1-1-2006

A comparative study of personality traits between video poker and traditional pull/push machines players

Jungjin Hwang
University of Nevada, Las Vegas

A COMPARATIVE STUDY OF PERSONALITY TRAITS BETWEEN VIDEO POKER AND TRADITIONAL PULL/PUSH MACHINES PLAYERS

by

Jungjin Hwang

Bachelor of Business Administration
Soonchunhyang University
2003

A thesis submitted in partial fulfillment
of the requirements for the

Master of Science Degree in Hotel Administration
William F. Harrah College of Hotel Administration

Graduate College
University of Nevada, Las Vegas
August 2006

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

Thesis Approval

The Graduate College
University of Nevada, Las Vegas

May 5, 2006

The Thesis prepared by

Jungjin Hwang

Entitled

A Comparative Study of Personality Traits Between Gamblers Who Play Video Poker or Traditional Pull/Push Machines Through Cattell's 16 Personality Factors

is approved in partial fulfillment of the requirements for the degree of

Master of Science in Hotel Administration

Examination Committee Chair

Dean of the Graduate College

Examination Committee Member

Examination Committee Member

Graduate College Faculty Representative

1017-53

ABSTRACT

A Comparative Study of Personality Traits between Video Poker and Traditional Pull/Push Machines Players

by

Jungjin Hwang

Dr. Kathryn LaTour, Examination Committee Chair
Assistant Professor of Tourism & Convention
University of Nevada, Las Vegas

Since the first spinning-reel slot machine was invented in 1895 by a German-born mechanic and installed in San Francisco taverns (Span 2003), machine games have enjoyed popularity among gamblers. Two main types of slot machines dominate the market: video poker machines, and the more traditional pull/push machines. Previous research suggests that video poker players and pull/push slot gamblers have different motivations for playing. In our study we looked at whether or not video poker and slot players have different personality traits as measured through Cattell's 16 Personality Factors. The findings showed that video poker players presented a more dominant personality trait than pull/push slot machine gamblers when they play their games. Conversely, pull/push slot machine gamblers showed a more submissive personality trait than video poker players. The results were based on the fact that video poker provides decision processes, in other words, controlling processes against the game to the players, and pull/push slot machines offer simple, easy, and mindless gaming styles to gamblers.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGMENTS

Achievement of this study would not have been possible without the contributions and support of my significant persons. Particularly, my admiration and gratitude extend to my chairperson, Dr. Kathryn LaTour, who patiently shared her wealth of knowledge throughout my entire master's program. I am also grateful to my committee members, Dr. Billy Bai, Dr. Bo Bernhard, and Dr. Taedong Han, for their encouragement and invaluable feedback.

My appreciation also belongs to all the participants who devoted their time to answer the questionnaire that made this study possible. Finally, and most importantly, I wish to acknowledge my gratitude to my parents and sisters. Without my family, I did not have the motivation to finish this thesis. I cannot thank you enough for everything you have done for me.

CHAPTER I

INTRODUCTION

Since the first spinning-reel slot machine—it was called the Liberty Bell—was invented by a German-born mechanic in 1895 and installed in San Francisco taverns (Span, 2003), machine games have been popular among gamblers. According to the Nevada Gaming Control Board (2001), for the fiscal year ended June 30, 2001, 65% of Nevada's gaming revenue was obtained by slot machine play. Plume (2001) claimed that slot machines have contributed as much as 95% of gaming revenues in other US jurisdictions. In addition, Brewer and Cummings (1995) mentioned that many of the casinos on American Indian lands are 100% slot machines and do not have table games. With respect to profitability of slot machines, according to Span (2003), they bring higher profits than table games such as roulette, craps, and poker, because they do not require dealers and the casino can control their payouts. A researcher mentioned that this popularity of slot machines is partly based on the intimidation factor of table games. According to William Eadington, director of the Institute for the Study of Gambling & Commercial Gaming at the University of Nevada-Reno, the popularity of table games has declined over the years (Anonymous, 2003). Eadington claimed that the demand for slot machines is generated largely because of their lack of intimidation. Eadington insisted that the demand for slot machines has gone up due to the intimidation factor of table games.

Among slot machines, video poker and pull/push slot machines have been occupying most of casino floor space. The next table shows a breakdown of the slot machine population in Nevada (Kilby & Fox, 1998).

Table 1

A Breakdown of the Slot Machine Population in Nevada

	1997 Nevada Gaming Census
Upright reel slot	41.0%
Upright video poker	19.1%
Bar top poker	4.9%
Slant top poker	11.7%
Slant top reel slot	15.0%
Keno	3.1%
Multigame	3.9%
Other	1.2%

Note. Source: Kilby & Fox (1998, p.110)

According to Kilby and Fox (1998), local casinos in Las Vegas that serve local gamblers dominantly have video poker machines, while Strip casinos that cater to tourists mainly offer the reel type of slots. They explained this phenomenon as having two reasons. The first reason appears to be the level of sophistication of the gamblers. Local gamblers seem to be cleverer gamblers, because they know that video poker machines may give a lower advantage to casinos. Second, the authors also claimed that video poker machines offer a thought process. This process means that players must make certain

decisions; that is, they require interaction with machines. The only decision processes, however, that reel slot machines offer are which machine to play and how many coins to bet (Kilby and Fox, 1998).

