is "control vs **impulsiveness**". This dimension consists of 24 items and will be the only subscale of the MPQ used in this study. The MPQ demonstrated test-retest reliability ranging from .82 to .86. It has also received extensive construct validation (**DiLalla, Gottesman, Carey, & Vogler. 1993**). High scores on the MPQ coincide with low **impulsivity**.

The BPI is a 240-item self-report inventory containing 12 subscales. One of these subscales is "impulse **expression**", the subscale this study **administered**. Holden, Fekken, Reddon, **Helmes** and Jackson (1988) found test-retest correlations of 0.74 and an internal reliability coefficient of 0.90. The BPI has also received considerable construct validation. High scores on the BPI coincide with

high **impulsivity**.

The TPQ is a **100-item** self report scale developed through empirical and rational approaches. It contains an eight-item subscale, "impulsiveness **vs.** reflection" and a nine-item subscale, "exploratory excitability **vs.** stoic **rigidity**". both believed to be relevant to the impulsivity construct. Test-retest reliability for these subscales were found to be **0.58** and **0.68** respectively while internal **reliabilities** for these scales were found to be in the **0.50s** (Cloninger, Przybeck. & Svarkic. 1991). High scores on the TPQ coincide with high **impulsivity**.

Scores were calculated for all scales as well as for the subscales of the TPQ. The three inventories can be found in Appendices **B**, **C**, and **D**. This study used three inventories as opposed to one to investigate the degree of relationship between different scales supposedly measuring the same **construct**.

Sensation Seeking: SSS-V and ZKPQ-ImpSS

To measure sensation seeking. Form V of the Sensation Seeking Scale (SSS-V) (Zuckerman, 1975) was administered. This inventory is a forced choice

questionnaire and includes four subscales: Thrill and Adventure Seeking (**TAS**), Experience Seeking (ES), Boredom **Susceptibility** (BS), and **Disinhibition** (**Dis**). These four subscales correspond to the four areas of sensation seeking identified by Zuckerman (1994) and discussed earlier in this paper. The SSS-V has been widely used in research and has been shown to be one of the most valid and reliable inventories for measuring the construct of sensation seeking (Breen & Zuckerman. 1996). Scores were calculated for the SSS-V as a whole and for each subscale. The SSS-V can be found in Appendix G.

The **ImpSS** subscale of the Zuckerman-Kuhlman Personality Questionnaire (**ZKPQ**) (Zuckerman. Kuhlman. Joireman. Teta & Kraft, 1993) was also administered. The ZKPQ was developed through factor analysis of scales and items. It assesses five personality traits, one of which is Impulsive Sensation Seeking (**ImpSS**). This subscale consists of 19 statements to be answered either true or false. While it is believed to combine the two traits, **impulsivity** and sensation seeking, Zuckerman (1994) believes that it is best used as a measure of the general sensation seeking trait. In contrast to many of the items on

the SSS-V, the **ZKPQ** items are all general in content and do not describe specific activities or behaviors (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). The **ImpSS subscale** has been shown to correlate highly with the SSS-V total subscale and moderately with all **subscals** (Zuckerman, 1994). **Reliabilities** of the ZKPQ scales have been found to range from .70 to .86. This scale can be found in Appendix E.

Gambling: SOGS and GA20

To measure degree of gambling **pathology**, subjects were given the South Oaks Gambling Screen (SOGS: **Lesieur & Blume**, 1987) and the GA20 **questionnaire**. The SOGS was designed to determine the presence of gambling **problems**, with the hope of improving **identification**, intervention and treatment for problem gamblers who go unrecognized by health care and criminal justice systems.

The SOGS is a **scientifically** validated and reliable instrument. It's test-retest reliability and internal reliability are high (Breen & Zuckerman, 1996). It is the most widely used assessment screen for problem gambling and can be **self-administered** or given by an interviewer.

The SOGS consists of 20 items along seven

dimensions: family disruption, job or school disruption, lying about gambling, default on debts, going to someone to relieve a desperate financial situation resulting from gambling, borrowing from illegal sources to finance gambling and committing an illegal act to finance gambling. The 20 items are based on **DSM-III-R** criteria for pathological gambling. A score of 1-4 indicates "some gambling problems", with scores of 3-4 suggesting "problem gambling", while a score of 5 or more indicates "probable pathological gambling". The SOGS also contains a list of actual gambling behaviors. The respondent indicates whether they have ever partaken in the behavior and if so less than or more than once a week. This study used this list as a measure of actual gambling behavior, as opposed to pathology. Scores of 0, 1, and 2 were given for each behavior listed if the respondent indicated never, less than once a week, or once a week or more, respectively. The SOGS can be found in Appendix H.

The Gamblers Anonymous Questionnaire (GA20) was also administered to participants. This is a 20 question screen used by Gamblers Anonymous to determine if potential members are social gamblers or

problem/pathological gamblers. Scores of 7 or greater indicate the individual is a probable pathological gambler. The GA20 can be found in Appendix J.

Personal Information Questionnaire

This **questionnaire** was developed by the researcher and contains questions pertaining to **participants'** age, ethnicity, and major area of study at the university. To assess socioeconomic status, the **participants'** annual income was requested as was that of their parents. They were also asked their location of residence in Windsor in order to determine if living in a university residence influenced behavior. Participants were also asked whether or not they had been to a casino in Windsor or a casino outside of Windsor.

Administration and Data Collection

In recruiting **participants**, the researcher entered classes and gave a brief description of what the study was **investigating**. Sign-up sheets were then sent around the classroom. Individuals who wished to participate signed there name and a date and time when they would like to take part. Subjects were tested in groups in a classroom setting.

After a brief introduction, the subjects were given the self-report inventories and were informed, verbally and by the consent form (Appendix A), that their responses would be anonymous as they did not put their names on any of the inventories. The consent forms were collected prior to handing out the inventories and were kept separate from the completed inventories. Debriefing forms were given to participants following completion of the questionnaires. Any questions they had were answered outside of the testing room at that time to ensure that any students still completing the questionnaires would not hear potentially biasing information. Individuals who completed the questionnaires were also told that they could put their names on a sign-up sheet if they wanted the results of the study mailed to them.

CHAPTER III

RESULTS

The following is a presentation of the results obtained from statistical analyses of the data.

Results are discussed in fours steps: 1) a summary of the **univariate** statistics for ail major **variables** to examine the **distributions** of scores on the various measures, 2) a summary of the bivariate correlations for the independent variables and the different measures of the dependant **variable**, for the purpose of testing hypotheses two to six of the present study, 3) a presentation of the bivariate correlations of the independent variables with the dependant variables for the purpose of selecting the optimum subset of predictor variables and to test hypothesis one of this study **and**, 4) a summary of the hierarchical regression analyses to test the seventh hypothesis of this study.

1) Univariate Statistics

The **means**, standard deviations, and range of items endorsed for each measure of gambling, the dependent **variable**, can be found in Table 2. **Means**, standard **deviations**, and ranges of the measures for the independent variables, **impulsivity**, sensation

Table 2

Descriptive Statistics for the Dependent Variable Measures
 (SOGS and GA20)

Variable	Measure	M	SD	Range
Gambling				
	SOGS-Path	2.39	2.82	0-13
	SOGS-Act	7.25	3.57	0-17
	GA20	4.18	3.35	0-18

Note. SOGS-Path = South Oaks Gambling Screen measure of degree of pathology; SOGS-Act = South Oaks Gambling Screen measure of gambling activities; GA20 = Gamblers Anonymous Questionnaire, measure of degree of pathology

Measure	Range	#	Percentage
SOGS-Path	0	44	30.6
	1-4	67	46.5
	5-13	33	22.9
GA20	0-6	110	76.4
	7-18	34	23.6

Note. Scores on the SOGS are categorized as follows: 0 = no problems, 1-4 = some problems, 5 or greater = probable pathological. A score of 6 or less on the GA20 suggests social gamblers while a score of 7 or greater suggests problem/probable pathological gamblers.

seeking, and risky behavior can be found in Table 3.

Referring to Table 2, it can be seen that the mean total score on the SOGS-Path was 2.39 with a standard deviation of 2.82. Thus, the average number of items endorsed was 2.39 with the range of items endorsed being 0 to 13. The frequency distribution of these scores was positively skewed ~~demonstrating~~ that a greater proportion of the scores were located at the lower end of the scale. This is indicative of a low frequency of reported gambling pathology. This pattern of item endorsement is not surprising as the majority of the population were not expected to be pathological gamblers.

Descriptive statistics for the GA20 can also be found in Table 2. The mean total score on the GA20 was 4.18 with a standard deviation of 3.35. The distribution of these scores was similarly positively skewed, although not as strongly as that of the SOGS-Path. Once again this finding is not surprising given the expected low percentage of pathological gamblers in the general population. Normative data for the GA20 are not available for comparison purposes at present.

Referring to Table 2, it can be seen that the

mean **total** score on the SOGS-Act, a measure of gambling **activity**, was 7.25 with a standard deviation of 3.57. The distribution of these scores was slightly positively skewed once again suggesting that the majority of participants were not heavy gamblers. As this study was the first to use this method of measuring gambling **activity**, no normative data are present for comparison.

Table 2 also shows the breakdown of scores on the SOGS and GA20 according to categories of pathological gambling. Analyses show that according to the SOGS, 22.9 (n = 33) percent of respondents categorize as "probable pathological gamblers" while the GA20 shows 23.6 (n = 34) percent of respondents to be "problem or pathological gamblers". These percentages are **significantly** higher than those found in previous studies of the general population. These findings will be used in further analyses and explored in the following sections. Of note, out of the 33 and 34 respondents who classified as pathological gamblers on the SOGS and GA20 **respectively**, only 25 of them classified as pathological on both tests. In other **words**, 8 of the respondents who scored 5 or over on the SOGS and 9 of

the respondents who scored 7 or over on the GA20 did not score in the **pathological** range on the **alternative** measure of gambling pathology. This will be considered in the discussion section of this **study**.

The descriptive statistics for the SSS-V total and subscale scores can be found in Table 3. The mean of the total scale scores for this sample was 22.33 with a standard deviation of 6.99 and a range of 7 to 38. This compares closely with the **normative** data for the SSS-V for males: a mean of 21.6 and a standard deviation of 5.7 (**Zuckerman**, 1978). The scores from this sample were normally distributed. The mean scores for the four subscales (see Table 3) ranged **from** 3.97 for SSS-BS (**Boredom Susceptibility**) to 7.34 for SSS-Tas (**Thrill and Adventure Seeking**). Scores for the SSS-Tas and SSS-Dis subscales were both negatively skewed while the SSS-ES and SSS-BS subscales were very slightly positively skewed. **Due** to the non-normality of the **subscale**s' distributions and their high **intercorrelations**, only the SSS-V Total scale was used in the regression analysis. Subscale scores from this study are also similar to the normative data for males on the SSS-V (**Zuckerman**,

Table 3

Descriptive Statistics for the Independent Variable Measures
 (SSS-V, ZKPQ, TPQ, BPI, MPQ, GRAS)

Variable	Measure	M	SD	<u>Range</u>
Sensation Seeking				
	SSS-Tot	22.33	6.99	7-38
	SSS-Tas	7.34	2.53	0-10
	SSS-Dis	5.84	2.65	0-10
	SSS-ES	5.18	2.19	0-10
	SSS-BS	3.97	2.35	0-9
	ZKPQ (ImpSS)	9.67	4.52	0-19
Impulsivity				
	BPI	9.28	4.61	0-19
	MPQ	13.90	6.51	0-24
	TPQ-Tot	8.31	3.51	0-16
	TPQ-Imp	3.24	2.18	0-8
	TPQ-EE	5.07	2.18	0-9
Risky Behavior				
	GRAS-Tot	32.42	15.03	3-74
	GRAS-C	8.03	7.42	0-31
	GRAS-S	5.27	2.81	0-14
	GRAS-F	6.70	3.20	0-15
	GRAS-MV	12.42	6.05	0-28

Note. SSS = Sensation Seeking Scale - V, Tot = total scale score, Tas = Thrill and Adventure Seeking subscale, Dis = **Disinhibition** subscale, ES = Experience Seeking subscale, BS = Boredom Susceptibility subscale; ZKPQ = **Zuckerman-Kuhlman Personality Questionnaire**, ImpSS subscale; BPI = Basic Personality Inventory - Impulse Expression scale; MPQ = **Multidimensional Personality Questionnaire - Control/Impulsiveness** scale; TPQ = **Tridimensional Personality Questionnaire - Tot** = Total scale score (Imp and EE), Imp = Impulsiveness scale. EE = Exploratory Excitability scale; GRAS = General Risk Appraisal Scale. Tot = total scale score. C = crime risk subscale, F = financial risk subscale, S = sports risk subscale, MV = minor violations risk subscale

1978).

The mean total score and standard deviation for the ZKPQ-ImpSS subscale can be found in Table 3. This distribution of scores was normal. As yet, there is no normative data available for comparison of the ZKPQ.

Descriptive statistics for the three measures of Impulsivity, the BPI, MPQ, and TPQ, can also be found in Table 3. The distribution of scores for the BPI was normal as were the scores for the whole scale TPQ. However, the TPQ-Imp subscale was positively skewed and the TPQ-EE subscale was negatively skewed. Due to the incongruence between the subscales and the considerable difference in item endorsement between the two of them, the TPQ was not used in the regression analyses. The final impulsivity measure, the MPQ, demonstrated a negatively skewed distribution of scores.

Descriptive statistics for the GRAS whole scale and subscales can also be found in Table 3. The GRAS total scale demonstrated a mean of 32.42 and a standard deviation of 15.03. The range of scores was rather large, from 2 to 74 (a total possible range of scores on the GRAS is 0-160). The distribution of scores for the whole scale was normal. Means and standard deviations for the subscales can be found in

Table 3. All **GRAS subscales** were at least slightly positively skewed, with the **GRAS-C** being extremely positively skewed. As this study used a new method for scoring the GRAS, no normative data is available for comparison purposes.

2) Bivariate Correlations Between Measures

Table 4 shows the correlations between the different measures of the independent **variables**, sensation seeking, **impulsivity**, and risky behaviors, and their subscales. As expected, the SSS-V total scale demonstrated moderate to strong **correlations**, all significant, with all of the SSS-V subscales suggesting high internal consistency of the SSS-V. For this reason the full scale as opposed to the subscales will be used in **regression** analysis. The ZKPQ (**ImpSS** subscale) was also strongly correlated with the SSS-V ($r = .70$. $p < .001$) suggesting that they are in fact measuring the same construct despite the fact that the ZKPQ does not describe specific activities or behaviors and is thought to perhaps also measure impulsivity. The ZKPQ was found to have moderate significant correlations with all subscales of the SSS-V as well. These results support those found by **Zuckerman** (1994). Either of the ZKPQ or the SSS-V could be used in the regression analyses. However, given their high degree of collinearity it

Table 4

Bivariate Correlations Between the Independent Variables:
 Full Scales and Subscales:
 Sensation Seeking, Impulsivity, and Risky Behavior

Sensation Seeking

Measure	SSS-Tot	SSS-BS	SSS-Dis	SSS-TAS	SSS-ES	ZKPQ
SSS-Tot	1.00	.66***	.83***	.67***	.68***	.70***
SSS-BS		1.00	.48***	.19*	.23**	.52***
SSS-Dis			1.00	.40***	.44***	.56***
SSS-TAS				1.00	.31***	.44***
SSS-ES					1.00	.49***
ZKPQ						1.00

Impulsivity

Measure	MPQ	BPI	TPQ	TPQ-EE	TPQ-Imp
MPQ	1.00	-.79***	-.77***	-.51***	-.73***
BPI		1.00	.69***	.48***	.64***
TPQ			1.00	.81***	.80***
TPQ-EE				1.00	.30***
TPQ-Imp					1.00

Risky Behavior

Measure	GRAS-Tot	GRAS-C	GRAS-F	GRAS-S	GRAS-MV
GRAS-Tot	1.00	.88***	.61***	.47***	.87***
GRAS-C		1.00	.41***	.23**	.63***
GRAS-F			1.00	.15	.42***
GRAS-S				1.00	.35***
GRAS-MV					1.00

*p<.05, **p<.01, ***p<.001

is unlikely that entering both would result in a significant increase in the variance of the dependent variable, gambling, accounted for by the independent variables. The SSS-V will be used in the present regression analysis as it has been more widely researched, is believed to be a more accurate measure of sensation seeking, and **demonstrates**, even in this study, high internal consistency.

Correlations between the different measures of **impulsivity** can be found in Table 4. All three measures demonstrated strong significant **correlations** with each other. The correlation between the **MPQ** and the **BPI** was -.79, between the **MPQ** and the **TPQ** was -.77, and between the **TPQ** and the **BPI** was .69. Since these indices of association were so strong, either measure could serve as the variable to be entered into the regression equation. The **BPI** was the most normally distributed for this study and also has been shown to have the highest test-retest and internal reliability of the three measures. For these reasons it will serve as the measure of impulsivity in the subsequent regression analysis.

Correlations between the **GRAS** whole scale and subscales are shown in Table 4 as well. The total scale correlated very strongly with both the crime risk subscale (**GRAS-C**, $r = .88$) and the minor

violations risk scale (**GRAS-MV**, $r = .87$) but only moderately with the financial risk subscale (**GRAS-F**, $r = .61$) and the sports risk subscale ($r = .47$).

Correlations between the **subscale**s, although significant for the most, ranged from weak to moderate. This suggests that engaging in one type of risky behavior does not necessarily predict participation in other types of risky behaviors.

GRAS-Tot will serve as an independent variable, risky behaviors, in regression analyses.

Table 5 shows the correlations between the measures of gambling pathology and amount of gambling activity. As expected, the GA20 and the **SOGS-Path** were strongly correlated, $r = .81$. Gambling activity as measured by the **SOGS-Act**, although significant, was not as highly correlated as expected. The correlation between SOGS-Path and SOGS-Act was .57 and .44 between the GA20 and the SOGS-Act. This suggests that the amount of gambling an individual participates in does not necessarily play a significant role in determining whether or not an individual develops problems associated with gambling.

Table 5 also shows the correlations between the measures of gambling pathology and activity and the demographic variables. Age, annual income, and time

Table 5

Bivariate Correlations Between Measures of the Dependent Variable, **Gambling**, and **Demographic Characteristics**

Measure	SOGS-Act	SOGS-Path	GA20	AINC	TIW	AGE
SOGS-Act	1.00	.57***	.44***	-.01	-.20*	-.22**
SOGS-Path		1.00	.81***	-.09	-.21*	-.17*
GA20			1.00	-.16	-.20*	-.25**
AINC				1.00	.20*	.43***
TIW					1.00	.06
AGE						1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; AINC = Annual Income. TIW = Time in Windsor.

lived in Windsor all demonstrated weak negative correlations with the measures of gambling. As such, it was deemed superfluous to use the **demographic** variables in any further analyses.

3) Bivariate Correlations Between the Dependent and Independent Variables

Correlations between the dependent variable measures and the independent variables selected for use in the regression analyses can be found in Table 6. For the full sample ($n = 144$) all independent variables correlated moderately with both the GA20 and the SOGS-Path, although slightly higher with the SOGS-Path further warranting its' use, as opposed to the GA20, as the primary measure of the dependent variable. The high correlations found between the measure of **gambling** activity (SOGS-Act) and the independent variables warrant further **investigation** as will be shown in the following regression **analyses**.

As previously mentioned, this sample demonstrated a large percentage of pathological gamblers as measured by both the GA20 and the SOGS-Path. Table 6 shows the bivariate correlations between the measures of gambling and the selected independent variables for the **sample** of respondents that demonstrated probable pathology on both the GA20

Table 6

Bivariate Correlations Between Independent Variables and Measures of the Dependent Variable

Full Sample (n=144)

Variable	GA20	SOGS-Path	SOGS-Act	SSS-Tot	BPI	GRAS-Tot
GA20	1.00	.81***	.44***	.18*	.31***	.33***
SOGS-Path		1.00	.57***	.22**	.30***	.43***
SOGS-Act			1.00	.38***	.28***	.48***
SSS-Tot				1.00	.61***	.58***
BPI					1.00	.45***
GRAS-Tot						1.00

Probable Pathological Sample (GA20 > 6 & SOGS-Path > 4)
(n=25)

Variable	GA20	SOGS-Path	SOGS-Act	SSS-Tot	BPI	GRAS-Tot
GA20	1.00	.29	-.43*	-.36	-.21	-.22
SOGS-Path		1.00	.17	.21	.11	.39
SOGS-Act			1.00	.60***	.14	.44*
SSS-Tot				1.00	.49*	.84***
BPI					1.00	.37
GRAS-Tot						1.00

*p<.05, **p<.01, ***p<.001

and the SOGS ($n = 25$). Interestingly, none of the correlations between the gambling pathology measures and the independent variables was significant. This is at least in part a result of the fact that the much smaller sample size required a higher correlation to be significant. However, the actual strength of the correlations was also considerably weaker than those found with the full sample. Correlations with the pathological sample ranged from very weak to moderate. Table 6 shows that the correlations between GA20 scores and the independent variables BPI, SSS-V, GRAS-Total, in fact reversed direction from positive to negative for the pathological sample. These results confirmed the SOGS-Path as the best choice for use as the measure of gambling pathology (the dependent variable) in the subsequent regression analyses. Due to the very strong correlations found with both the pathological sample and the full sample between the SOGS-Act and the independent variables, regression analyses also used the SOGS-Act measure as a dependent variable to investigate the relationship between gambling activity and impulsivity, sensation seeking and risky behaviors.