Titz, Andrus, and Miller (2001) examined the hedonic differences between table game players and slot game players. The authors found that table players tend to be more aware of the complexity of games than slot players. Titz et al. claimed that table game players differ from slot machine players, since table players have a more interactive style using their analytical approach, that is, a thought process. Based on the results of Kilby and Fox, and Titz et al., it can be assumed that video poker machine players are different from pull/push machine players, with respect to gaming styles. Video poker machine players also interact with the games, using their thought process, as do table game players. Thus, in this study, it is tested that video poker players have different attitudes from pull/push machine players, when they play their games. In order to find these different aspects, personality traits of video poker players and pull/push machine players are analyzed.

Marketers are concerned about personality theory, since it can help them comprehend purchasing behavior. According to McGuire (1976), the domain of personality embraces consumers' decisions relative to products and their perceptions of and feelings toward these products. Well and Beard (1973) claimed that if marketers understand consumers' personalities, they can comprehend why customers make particular decisions. Then, marketers can act to influence consumers' decisions. Accordingly, in this study, personality traits are employed to find any differences

between video poker and pull/push slot machine gamblers through Cattell's 16PF (Personality Factors).

Guilford (1959) mentioned that Cattell's 16 PF contains comprehensive personality inventory assessment tools and ranks individuals as scoring from high to low, based on different personality traits. Schuerger (1992) stressed that the assessment of personality traits by the Sixteen Personality Factor Questionnaire involves recording an individual's conscious self-presentation in some circumstances. Cattell and Scheurger (2003) stated that the 16PF Questionnaire has been used widely in counseling and clinical settings, because it is able to give an in-depth and integrated picture of the whole person. The 16PF Questionnaire is in a variety of settings, such as basic research, education, sports psychology, medical treatment, and military training (Cattell & Scheurger).

According to the theories of Kilby and Fox (1998) and Titz, Andrus, and Miller (2001), video poker and traditional pull/push slot machine gamblers show different gaming styles. In this study, personality traits between video poker and pull/push slot machine players are compared using Cattell's 16 Personality Factors. Based on the two theories of Kilby and Fox and Titz et al., it is expected to find some differences of personality traits between the two types of players. The personality factors that lead these two players to play video poker or traditional pull/push slot machines are important to developers of machine games and slot managers. This is because only a little research has been performed to study these two players, even though slot machines, especially video poker and traditional pull/push slot machines, have contributed significantly to slot management in casinos.

Purpose of the Study

Despite the significance of video poker and pull/push slot machines in the cash flow of casino management, only a few empirical studies about the two types of players, such as video poker or pull/push slot machine gamblers, have been conducted. In particular, there are limited studies that compare personality traits of the two groups of players. In fact, this study is the first empirical trial to find differences in personality traits between video poker and pull/push slot machine gamblers. Thus, given the significance of the contribution of slot machines to overall revenues of casinos and the lack of studies of the personality traits of video poker compared to those of pull/push slot machine players, any information related to the personality traits of the two types of players would be of substantial value to the slot managers, developers of machine games, and researchers, who are interested in the personality traits of the two groups of gamblers. If slot managers or developers of machine games can find any differences in personality traits between the two kinds of players, they will use this information to improve existing machines or properly organize the games on casino floors. Since only a few studies that compare the personality traits between the two groups of gamblers have been performed, this study will contribute a development of empirical study related to video poker and pull/push machine players. The purpose of this study is to find any differences of personality traits between video poker and pull/push slot machine gamblers.

Definition of Terms

The following terms are defined as they are used in this research project.

Local Casino Market: In *Casino Operation Management*, Kilby and Fox (1998) classify the majority of casinos within the Las Vegas metropolitan area as locals' market properties. The authors explain that the locals' market in Las Vegas is made up of hotel casinos that obtain a substantial portion of their revenues from local customers. It is important for these properties to maintain robust slot operations because of their dependence on slot revenues.

Personality: Mischel (1977) defined personality as "the distinctive patterns of behavior, including thoughts and emotions that characterize each individual's adaptation to the situations of his or her life." (p. 247)

Personality Trait: Guilford (1959) defined a personality trait as a distinguishing, relatively enduring way in which one individual differs from another. Kosslyn and Rosenberg (2004) explained that personality is a coherent set of behavioral properties that people express over time. Kosslyn and Rosenberg also stated that the concept of personality implies that people have stable characteristics, such as talkativeness or curiosity. These characteristics are called *personality traits*.

Pull/Push Slot Machine: In this study, pull/push slot machines are defined as every machine game managed by casinos, except the video poker machine. However, these slot machines provide only simple decision processes, such as pulling or pushing the starting buttons or levers.