4) Predicting Gambling Pathology and Behavior:
Results of Hierarchical Regression Analyses

This study will use hierarchical regression to investigate the contribution towards prediction of each independent variable on the dependent variable. The full hierarchical regression equation employed in this study takes the form:

$$Y = B_1 X_1 + B_2 X_2 + B_3 X_3 * C \text{ where;}$$

Y - the predicted score based on the full equation,

X_1 = an independent variable whose effects are statistically adjusted before subsequent independent variables are entered. In this instance. X_1 was the total score on the BPI Impulsivity Screen.

X_2 = the GRAS-Total scale score

X_3 = the SSS-V full scale score

The primary advantage of using this type of multivariate regression procedure is the fact that the contribution of each independent variable can be calculated in a predetermined order. In other words, hierarchical refers to the order of entry of the predictor variables into the regression equation. The degree of relationship between the dependent and independent variables can be assessed at each stage of the hierarchy. Another advantage of using hierarchical regression is that the researcher determines the order in which the independent variables are entered (Tabachnick & Fidell, 1989).

The beta weights (B' 's) are the constants which specify the contribution of that independent variable to the regression equation. Put another way, the prediction estimates (\hat{Y}) for each subject can be calculated by entering their scores into the equation and solving for Y . B' 's can be viewed in reference to their contribution toward the prediction of the dependent variable. The B' 's are actually the partial correlation coefficients, an estimate of the amount of variance that a particular independent variable accounts for in the dependent variable as a proportion of the total R .

For the purpose of this study, another important measure of the strength of the independent variable is the squared semi-partial correlation (SR^2). SR^2 in hierarchical regression is interpreted as the amount of variance added to the total R^2 by a given variable entered into the equation at that particular point. The SR^2 sum to the total R^2 ; in other words, the change in R^2 after a variable is entered is equivalent to the SR^2 for the added variable.

The inferential test employed in hierarchical regression is whether or not the sample of scores was taken from a population in which the multiple R was zero. In other words, the null hypothesis would be that all regression coefficients of the independent

variables equal zero. The F test for the total R^2 indicates whether or not all regression weights together are significantly different from zero. The F test for the individual SR² (the change in R^2 after each variable has been entered) indicate whether the individual variable's regression weight is significantly different from zero. These tests were employed for the following regression analyses.

Prior to conducting the regression analyses, assumptions were evaluated. As previously mentioned, all of the independent variables selected for use in the regression analyses (BPI, SSS-V, GRAS-Total) were normally distributed. Inspection of separate residual plots for these variables revealed that assumptions of linearity and homoscedasticity were also met. Although correlations were significant between the independent variables, multicollinearity was deemed not to be a significant problem based on the findings that all of the variables entered into the equations without violating the default values for tolerance. In fact, all tolerance levels were above .41, well within acceptable parameters (Tabachnick & Fidell, 1989). As well, the standard error of the B values were low suggesting the covariance was within acceptable limits.

Of the three independent variables employed in

the regression analyses, it was decided from a theoretical perspective that impulsivity (as measured by the BPI) was the most likely to predict a significant proportion of the variance in gambling pathology. This decision was made based on the fact that gambling pathology is actually categorized as an impulse-control disorder and **should** consequently be predicted by a measure of impulsivity. Therefore, the BPI was forced to enter all equations on the first step. To determine the effects of the other variables, they were entered **individually**. The risky behaviors wholescale score (**GRAS-Tot**) was entered in the second step and the sensation seeking scale (**SSS-Tot**) was entered on the last step. In **total**, four separate regression analyses were performed.

Hierarchical Regression #1.

The first regression analysis was run to determine whether BPI, GRAS-Tot, and SSS-Tot were significant predictors of **SOGS-Pathology** scores for the whole sample. Table 7 displays the total **R²** for the model, the change in **R²** (**SR**) and the incremental F (change in F) following each step, as well as the **standardized** regression coefficient (Beta = *B*) for each of the independent variables. The total **R²** was significant [$F (3,140) = 12.12$. **p<.001**] after all of the variables had been entered into the equation

Table 7

Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS-Tot) on the SOGS-Pathology Measure

Full Sample (n=144)

Model & Step	Total R^2	dfs	F	B	R^2 Change	F Change
Model	.21	3, 140	12. 12***			
Step 1. BPI				.30***	.09	13.72***
Step 2. GRAS-Tot				.37***	.11	9.70***
Step 3. SSS-Tot				-.15	.01	0.60

Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS-Tot) on the SOGS-Activity Measure

Full Sample (n=144)

Model & Step	Total R^2	dfs	F	B	R^2 Change	F Change
Model	.24	3, 140	14.84***			
Step 1. BPI				.28***	.07	11.72***
Step 2. GRAS-Tot				.44***	.16	14.65***
Step 3. SSS-Tot				.15	.01	0.61

*** $p < .001$

indicating that the combination of the variables held significant predictive value for the SOGS-Path scores for the full sample. R^2 (SR^2) after the BPI was added to the equation was significant [$F (1, 142) = 13.72, p < .001$]. The addition of the GRAS-Tot scale resulted in a significant improvement in the ability to predict SOGS-Path scores as indicated by the significant increment in $F (2, 141) = 9.70, p < .001$. The addition of SSS-V to the equation did not result in a significant change to the total R^2 . Put another way, the semi-partial correlations (SR^2) for the BPI and the GRAS-Tot were significant while SR^2 for the SSS-V was not.

Hierarchical Regression #2.

The second regression analysis was run to determine whether BPI, GRAS-Tot, and SSS-Tot were significant predictors of SOGS-Activity scores for the whole sample. Table 7 displays the total R^2 for the model, the change in R^2 (SR^2) and the incremental F following each step, as well as the standardized regression coefficient (B) for each of the independent variables. The total R^2 was significant [$F (3, 140) = 14.84, p < .001$] after all variables had been entered into the equation. This indicates that, similar to the regression analyses for the SOGS-Pathology scores, the combination of the three

independent variables accounted for a significant percentage of the variance in the dependent variable, the SOGS-Activity score. R^2 (SR^2) after the BPI was added to the equation was significant [$F (1, 142) = 11.72, p < .001$]. The addition of the GRAS-Tot scale resulted in a significant improvement in the ability to predict SOGS-Path scores as indicated by the significant increment in $F (2, 141) = 14.65, p < .001$. The addition of SSS-V to the equation did not result in a significant change to the total R^2 . Once again, the semi-partial correlations (SR^2) for the BPI and the GRAS-Tot were significant while SR^2 for the SSS-V was not.

Hierarchical Regression #3.

Through the course of running the preliminary univariate statistics, an interesting finding arose. As already stated, this study found an unexpectedly high percentage of respondents who scored in the pathological range on both the GA20 and SOGS-**Pathology** gambling screens. The bivariate correlation analyses revealed that there was a considerable difference between the correlations of the GA20 and SOGS-Path with the independent variables for the whole sample when compared to the pathological sample. For this reason, it was decided that regression analyses should also be conducted on

the pathological sample to examine the predictability of the independent variables on gambling scores, when those scores were in the probable pathological range. The third regression analysis was run to determine whether BPI, GRAS-Tot, and SSS-Tot were significant predictors of SOGS-Pathological scores for the probable pathological sample. Table 8 displays the total R^2 for the model, the change in R^2 (ΔR^2) and the incremental F following each step, as well as the standardized regression coefficient (B) for each of the independent variables. In contrast to the previous regression analyses, the total R^2 was not found to be significant after all variables had been entered into the equation. The changes in R^2 (ΔR^2) upon the addition of BPI, GRAS-Total, and SSS-Total were not found to be significant either. These findings suggest that the relationship between the independent variables and gambling pathology scores is not the same for a pathological sample as it is for a general sample of the population. Implications of this will be examined in the discussion section.

Hierarchical Regression #4.

The fourth regression analysis was conducted to determine whether BPI, GRAS-Tot, and SSS-Tot were significant predictors of SOGS-Activity scores for the probable pathological sample. Table 8 displays

Table 8

Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS-Tot) on the SOGS-Pathology Measure:
 Probable Pathological Sample fGA20 > 6 & SOGS-Path > 4
 (n = 25)

Model & Step	Total R ²	dfs	F	B	R ² Change	F Change
Model	.20	3, 21	1.74			
Step 1. BPI				.11	.01	.30
Step 2. GRAS-Tot				.40	.14	1.81
Step 3. SSS-Tot				-.44	.05	0.44

Hierarchical Regression of the Independent Variables (BPI, SSS-Tot, GRAS-Tot) on the SOGS-Activity Measure:
 Probable Pathological Sample (GA20 > 6 & SOGS-Path > 4)
 (n = 25)

Model & Step	Total R ²	dfs	F	B	R ² Change	F Change
Model	.40	3, 21	4.70*			
Step 1. BPI				.14	.02	.47
Step 2. GRAS-Tot				.45*	.18	2.41
Step 3. SSS-Tot				.91*	.20	2.33

*p < .05

the total R^2 for the model, the change in R^2 (ΔR^2) and the incremental F following each step, as well as the standardized regression coefficient (B) for each of the independent variables. The total R^2 was significant [$F (3, 21) = 4.70, p < .05$] after all variables had been entered into the equation. This indicates that the combination of the three independent variables accounted for a significant percentage of the variance in the dependent variable, the SOGS-Activity score. R^2 (ΔR^2) after the BPI was added to the equation was not found to be significant. The addition of the GRAS-Tot scale and the SSS-Total scale also did not result in a significant change in R^2 . This indicates that none of the variables individually account for a specific proportion of the variance in the dependent variable.

CHAPTER IV

DISCUSSION

The primary goal of the present study was to investigate the relationship between the personality constructs known as sensation seeking and **impulsivity**, risky **behaviors**, and gambling pathology and activity. In **addition**, the relationship between the constructs themselves and risky behavior was also examined. Finally, this study also explored the degree to which different measures of the constructs sensation seeking, **impulsivity**, and gambling pathology related to each other. An attempt was made to clarify the utility of different measures for a given trait or behavior by applying a multi-method scoring approach.

The discussion of the results will be organized to review the findings relating to each of the major hypotheses. Findings will be summarized in terms of the present study and in relation to previous research. Limitations, if present, for each hypotheses will be discussed and implications and directions for future research will be explored.

Hypotheses 1 & 2

The first two hypotheses, **namely**, that the amount of risky behaviors engaged in will be positively correlated with the personality constructs

impulsivity and sensation seeking and that impulsivity and sensation seeking will be **highly** correlated with each other, were supported by the results of the bivariate correlation analyses. A positive relationship was found between the degree to which a person participates in risky behaviors and **measures** of his tendency to be impulsive or seek high arousal. **Also**, the tendency to be impulsive was found to be associated with the tendency to be a high sensation seeker.

The finding that sensation seeking is related to risky behaviors supports extensive previous research (Zuckerman & Neeb, 1980; Zuckerman, 1983; Wong & Carducci, 1991; **Castellani & Rugle**, 1995; Donovan et al., 1985). This result is not surprising given that the definition of sensation seeking actually incorporates **participation** in risky behaviors (Zuckerman, 1994).

The relationship found in the present study between impulsivity and risky behaviors also supports previous research findings (Steiner, 1972; Moore & Rosenthal, 1993) and theory (Barratt, 1985). Given the high correlation found between sensation seeking and impulsivity, this finding is not surprising. **Implications** of these findings extend into clinical and social realms. If measures of impulsivity and

sensation seeking do predict risky behavior, then early screening of individuals, particularly adolescents, may help detect and therefore prevent such individuals from engaging in potentially harmful activities. Those people who score high on measures of impulsivity or sensation seeking may need to learn more adaptive ways of dealing with their personality styles. Future research may wish to focus on alternative methods of satisfying the impulsive or high sensation seeking person.

The fact that sensation seeking and impulsivity were strongly related and that both were highly related to risky behaviors raises the question as to whether or not they are truly distinct constructs. The fact that the correlations were not extremely high indicates that there is at least some difference between them. However, the collinearity between them does indicate that they at least, in part, measure a similar quality. These findings support the theory put forth by Zuckerman (1994) that sensation seeking and impulsivity may be best conceptualized as parts of a broader trait called impulsive-sensation seeking. This concept led to the development of the Impulsivity-Sensation Seeking (Imp-SS) subscale used in this study. Along the same lines, these findings support the findings of Eysenck and Eysenck (1977)

who viewed sensation seeking as a component of impulsivity and later found that the two constructs fall closely together on their **Psychotocism** dimension of personality.

Future research needs to examine the relationship between the constructs so that a decision can be made as to which is the best way to conceptualize them: as two distinct personality constructs or as one broad trait. From a theoretical point of view, **sensation seeking** and **impulsivity** do represent two different ideas, depending on which **conceptualization** one emphasizes. However, from a methodological and statistical perspective, it is clear that they are at least to an extent measures of the same **quality**. Research should continue to focus on what, if any, behaviors impulsivity as opposed to sensation seeking predict and vice versa. If such a distinction is found, then from a practical point of view it would seem wise to keep the two constructs separate, especially with respect to using tests of the constructs for detection and intervention of potential problem behavior.

Hypothesis 3

The third hypothesis of the present study predicted that scores on the Basic Personality Inventory (BPI) and the **Tridimensional** Personality

Questionnaire (TPQ) would correlate positively with each other and negatively with scores on the Multidimensional Personality **Questionnaire (MPQ)**. This hypothesis was supported by the bivariate correlations. The **BPI** and the TPQ demonstrated high positive correlations and both showed high negative correlations with the MPQ. While these findings indicate that the various inventories measure the same construct, further research should investigate the extent to which these results generalize across other populations, particularly various pathological samples.

Hypothesis 4

Similarly, the fourth hypothesis of this study predicted that scores on the Sensation Seeking Scale Version Five (SSS-V) and Zuckerman-Kuhlman Personality **Questionnaire ImpSS** subscale (**ZKPQ-ImpSS**) would correlate positively. This hypothesis was supported by the significant bivariate correlations found between the two measures. These findings support those of **Zuckerman** (1994) who proposes that although the **ZKPQ-ImpSS** was designed to measure the combination of sensation seeking and **impulsivity**, the ZKPQ-ImpSS is best used as a measure of the general sensation seeking trait. The ZKPQ-ImpSS was designed to measure both **impulsivity** and sensation seeking

while the SSS-V was designed to measure distinctly sensation seeking. The fact that these two scales were found to be highly related offers support to the second hypothesis of this study as well and further raises the question as to the extent to which these constructs are different. As previously stated, more research needs to be conducted to attempt to clarify the distinction between these constructs.

Hypothesis 5

The fifth hypothesis of the present study stated that the different indices of gambling pathology [the South Oaks Gambling Screen (SOGS) and the Gamblers Anonymous **Questionnaire (GA20)**] would be highly related not only with each other but with a measure of gambling activity as well. Although results of the present study supported this hypothesis, some interesting findings were revealed. It was predicted that the amount of gambling behavior would be highly correlated with the degree of gambling pathology. Results showed that although the relationship between gambling activity and pathology (as measured by the SOGS and the GA20) was **significant**, it was not as high as might have been expected. While it does appear that the amount of gambling behavior an individual participates in is at least moderately related to their degree of gambling pathology, it is

by no means a perfect linear relationship.

Seemingly, one might expect that those who are pathological gamblers would gamble a great deal.

However, the inverse relationship may not exist: gambling a lot may not necessarily be related to the likelihood of becoming a pathological gambler.

Gambling pathology is neither a trait or a behavior.

Gambling pathology is an effect or a result. There is very likely more to pathological gambling than just gambling extensively. A qualitative difference may exist between heavy gamblers and pathological gamblers. This idea and its' implications will be discussed further in relation to the final hypotheses of this study.

Scores on the GA20 and SOGS, overall, were very highly correlated. This suggests that the two tests are in accordance when it pertains to measuring the degree of gambling pathology for a given individual. However, when specific categories of gambling pathology (i.e. probable pathological gambler) were examined, the SOGS and GA20 no longer demonstrated such convergence. Although 25 of the 144 males (17.4%) scored in the probable pathological range on both Inventories, eight others scored in the probable pathological range on the SOGS and nine other different subjects scored in the probable

pathological range on the GA20. Put another way. out of the 42 subjects who were deemed to be probable pathological gamblers by at least one of the two gambling pathology measures, only 25 (59.5%) of them scored in the **pathological** range on both measures. There are several possible reasons as to why this discrepancy may have occurred. First of all. as mentioned earlier in the Method section, the SOGS and the GA20 were developed in different ways and for **different** reasons. The design of the GA20 was based on the **questionnaire** used for **determining** whether or not an individual is an alcoholic, a screen used as part of the intake process for Alcoholics **Anonymous**. In the same **way**. the GA20 is primarily used as such a screen for individuals in Gamblers **Anonymous**. The **SOGS**, on the other **hand**, was designed through research for the purposes of classifying people into different categories of problem gambling. The SOGS is based on the criteria for Pathological Gambling in the **DSM-III** and its' primary use is in research in the field of **gambling**, not as a clinical assessment tool. The SOGS is and has been used in considerably more research than the GA20 and has consequently received extensive validation. It was for these reasons that this study used the SOGS as the measure of gambling pathology in regression analyses.

The GA20 needs to be ~~further~~ studied and compared with other gambling inventories such as the SOGS ~~before~~ it can be used as a reliable measure of gambling pathology. As this study ~~shows~~, although there is a strong relationship in actual response frequency between the SOGS and the GA20, they differ notably when it comes to categorizing individuals as probable pathological gamblers.

Another surprising finding of the present study was the very high percentage of ~~individuals~~ who scored in the pathological range on either or both of the SOGS and the GA20. As previously mentioned 17.4% of respondents scored in the probable pathological gambler range on both the SOGS and the GA20. Looking at the two measures ~~individually~~, the percentages become even more dramatic. On the SOGS, 22.9% (33 out of 144) of respondents scored in the probable pathological range while 23.6% (34 out of 144) of respondents scored in the probable pathological range on the GA20. When these figures are compared with literature on the prevalence of pathological gambling in normal populations, the divergence is glaring.

As stated in the introduction, the ~~DSM-IV~~ estimated that between 1 and 3% of the adult population are pathological gamblers. Govoni et al (1996), in a study also conducted in Windsor, found

that 17.5% of the adolescent population examined were problem or at risk gamblers. Numerous studies have looked at the prevalence of pathological gambling with varying prevalence estimates found. However, very few have found percentages even close to those found in this study.

Ladouceur et al (1994) found that 5.7% of the male college students they tested in Quebec fell into the category of probable pathological gamblers on the SOGS. This percentage was twice as high as that found for the general population of Quebec although still meagre in comparison to the findings of this paper. Volberg & Steadman (1989) found 1.4%, 1.5% and 1.4% of the population classified as probable pathological gamblers in New Jersey, Maryland, and New York respectively. However, it should be noted that they looked at both men and women. Several studies have shown that males gamble considerably more than do females. The DSM-IV estimates that approximately two out every three pathological gamblers is male. Lesieur, Cross, Frank et al (1991) found that of the almost two thousand undergraduate students in their sample, 9.3% of males as opposed to 2.4% of females classified as probable pathological gamblers. Also, over three times as many males as females demonstrated gambling problems. Lesieur et

al (1991) concluded that the difference in pathological gambling between men and women is larger for individuals in their teens and early 20s than for adults. Findings such as these may help to explain the large prevalence rates found in this study as only males were **investigated**.

There are a few methodological issues that need to be addressed regarding the present study before any conclusions can be **made**. First of all, the method of recruitment used in this study may have contributed to the large percentage of gamblers found. As stated previously in the Method section, participants were recruited in person from numerous undergraduate classes. They were told before **participating** that this study was looking at gambling and risky behaviors and the relationship between them and specific personality constructs. It is possible that those students who agreed to participate in the study had a personal interest in gambling. In fact, during recruitment, many of those who did sign up for the study were quite vocal and raucous when it was announced that the study was looking at gambling. Given the age range of the majority of the group and their rowdy response, it may be assumed that this was an indication of **their** tendency to gamble and subsequent interest in the study. Such a population

could invariably yield a higher, biased percentage of pathological gamblers than would a sample picked at random.

Shaffer and Hall (1996) point out that prevalence estimates need to be carefully inspected before sound conclusions can be drawn. Prevalence estimates are calculated by dividing the numerator (those individuals who in this study were pathological gamblers) by the denominator (all individuals studied). Much of the research on gambling has looked at general populations consisting of people who have gambled as well as people who have never gambled. Obviously, people who have never gambled are not going to be at risk for developing a pathological gambling disorder. It follows then that prevalence rates of pathological gambling will be higher if the denominator (the entire population) includes only people who have at some point gambled (Shaffer & Hall, 1996). In examining the data collected for this study, it was found that of the 144 respondents, not one of them scored a zero on gambling activities. The entire sample (**denominator**) for this study consisted of people who have at some point in their lifetime gambled. Based on the argument of Shaffer and Hall (1996), one would expect a higher than normal prevalence rate which is indeed

what was found.

Another factor that may have contributed to the high percentage of gamblers is the method of testing employed in this study. All subjects were tested in a face-to-face setting; in other words, the researcher was present while the measures were completed. The Massachusetts Council on Compulsive Gambling (1997) released a report by R. Volberg showing that prevalence rates of pathological gamblers varied depending on the method of interview (telephone or **face-to-face**). Volberg found that prevalence rates of problem and pathological gamblers interviewed by phone was only 8 percent, while those interviewed in person (**face-to-face**) was 32 percent. This difference suggests that perhaps **face-to-face** interviews, such as those employed in this study, may yield **overestimates**. Although further research is needed to confirm or refute this noteworthy finding, it does suggest that perhaps the method of data collection employed in this study may have contributed to the high percentages of pathological **gambling**.

One final element that may have influenced the percentage of pathological gamblers found in this study is the city from which the sample was drawn. The city of Windsor has two casinos and several bingo

halls making it very easy for people who ~~may~~ not normally gamble to "try their luck". While this may have contributed to both the amount of gambling activity and pathology found in this study, it is unlikely that the effect was significant. Several studies have investigated the ~~prevalence~~ of gambling pathology in cities with casinos and found negligible differences between the rates in those cities compared with cities that have no casinos (Griffiths, 1995; Volberg & Steadman, 1989).

While the majority of the research conducted on prevalence rates of pathological gambling have found percentages similar to those ~~aforementioned~~, a recent study did find estimates comparable to those of this study. Powell, Hardoon, Derevensky & Gupta (1996) found that of the 63 university students who participated in their study, 11 of them (17.5%) scored in the probable pathological range on the SOGS. Closer examination of their results revealed that of the 11, 10 were male students. In all, 10 of the 30 (33.3%) males involved in the study scored in the probable ~~pathological~~ range. This prevalence estimate is even larger than that found in this ~~study~~.

Although the sample size for the Powell et al (1996) study, as well as the present study, was relatively small, these findings do raise questions about the prevalence rates of pathological gambling, particularly in male college or university students. The majority of past research investigating pathological gambling has looked at either the general adult population or specific subsections thereof, such as alcoholics and other addictive groups. The findings of Powell et al (1996) and the present study suggest that university students, particularly males, may have a considerably higher percentage of pathological gamblers than both the adult and adolescent populations. Future research is needed to examine pathological gambling in such populations in an attempt to confirm these findings and to determine why such a difference may exist. Perhaps intervention and prevention should focus on university students or those students who may plan to go to university (i.e. adolescent populations).

Hypothesis 6

The sixth hypothesis of this study, namely, that sensation seeking, impulsivity, and risky behaviors would be positively correlated with gambling behavior

and activity was supported by the results of the bivariate correlations, at least for the whole sample. Significant, although moderate, correlations were found between sensation seeking, impulsivity, and risky behavior scores and all measures of gambling pathology and activity for the whole sample. These results indicate that non-pathological gamblers who are impulsive, or are sensation seekers, or participate in risky behaviors, are more likely to gamble and demonstrate a greater degree of gambling pathology. Implications of these results will be discussed in relation to the final hypothesis in the following paragraphs.

With respect to sensation seeking, these results support the previous findings of Kuley and Jacobs (1988), Coventry & Brown (1993), and Zuckerman, (1994). It is difficult to determine from the findings of these studies, including this one, whether sensation seeking leads to gambling or gambling increases an individual's tendency to be a sensation seeker. This is a problem with any "trait" or personality approach to gambling. Being a sensation seeker may predispose an individual to gamble but gambling may also change the personality

of the individual. For example, heavy financial losses due to excessive gambling may lead to depression which may lead to a decrease in sensation seeking. This study does not intend to imply a direction of causation although such an issue needs to be further studied. What is clear from the findings of this study is that sensation seeking and gambling are strongly related. at least at the non-pathological level. The use of sensation seeking screens, such as the SSS-V employed in this study, may be applicable in large scale detection of gambling and other risky behaviors, particularly in adolescent and young adult populations. Future research may be well served in investigating such an application.

The relationship found between gambling and risky behaviors supports the results of Ladouceur et al (1994), who found that scores on the SOGS correlated significantly with alcohol abuse, illegal substance abuse, arrest for criminal offense, and eating disorders. Similarly, this study supports the conclusions of Powell et al (1996) who found that a variety of risk taking measures correlated positively with the degree of gambling involvement as

categorized by the SOGS. The correlations observed in this study as well as those aforementioned show that addictive behaviors such as **gambling**, alcohol and drug use, and eating disorders are related. However, it is difficult to determine if there is a **cause-and-effect** relationship between them and if so, in which direction, or whether they just co-exist. **Nonetheless**, the observation of one type of risky behavior may serve as a "red flag" of sorts suggesting that others may be present as well. Future research may wish to attempt to clarify this relationship for potential utility in detection and subsequent intervention of risky behaviors including **gambling**.

The relationship between gambling and **impulsivity** at first glance would seem to imply that the **DSM-IV's** Inclusion of gambling as an impulse control disorder is **substantiated**. However, examination of the probable pathological gamblers did not reveal significant correlations between gambling pathology and sensation seeking, risky behaviors, or impulsivity. Pathological gamblers did not demonstrate a tendency to be sensation seekers, or impulsive, or participate in other risky behaviors. This unexpected finding and its' implications will be discussed further with respect to the final

hypothesis.**Hypothesis 7**

The final hypothesis of this study stated that sensation **seeking**, **impulsivity**, and risky behaviors would likely be significant predictors of gambling behavior and pathology. Initially there was concern that the expected high **collinearity** between the variables would make such an analysis impossible. Despite the fact that the three variables were highly correlated, the employment of hierarchical regression was possible.

Regression analyses on the entire sample of respondents indicated that indeed impulsivity and risky behaviors were significant predictors of both the degree of **gambling** pathology and amount of gambling activity. Sensation seeking did not turn out to be a **significant** predictor for either gambling pathology or gambling activity. However, post-hoc analyses revealed that this was actually an artifact of statistical methodology. When the SSS-V (sensation seeking) was entered first and the **BPI** (**impulsivity**) entered last, sensation seeking was found to be a significant predictor while impulsivity was not. This is attributable to the covariance found between the two variables, one of the initial concerns surrounding this hypothesis. The results of

the regression analyses for the whole sample coincide with the findings of the bivariate correlations.

Regression analyses on the probable pathological sample demonstrated that the combination of sensation seeking, impulsivity, and risky behavior accounted for a significant proportion of the variance in gambling activity. However, individually, none of the variables was significant. These results suggest that although the combination of sensation seeking, impulsivity and risky behaviors predicted gambling activity, none of them, individually, significantly predicted gambling activity in the pathological gambling sample. These relationships differ significantly from those found for the whole sample. It appears that different factors are involved in gambling activity for pathological gamblers than for non-pathological gamblers. While sensation seeking, impulsivity, and risky behaviors are important correlates of gambling behavior for a normal male population, they do not appear to play as important a role in male pathological gamblers. This discrepancy will be explored further in the following paragraphs.

Regression analyses on the probable pathological sample using gambling pathology as the dependent variable revealed some intriguing results. First of all, neither impulsivity, sensation seeking, or risky

behaviors demonstrated significant predictive power for the degree of gambling pathology. As a group, they also did not account for a significant proportion of the variance in the gambling pathology scores. Given the non-significance of the prior bivariate correlations, this is not surprising.

These findings intimate that there is a qualitative difference in what drives, or is at least present in, non-pathological gamblers as opposed to pathological gamblers. The fact that impulsivity in particular was not found to be predictive of or even related to gambling pathology for the pathological gamblers suggests that the inclusion of pathological gambling as an Impulse Control disorder in the DSM-IV needs to be examined. Although risky behaviors were also not significantly related to gambling pathology for the pathological sample, the fact that they were related for the whole sample may offer an alternative categorization for pathological gambling. This study, along with several others including Ladouceur et al (1994) and Powell et al (1996), found a strong relationship between gambling and risky or addictive behaviors. It follows from this that pathological or compulsive gambling arguably would fit better in a clinical classification of addictive behaviors.

Future research and theory may wish to explore this

option as such an inclusion may aid in the prevention and treatment of pathological gambling.

The fact that there seems to be a qualitative difference between pathological and non-pathological gamblers lends support to Jacobs' General Theory of Addiction. Jacobs proposes that addictive behaviors result from a combination of two predisposing factors: a unipolar psychological resting state that is either depressed or **excited**, and feelings of inadequacy resulting from experiences in childhood or adolescence. This study lends support to the first of his factors and also reveals that something else, although not necessarily childhood **experiences**, is required for an individual to become addicted to gambling (a pathological **gambler**). It is probable that the arousal obtained from gambling may lead one to gamble more often, but the fact that sensation seeking does not appear to be a factor once an individual becomes a pathological gambler suggests that something else plays a significant role in creating and sustaining the addiction. As to what this factor may be is presently unclear. Future research needs to focus on what else may be playing a role in gambling at the pathological level.

In conclusion, the findings of this study may have raised more questions than it actually answered.

The relationship between sensation seeking, impulsivity, and risky behavior with gambling activity and pathology is evident in a male non-pathological population. However, what causes this relationship to change in pathological samples is an issue that needs to be examined. Pathological gambling needs to be closely examined in terms of where it fits into a diagnostic classification system. Finally, the extremely high prevalence rates of pathological gambling found in this study indicate that more research is needed particularly in male adolescent and college populations. Targeting such populations is vital: prevention is a far more feasible and economic option than intervention and treatment.

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Appendix A
Consent Form

I. _____ (please print) hereby understand and consent to the following:

I am being asked to complete a series of questions asking about my experience with gambling and other similar behaviors. Although many of these questions are of a general **nature**, many of them ask about matters that are potentially upsetting to some people. The purpose of this study is to learn what we can about gambling and other behaviors from many different people's responses.

I am aware that my **participation** is completely voluntary. I have the right to withdraw from **participation** at any time without explanation or penalty, and I may also refrain from answering any questions that I prefer to omit. I may ask any questions during my **participation**, and M. Langewisch (graduate student) or Dr. R. Frisch (supervisor) may be contacted at 253-4232 ext. 7012 after I have finished for any further **questions**, comments or discussion. Anonymity regarding my responses will be protected by not having my name or any other identifying information appear on the survey. The results of this study **may** be published at a **later** date, but my identity or that of the other participants will not be known and my own individual results will not be available.

I am being asked to participate on one occasion for approximately 30 minutes. This procedure has been cleared by the University of Windsor Ethics Committee. I have received a copy of this form and the copy I submit to the researcher will be kept separate from my survey to protect my identity.

I understand this information and consent to participate in this study.

Signature _____

Date _____

Appendix B
 Multidimensional Personality Questionnaire-
 (Control/Impulsiveness Scale)
 Tellegen, 1982 (as cited in Parker & Bagby, 1991)

MPQ

Please circle either true (T) or false (F) for all statements as they apply to **you**.

I keep close track of where my money goes .	T	F
I often stop one activity before completing it and start another.	T	F
When faced with a decision I usually take time to consider and weigh all aspects.	T	F
I often act without thinking.	T	F
I like to stop and think things over before I do them.	T	F
I often prefer to "play things by ear" rather than to plan ahead .	T	F
I don't like to start a project until I know exactly how to proceed.	T	F
I am very level-headed and always like to keep my feet on the ground.	T	F
I am more likely to be fast and careless than to be slow and plodding.	T	F
I almost never do anything reckless.	T	F
When I need to buy something, I usually get it without thinking what more I may soon need from the store.	T	F
I tend to value and follow a rational , "sensible" approach to things.	T	F
I often act on the spur of the moment.	T	F
I usually make up my mind through careful reasoning.	T	F
I am often not as cautious as I should be .	T	F
I plan and organize my work in detail.	T	F
I often start projects with only a vague idea of what the end result will be .	T	F
People say that I am methodical (that I do things in a systematic manner).	T	F
I am a cautious person.	T	F
I generally do not like to have detailed plans.	T	F
Whenever I go out and have fun I like to have a pretty good idea of what I'm going to do .	T	F
People consider me a rather freewheeling and spontaneous person.	T	F
Before I get into a new situation I like to find out what to expect from it.	T	F
I often like to do the first thing that comes to mind.	T	F

Appendix C
Basic Personality Inventory
 (Impulse Expression Scale)
 Jackson, 1989
BPI

Please circle either true (T) or false (F) for all statements as they apply to you.

	T	F
Many times I act without thinking.	T	F
I would not do something foolhardy just for the fun of it.	T	F
I often behave in a reckless manner.	T	F
Ideas do not race through my head faster than I can speak them.	T	F
Sometimes I suddenly get up and act without reason or warning.	T	F
I am careful in almost everything I do.	T	F
I'll try almost anything regardless of the consequences.	T	F
I can work for a reasonable length of time without being bored.	T	F
I often take risks without stopping to think about the results.	T	F
I am not the type to be bored one minute and excited about something the next.	T	F
I am usually somewhat restless.	T	F
My feelings about people do not change much from day to day.	T	F
I often leave jobs unfinished.	T	F
I generally make careful plans.	T	F
At times I am rather careless.	T	F
I never take unnecessary chances.	T	F
I usually say the first thing that comes into my mind.	T	F
I have a well thought out reason for almost everything I undertake.	T	F
I find it exiting to drive a fast car.	T	F
I seldom do things without thinking.	T	F

Appendix D
 Tridimensional Personality Questionnaire
 (Impulsiveness Scale)
 Cloninger, 1987

TPQ

Please circle either true (T) or false (F) for all statements as they apply to **you**.

- | | |
|---|----------|
| I often react so strongly to unexpected news that I say or do things that I regret. | T F |
| I like to think about things for a long time before I make a decision. | T F |
| I often follow my instincts, hunches , or intuition without thinking through all the details. | T F |
| I often have to change my decisions because I had a wrong hunch or mistaken first impression. | T F |
| I usually think about all the facts in detail before I make a decision. | T F |
| I nearly always think about all the facts in detail before I make a decision, even when other people demand a quick decision. | T F |
| I hate to make decisions based only on my first impressions. | T F |
| I like to pay close attention to details in everything I do. | T F |

Exploratory Excitability Scale

- | | |
|--|----------|
| I often try new things just for fun or thrills , even if most people think it is a waste of time . | T F |
| When nothing new is happening, I usually start looking for something that is thrilling and exciting . | T F |
| I usually demand very good practical reasons before I am willing to change my old way of doing things. | T F |
| I hate to change the way I do things , even if many people tell me there is a new and better way to do it. | T F |
| I am slower than most people to get excited about new ideas and activities. | T F |
| It is difficult for me to keep the same interests for a long time because my attention often shifts to something else. | T F |
| I like old " tried and true " ways of doing things much better than trying "new and improved" ways . | T F |
| In conversations I am much better as a listener than as a talker. | T F |
| I like to stay at home better than to travel or explore new places. | T F |

Appendix E
Personal Information Questionnaire

Are you male or female? M F

How old are you? _____

How long have you lived in Windsor? _____

What ethnicity are you?

Caucasian African-American Other (Please indicate)

Do you: live in a university residence? Yes No
 rent an apartment or house? Yes No
 live with parents? Yes No

Have you ever been to a Casino in Windsor? Yes No

Have you ever been to a Casino outside of Windsor? Yes No

What are you majoring in at the University of Windsor?

Please estimate your annual income. _____

Appendix F
Zuckerman-Kuhlman Personality Questionnaire
 (Zuckerman, Kuhlman, Joireman, Teta & Kraft, 1993)
ImpSS Subscale

I tend to begin a new job without much advance planning on how I will do it.	T	F
I usually think about what I am going to do before doing it.	T	F
I often do things on impulse.	T	F
I very seldom spend much time on the details of planning ahead .	T	F
I like to have new and exciting experiences and sensations even if they are a little frightening .	T	F
Before I begin a complicated job. I make careful plans.	T	F
I would like to take off on a trip with no preplanned or definite routes or timetables.	T	F
I enjoy getting into new situations where you can't predict how things will turn out .	T	F
I like doing things just for the thrill of it.	T	F
I tend to change interests frequently.	T	F
I sometimes like to do things that are a little frightening.	T	F
I'll try anything once.	T	F
I would like the kind of life where one is on the move and travelling a lot, with lots of change and excitement.	T	F
I sometimes do crazy things just for fun.	T	F
I like to explore a strange city or section of town by myself, even if it means getting lost.	T	F
I prefer friends who are excitingly unpredictable .	T	F
I often get so carried away by new and exciting things and ideas that I never think of possible implications .	T	F
I am an impulsive person.	T	F
I like "wild" uninhibited parties.	T	F

Appendix G
Zuckerman Sensation Seeking Scale Form-V (SSS-V)
(Zuckerman et al., 1978)

Each of the items below contains two choices. A and B. Please circle which of the two choices most describes your likes or the way you feel. In some cases you may find items in which both choices describe your feelings. Please choose the one which better describes your likes or feelings. In some cases you may find items in which you do not like either choice. In these **cases**, mark the choice you dislike least. Do not leave any items blank. Please circle only one choice for each item. Please be frank and give your honest appraisal of yourself. There are no right or wrong answers.

1. A. I like "wild" uninhibited parties.
B. I prefer quiet parties with good **conversation**.
2. A. There are some movies I enjoy seeing a second or even a third **time**.
B. I can't stand watching a movie that I've seen before.
3. A. I often wish I could be a mountain climber.
B. I can't understand people who risk their necks climbing **mountains**.
4. A. I dislike all body odors.
B. I like some of the earthy body smells.
5. A. I get bored seeing the same old faces.
B. I like the comfortable **familiarity** of everyday friends.
6. A. I like to explore a strange city or section of town by myself, even if it means getting **lost**.
B. I prefer a guide when I am in a place I **don't** know well.
7. A. I dislike people who do or say things just to shock or upset others.
B. When you can predict almost everything a person will do or say he or she must be a bore.
8. A. I usually **don't** enjoy a movie or play when I can predict what will happen in advance.
B. I don't mind watching a movie or play where I can predict what will happen in **advance**.
9. A. I have tried marijuana or would like to.
B. I would never smoke marijuana.
10. A. I would not like to try any drug which might produce strange and dangerous effects on **me**.
B. I would like to try some of the new drugs that produce **hallucinations**.
11. A. A sensible person avoids activities that are dangerous.
B. I sometimes like to do things that are a little **frightening**.

Appendix G cont.

12. A. I dislike "swingers" (people who are uninhibited and free about sex).
B. I enjoy the company of real swingers.
13. A. I find that stimulants make me uncomfortable.
B. I often like to get high (drinking liquor or smoking marijuana).
14. A. I like to try new food that I have never tasted before.
B. I order the dishes with which I am familiar, so as to avoid disappointment and unpleasantness.
15. A. I enjoy looking at home movies or travel slides.
B. Looking at someones home movies or travel slides bores me tremendously.
16. A. I would like to take up the sport of water skiing.
B. I would not like to take up water skiing.
17. A. I would like to try surfboard riding.
B. I would not like to try surfboard riding.
18. A. I would like to take off on a trip with no preplanned or definite routes, or timetable.
B. When I go on a trip I like to plan my route and timetable fairly carefully.
19. A. I prefer the "down to earth" kinds of people and friends.
B. I would like to make friends in some of the "far out" groups like artists or "punks".
20. A. I would not like to learn to fly an airplane.
B. I would like to learn to fly an airplane.
21. A. I prefer the surface of the water to the depths.
B. I would like to go scuba diving.
22. A. I would like to meet some persons who are homosexual (men or women).
B. I stay away from anyone I suspect of being gay or lesbian.
23. A. I would like to try parachute jumping.
B. I would never want to try jumping out of a plane with or without a parachute.
24. A. I prefer friends who are excitingly unpredictable.
B. I prefer friends who are reliable and predictable.
25. A. I am not interested in experience for its own sake.
B. I like to have new and exciting experiences and sensations even if they are a little frightening, unconventional or illegal.
26. A. The essence of good art is in its clarity, symmetry of form and v harmony of colours.
B. I often find beauty in the clashing of colours and irregular forms of modern paintings.

Appendix G cont.

27. A. I enjoy spending time in the familiar surroundings of **home**.
B. I get restless if I have to stay around home for any length of **time**.
28. A. I like to dive off the high board.
B. I don't like the feeling I get standing on the high board (or I don't go near it at **all**).
29. A. I like to date **members** of the opposite sex who are physically exciting.
B. I like to date members of the opposite sex who share my values.
30. A. Heavy drinking usually ruins a party because **some** people get loud and boisterous.
B. Keeping the drinks full is the key to a good party.
31. A. The worst social sin is to be **rude**.
B. The worst social sin is to be a bore.
32. A. A person should have considerable sexual experience before marriage.
B. It's better if two married persons begin their sexual experience with each other.
33. A. Even if I had the money I would not care to associate with flighty rich persons like those in the "jet set".
B. I could conceive of myself seeking pleasures around the world with the "jet set".
34. A. I like people who are sharp and witty even if they do sometimes insult others.
B. I dislike people who have their fun at the expense of hurting the feelings of others.
35. A. There is altogether too much portrayal of sex in the **movies**.
B. I enjoy watching many of the "sexy" scenes in movies.
36. A. I feel best after taking a couple of drinks.
B. Something is wrong with people who need liquor to feel **good**.
37. A. People should dress according to some standard of taste, **neatness**, and style.
B. People should dress in **individual** ways even if the effects are sometimes strange.
38. A. Sailing long distances in small sailing crafts is foolhardy.
B. I would like to sail a long distance in a small but seaworthy **sailing craft**.
39. A. I have no patience with dull or boring persons.
B. I find something interesting in almost every person I talk to.
40. A. Skiing down a high mountain slope is a good way to end up on **crutches**.
B. I think I would enjoy the sensations of skiing very fast down a high mountain slope.

Appendix H
South Oaks Gambling Screen
(SOGS)
(Lesieur & Blume, 1987)

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

not	less	once
at	than	a
all	once	week
	week	or
		more

- a. play cards for money
- b. bet on **horses**, dogs, or other animals (at OTB, the track or with a bookie)
- c. bet on sports (parlay cards, with a **bookie**, or at **Jai Alai**)
- d. played dice games (including craps, over and under or other dice **games**) for money
- e. gambled in a casino (**legal** or otherwise)
- f. played the numbers or bet on lotteries
- g. played bingo for money
- h. played the stock, options and/or commodities market
- i. played slot machines, poker machines or other gambling **machines**
- j. bowled, shot pool, played golf or some other game of skill for money
- k. pull tabs or paper games other than lotteries
- l. some form of gambling listed above
(please specify) _____

2. What is the largest amount of money you have ever gambled with on any one day?

<input type="checkbox"/> never have gambled	<input type="checkbox"/> more than \$100 up to \$1,000
<input type="checkbox"/> \$1 or less	<input type="checkbox"/> more than \$1,000 up to \$10,000
<input type="checkbox"/> more than \$1 up to \$10	<input type="checkbox"/> more than \$10,000
<input type="checkbox"/> more than \$10 up to \$100	

3. Check which of the following people in your life has (or **had**) a gambling problem.

<input type="checkbox"/> father	<input type="checkbox"/> mother	<input type="checkbox"/> a brother or sister	<input type="checkbox"/> a grandparent
<input type="checkbox"/> my spouse or partner	<input type="checkbox"/> my child(ren)	<input type="checkbox"/> another relative	
<input type="checkbox"/> a friend or someone else important in my life			

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

<input type="checkbox"/> never	
<input type="checkbox"/> some of the time (less than half the time I lost)	
<input type="checkbox"/> most of the time I lost	
<input type="checkbox"/> every time I lost	

Appendix H cont.

5. Have you ever **claimed** to be winning money gambling but weren't really?
 In fact, you lost?
 ____ never (or never **gambl(ed)**)
 ____ yes, less than half the time I lost
 ____ yes, most of the time
6. Do you feel you have ever had a problem with betting money or gambling?
 ____ no
 ____ yes, in the past but not now
 ____ yes
7. Did you ever gamble more than you intend **to?**..... yes ____ no
8. Have people criticized your betting or told you
 that you had a gambling problem, regardless of
 whether or not you thought it was **true?**..... yes ____ no
9. Have you ever felt guilty about the way you gamble
 or what happens when you **gamble?**..... yes ____ no
10. Have you ever felt like you would like to stop
 betting money or gambling but **didn't** think
 you **could?**..... yes ____ no
11. Have you ever hidden betting **slips**, lottery
 tickets, gambling money, I.O.U.s or other signs of
 gambling or betting **from** your spouse, children or
 other important people in your **life?**..... yes ____ no
12. Have you ever argued with people you **live with**
 over **money?**..... yes ____ no
13. (If you answered yes to question 12): Have money
 arguments ever centered on your **gambling?**..... yes ____ no
14. Have you ever borrowed from someone and not paid
 back as a result of **your gambling?**..... yes ____ no
15. Have you ever lost time from work (or school) due
 to betting money or **gambling?**..... yes ____ no
16. If you borrowed money to gamble or to pay gambling
 debts, who or where did you borrow from?
 (check "yes" or "no" for each)

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

Appendix I
General Risk Appraisal Scale
(Horvath & Zuckerman, 1993)

This **questionnaire** contained on the following eight pages is about your opinions and your experience with a variety **of** situations. Each situations, which is **underlined**, is followed by four questions, each with its own response. Select the response that best corresponds to your answer and circle the matching letter i.e. A, B, C, D. or E. "PEERS" are people you know of who are your own sex and about the same age.

The questions go from left to right in the following manner:

- (1) ---> (2) ---> (3) ---> (4)
(5) ---> (6) ---> (7) ---> (8) and so on.

Please answer questions in the order they appear. Please do not skip questions and make sure to answer all of them.

THANKYOU FOR YOUR HELP!

Questions 1-4

- (1) Chance of YOU getting cancer if you ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (2) How often do you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times
- (3) Chance of a PEER getting cancer if he or she ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (4) What % of your peers ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 5-8

- (5) Chance of YOU having an accident if you ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (6) How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times
- (7) Chance of a PEER having an accident if he or she ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (8) What % of your peers who drive ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 9-12

- (9) Chance of YOU losing money if you ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (10) How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times
- (11) Chance of a PEER losing money if he or she ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (12) What % of your peers ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 13-16

- (13) Chance of YOU losing money if you ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (14) How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times
- (15) Chance of a PEER losing money if he or she ____?
 (A) impossible
 (B) slight chance
 (C) Tossup, SO/SO
 (D) likely chance
 (E) almost certain
- (18) What % of your peers have ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 17-20 PERJURY (lying in court)

(17)	(18)	(19)	(20)
Chance of YOU being caught if committing ?	How often have you committed ?	Chance of a PEER being caught if he or she committed ?	If your peers were testifying in court, what % might commit ?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)

Questions 21-24 ENGAGED IN CASINO GAMBLING

(21)	(22)	(23)	(24)
Chance of YOU losing money if you ___?	How often have you ___?	Chance of a PEER losing money if he or she ___?	What % of your peers ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)

Questions 25-28 WRITTEN A CHECK YOU KNEW COULD NOT BE COVERED

(25)	(26)	(27)	(28)
Chance of YOU being penalized if you have ___?	How often have you ___?	Chance of a PEER being penalized if he or she has ___?	What % of your peers who have checking accounts have ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)

Questions 29-32 FORGED CHECKS

(29)	(30)	(31)	(32)
Chance of YOU being arrested if you ___?	How often have you ___?	Chance of a PEER being arrested if he or she ___?	What % of your peers have ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)

Questions 33-36 SOLD STREET DRUGS**(33) (34)**

Chance of YOU being arrested if you ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(35)

Chance of a PEER being arrested if he or she ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(36)

What % of your peers have ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 37-40**(37)**

Chance of YOU being arrested if you ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

SHOPLIFTED**(38)**

How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(39)

Chance of a PEER being arrested if he or she ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(40)

What % of your peers have ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 41-44**(41)**

Chance of YOU going bankrupt if you ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

PAN A SMALL BUSINESS**(42)**

How often have you ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(43)

Chance of a PEER going bankrupt if he or she ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(44)

What % of your peers have ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 45-48**(45)**

Chance of YOU dying if you were ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

EXPOSED TO A CANCER-CAUSING SUBSTANCE**(46)**

How often have been ____?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ time*

(47)

Chance of a PEER dying if he or she were ____?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(48)

What % of your peers have been ____?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 49-52 SCUBA DIVING

- | | | | |
|--|--------------------------------|--|---------------------------------------|
| (49) Chance of YOU seriously injured if you went ? | (50) How often have you gone ? | (51) Chance of a PEER being seriously injured if ? | (52) What % of your peers have gone ? |
| (A) Impossible | (A) Never | (A) Impossible | (A) None (0%) |
| (B) Slight chance | (B) 1-2 times | (B) Slight chance | (B) Some or few (1-19%) |
| (C) Tossup, 50/50 | (C) 3-5 times | (C) Tossup, 50/50 | (C) About 1/3 (20-39%) |
| (D) Likely chance | (D) 6-9 times | (D) Likely chance | (D) About 1/2 (40-59%) |
| (E) Almost certain | (E) 10+ times | (E) Almost certain | (E) Majority or many (60-100%) |

Questions 53-56 FAILED TO PAY CHILD SUPPORT

- | | | | |
|--|---------------------------|---|---|
| (53) Chance of YOU being caught if you ? | (54) How often have you ? | (55) Chance of a PEER being caught if he or she ? | (56) What % of your divorced peers who have children have ? |
| (A) Impossible | (A) Never | (A) Impossible | (A) None (0%) |
| (B) Slight chance | (B) 1-2 times | (B) Slight chance | (B) Some or few (1-19%) |
| (C) Tossup, 50/50 | (C) 3-5 times | (C) Tossup, 50/50 | (C) About 1/3 (20-39%) |
| (D) Likely chance | (D) 6-9 times | (D) Likely chance | (D) About 1/2 (40-59%) |
| (E) Almost certain | (E) 10+ times | (E) Almost certain | (E) Majority or many (60-100%) |

Questions 57-60 TOOK ILLEGAL DRUGS

- | | | | |
|--|---------------------------|---|--------------------------------|
| (57) Chance of YOU overdosing if you ? | (58) How often have you ? | (59) Chance of a PEER overdosing if he or she ? | (60) What % of your peers ? |
| (A) Impossible | (A) Never | (A) Impossible | (A) None (0%) |
| (B) Slight chance | (B) 1-2 times | (B) Slight chance | (B) Some or few (1-19%) |
| (C) Tossup, 50/50 | (C) 3-5 times | (C) Tossup, 50/50 | (C) About 1/3 (20-39%) |
| (D) Likely chance | (D) 6-9 times | (D) Likely chance | (D) About 1/2 (40-59%) |
| (E) Almost certain | (E) 10+ times | (E) Almost certain | (E) Majority or many (60-100%) |

Questions 61-64 PLAYED THE LOTTERY

- | | | | |
|--|---------------------------|---|----------------------------------|
| (61) Chance of YOU losing money if you ? | (62) How often have you ? | (63) Chance of a PEER losing money if he or she ? | (64) What % of your peers have ? |
| (A) Impossible | (A) Never | (A) Impossible | (A) None (0%) |
| (B) Slight chance | (B) 1-2 times | (B) Slight chance | (B) Some or few (1-19%) |
| (C) Tossup, 50/50 | (C) 3-5 times | (C) Tossup, 50/50 | (C) About 1/3 (20-39%) |
| (D) Likely chance | (D) 6-9 times | (D) Likely chance | (D) About 1/2 (40-59%) |
| (E) Almost certain | (E) 10+ times | (E) Almost certain | (E) Majority or many (60-100%) |

Questions 65-68

(65) Chance of YOU being caught if you ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

LIED ON TAX FORMS

(66) How often have you ?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(67) Chance of a PEER being caught if he or she ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(68) What % of your peers have ?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 69-72

(69) Chance of YOU being seriously injured if you ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

SAILED A BOAT

(70) How often have you ? injured if he/she ?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(71) Chance of a PEER being seriously injured if he/she ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(72) What % of your peers have ?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 73-76

(73) Chance of YOU being arrested if you ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

VANDALIZED (deliberately damaged property)

(74) How often have you ? - he or she ?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(75) Chance of a PEER being arrested if he/she ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(76) What % of your peers have ?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 77-80

(77) Chance of YOU being seriously injured if you ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

PLAYED BASKETBALL

(78) How often have you ? injured if he/she ?
 (A) Never
 (B) 1-2 times
 (C) 3-5 times
 (D) 6-9 times
 (E) 10+ times

(79) Chance of a PEER being seriously injured if he/she ?
 (A) Impossible
 (B) Slight chance
 (C) Tossup, 50/50
 (D) Likely chance
 (E) Almost certain

(80) What % of your peers have ?
 (A) None (0%)
 (B) Some or few (1-19%)
 (C) About 1/3 (20-39%)
 (D) About 1/2 (40-59%)
 (E) Majority or many (60-100%)

Questions 81-84 BOUGHT STREET DRUGS

(81) Chance of YOU being arrested if you ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(82) How often have you ____? (A) Never (B) 1-2 times (C) 3-5 times (D) 6-9 times (E) 10+ times	(83) Chance of a PEER being arrested if he or she ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(84) What % of your peers have ____? (A) None (0%) (B) Some or few (1-19%) (C) About 1/3 (20-39%) (D) About 1/2 (40-59%) (E) Majority or many (60-100%)
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Questions 85-88 SURFING

(85) Chance of YOU being seriously injured if you went ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(86) How often have you gone ____? (A) Never (B) 1-2 times (C) 3-5 times (D) 6-9 times (E) 10+ times	(87) Chance of a PEER being seriously injured if ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(88) What % of your peers have gone ____? (A) None (0%) (B) Some or few (1-19%) (C) About 1/3 (20-39%) (D) About 1/2 (40-59%) (E) Majority or many (60-100%)
--	--	--	--

Questions 89-92 PARKED IN A TOW-AWAY ZONE

(89) Chance of YOU being towed if you ____? (A) Impossible (B) Slight chance (C) Tossup, SO/SO (D) Likely chance (E) Almost certain	(90) How often have you ____? (A) Never (B) 1-2 times (C) 3-5 times (D) 6-9 times (E) 10+ times	(91) Chance of a PEER being towed if he or she ____? (A) Impossible (B) Slight chance (C) Tossup, SO/SO (D) Likely chance (E) Almost certain	(92) What % of your peers who drive have ____? (A) None (0%) (B) Some or few (1-19%) (C) About 1/3 (20-39%) (D) About 1/2 (40-59%) (E) Majority or many (60-100%)
---	---	--	---

Questions 93-96 DROVE THROUGH A RED LIGHT

(93) Chance of YOU having an accident if you ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(94) How often have you ____? (A) Never (B) 1-2 times (C) 3-5 times (D) 6-9 times (E) 10+ times	(95) Chance of a PEER having an accident if he or she ____? (A) Impossible (B) Slight chance (C) Tossup, 50/50 (D) Likely chance (E) Almost certain	(98) What % of your peers who drive have ____? (A) None (0%) (B) Some or few (1-19%) (C) About 1/3 (20-39%) (D) About 1/2 (40-59%) (E) Majority or many (60-100%)
--	---	---	---

Questions 97-100

(97)		(98)	(99)	(100)
Chance of YOU losing club membership if you ___?		How often have you ___?	Chance of a PEER losing membership if he or she ___?	What % of your peers who belong to clubs have ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)	
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)	
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)	
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)	
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)	

Questions 101-104

(101)		(102)	(103)	(104)
Chance of YOU being penalized if you ___?		How often have you ___?	Chance of a PEER being penalized if he or she ___?	What % of your peers who have credit cards have ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)	
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)	
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)	
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)	
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)	

Questions 105-108

(105)		(106)	(107)	(108)
Chance of YOU being mugged if you ___?		How often have you ___?	Chance of a PEER being mugged if he or she ___?	What % of your peers have ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)	
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)	
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)	
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)	
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)	

Questions 109-112

(109)		(110)	(111)	(112)
Chance of YOU being seriously injured if you ___?		How often have you gone ___?	Chance of a PEER being seriously injured if ___?	What % of your peers have gone ___?
(A) Impossible	(A) Never	(A) Impossible	(A) None (0%)	
(B) Slight chance	(B) 1-2 times	(B) Slight chance	(B) Some or few (1-19%)	
(C) Tossup, 50/50	(C) 3-5 times	(C) Tossup, 50/50	(C) About 1/3 (20-39%)	
(D) Likely chance	(D) 6-9 times	(D) Likely chance	(D) About 1/2 (40-59%)	
(E) Almost certain	(E) 10+ times	(E) Almost certain	(E) Majority or many (60-100%)	

Questions 113-116 ATTENDED A PRIVATE PARTY WITHOUT AN INVITATION

- | | | | |
|--|---|---|---|
| <p>(113) Chance of YOU being thrown out if you ___?</p> <p>(A) Impossible
(B) Slight chance
(C) Tossup, 50/50
(D) Likely chance
(E) Almost certain</p> | <p>(114) How often have you ___?</p> <p>(A) Never
(B) 1-2 times
(C) 3-5 times
(D) 6-9 times
(E) 10+ times</p> | <p>(115) Chance of a PEER being thrown out if he or she ___?</p> <p>(A) Impossible
(B) Slight chance
(C) Tossup, 50/50
(D) Likely chance
(E) Almost certain</p> | <p>(116) What % of your peers have ___?</p> <p>(A) None (0%)
(B) Some or few (1-19%)
(C) About 1/3 (20-39%)
(D) About 1/2 (40-59%)
(E) Majority or many (60-100%)</p> |
|--|---|---|---|

Questions 117-120 DROVE FAR ABOVE THE SPEED LIMIT

- | | | | |
|--|---|--|--|
| <p>(117) Chance of YOU being injured in an accident if you ___?</p> <p>(A) Impossible
(B) Slight chance
(C) Tossup, 50/50
(D) Likely chance
(E) Almost certain</p> | <p>(118) How often have you ___?</p> <p>(A) Never
(B) 1-2 times
(C) 3-5 times
(D) 6-9 times
(E) 10+ times</p> | <p>(119) Chance of a PEER being injured in an accident if he/she ___?</p> <p>(A) Impossible
(B) Slight chance
(C) Tossup, 50/50
(D) Likely chance
(E) Almost certain</p> | <p>(120) What % of your peers who drive ___?</p> <p>(A) None (0%)
(B) Some or few (1-19%)
(C) About 1/3 (20-39%)
(D) About 1/2 (40-59%)
(E) Majority or many (60-100%)</p> |
|--|---|--|--|

Appendix J
**Gamblers Anonymous Questionnaire
(GA20)**

Please circle yes (Y) or no (N) for each to the following questions.

- | | |
|--|--------|
| 1. Have you ever lost time from work due to gambling? | Y N |
| 2. Has gambling ever made your home life unhappy? | Y N |
| 3. Did/does gambling affect your reputation? | Y N |
| 4. Have you ever felt remorse after gambling? | Y N |
| 5. Did you ever gamble with money with which to pay debts or otherwise solve financial difficulties? | Y N |
| 6. Did/does gambling cause a decrease in your ambition or efficiency? | Y N |
| 7. After losing did/do you feel you must return as soon as possible and win back your losses? | Y N |
| 8. After a win did/do you have a strong urge to return and win more? | Y N |
| 9. Did/do you often gamble until your last dollar is gone? | Y N |
| 10. Did/do you ever borrow to finance your gambling? | Y N |
| 11. Have you ever sold anything to finance gambling? | Y N |
| 12. Were/are you reluctant to use gambling money for normal expenditures? | Y N |
| 13. Did/does gambling make you careless of the welfare of yourself and your family? | Y N |
| 14. Did/do you ever gamble longer than you have planned? | Y N |
| 15. Have you ever gambled to escape worry or trouble? | Y N |
| 16. Have you ever committed, or considered committing, an illegal act to finance gambling? | Y N |
| 17. Did/does gambling cause you to have difficulty sleeping? | Y N |
| 18. Do arguments, disappointments or frustrations create within you an urge to gamble? | Y N |
| 19. Did you ever have an urge to celebrate good fortune by a few hours of gambling? | Y N |
| 20. Have you ever considered self destruction as a result of your gambling? | Y N |

Appendix K
Debriefing Form

Title of Project: Gambling Behavior and its Relation to Risky Behavior, **Impulsivity**, and Sensation **Seeking**.

Researcher: Mark Langewisch

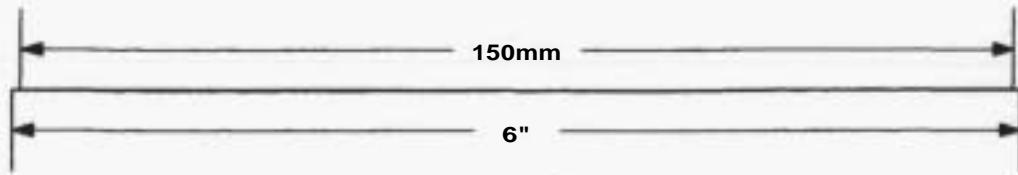
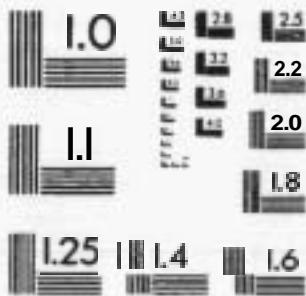
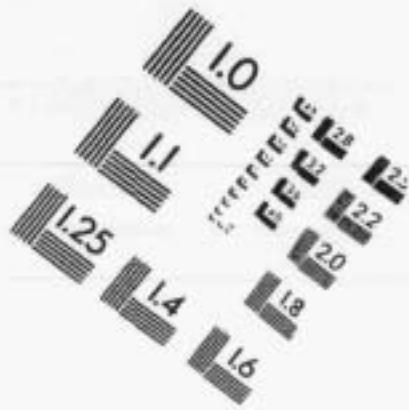
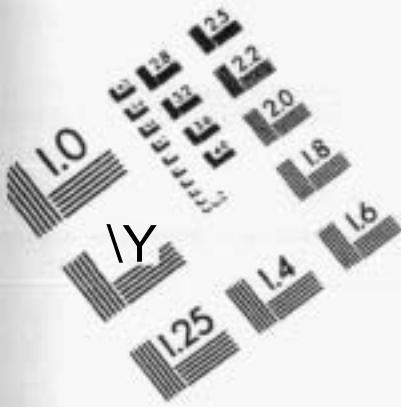
Advisor: Dr. R. Frisch

Thanks again for **participating** in my study. The focus of my study was to investigate the relationship between risky **behaviors**, especially gambling, and the personality constructs commonly referred to as sensation seeking and **impulsivity**. These areas have been extensively studied on an individual basis but little research has looked at the degree to which they are related. My hypothesis is that the relationship between gambling, as well as other risky behaviors, and sensation seeking and impulsivity will be extremely high. I also anticipate that there will be a strong correlation between the personality constructs themselves. Results of my study will hopefully lead to a better understanding of why people develop gambling problems and participate in other potentially harmful activities. If you have any further questions, please feel free to contact me through the psychology department.

VITA AUCTORIS

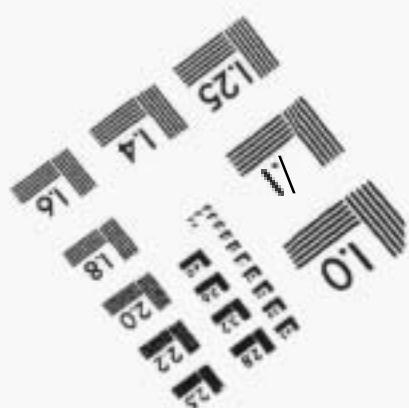
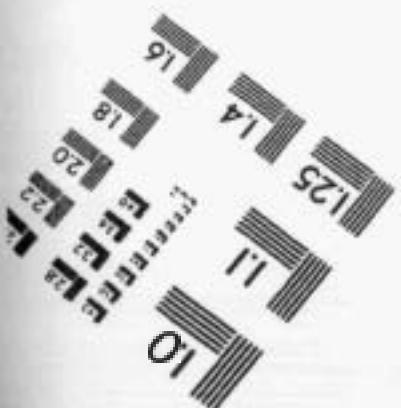
- 1972 Born in Liverpool, England.
- 1991 Graduated from Centennial Secondary School.
- 1991 Enroled in Queen's University.
- 1995 Graduated with Bachelor of Science Degree (**Honors**). Major in Psychology.
- 1997 Currently a candidate for the Master's Degree in Psychology at the University of Windsor, and hopes to graduate in the fall of 1997.

IMAGE EVALUATION TEST TARGET (QA-3)



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