Slot Machine: According to Kilby and Fox (1998), slot machines come in line games, multipliers, and buy-a-pays. They are available in either video or mechanical. Although Kilby and Fox classify video poker machines as a model option, video poker does not

refer to a slot (it is actually called video poker). Video poker machines are classified as a different style of machine from pull/push machines in this study.

Tourist Market: Gross gaming revenue on the Strip in Las Vegas is closely connected with the air travel into and out of McCarran International Airport (Gaming Studies Research Center of University of Nevada, Las Vegas, 2002). In other words, the casino industry in Las Vegas is highly affected by tourists.

Video Poker: According to *POKERNEWS* (2003), the video poker is a computerized slot machine—video slot machine—on the basis of draw poker (but not really a form of poker), with card symbols, on which players try to make certain poker hand combinations. This casino game can sometimes be beaten by skill, and is the fastest-growing form of mechanized gambling.

CHAPTER II

LITERATURE REVIEW

Introduction

The literature review consists of three parts. The first part is composed of studies related to gamblers' behavior. The second part is made up of contents regarding personality and marketing. Finally, the third part consists of contents relative to 16 Personality Factors.

Studies Relative to Gambler's Behavior

Some researchers studied gamblers through an ethnographic approach analyzing gamblers' culture relative to slot machines (Cebollero, Mayer, & Pinkos, 2000), recording of gamblers' speech acts while playing slot machines (Walker, 1992), and employing "thinking aloud" method to ask gamblers to say every thought that came to their mind when they played (Griffiths, 1993). In addition, Titz, Andrus, and Miller (2001) examined the hedonic differences between table game players and slot game players using existing scales, such as the Zuckerman Kuhlman Impulsivity and Sensation Seeking Scale and Swanson's absorbing experience scale. The studies of Cebllero et al., Walker, and Griffiths examined gamblers' behaviors using qualitative methods. Titz et al.' study compared attitudes and emotions between table game and slot machine players, through a quantitative approach.

Cebollero et al. (2000) studied a proposed typology of Odyssey slot machine gamblers. Typology is the classification of things according to their characteristics (Wikimedia Foundation, 2006). The authors discussed the development of a typology of gamblers who play the Odyssey slot machines in their study. The Odyssey slot machine is a new product that was newly presented to the gaming market. The goal of this study was to describe the culture associated with Odyssey players at the casino, through qualitative research methods. The authors used an ethnographic approach to the research. The ethnography is a branch of anthropology that treats with the scientific description of cultures. Because the ethnography focuses on sociocultural patterns of action, it concentrates on the observation of behavior. Cebollero et al. presented and discussed two typologies: one for the Odyssey Players, and the second for the Odyssey Observers.

The Odyssey Players categorizes slot machine players within a 2-dimensional matrix. The horizontal dimension of the matrix shows a player's duration of play, while the vertical dimension represents the demeanor of their play, whether they are mainly serious or primarily social, according to the nature of their play. In the Odyssey Observers the horizontal axis describes observer' degree of commitment to the setting whether he or she is either inactive or active, according to the behaviors. The vertical axis shows whether an observer has any relationship with a player in the setting.

Using a combination of non-participant and participant observations, along with personal interviews and a review of proprietary videotapes from the casino, the authors examined gamblers' behavior while playing the Odyssey slot machines. Cebollero et al. drew three general observations from studying the culture relative to playing the Odyssey slot machines. First, an ethnographic approach makes sense, given a lack of previous

available research on the Odyssey machines and the researchers' low degree of familiarity with the setting. Second, well-defined player types exist in the casino, according to both their length of play and their playing demeanor. Lastly, observer types also exist in the casino, according to their player association and their commitment to the setting.

Walker (1992) studied the presence of irrational thinking on the part of video poker machine players. The author investigated the connection between irrational thinking and heavy use of poker machines. Walker recorded gamblers' speech acts while playing a machine. In the point of the cognitive perspective, heavy gamblers carry on gambling because they believe that they will win; that is, they have the skill or special knowledge to enable them to win. The results reported that high levels of irrational statements are made by heavy poker machine players, when they play their preferred machines. This high level of irrational thinking proposes that poker machine gamblers try to influence their machines and may really consider that they will succeed in this effort.

Griffiths (1993) also discussed gambler behavior through a cognitive perspective. Griffiths employed the "thinking aloud method" to examine the cognitive activities of individuals while playing fruit machines. In this method, players were asked to say every thought that came to their mind as they played. Their responses were recorded and analyzed to obtain insight into their cognitive state while playing video machines. Griffiths also examined whether the skill associated with fruit machine playing is "actual" or "perceived" through the comparison of behavioral monitoring data of regular and non-regular players. The results showed that regular and non-regular players who thought aloud had significantly more total winning, and regular players who thought aloud had more wins. Based on these findings, the author concluded that "thinking aloud"

changed the fruit machine playing behavior in some way, and he explained this situation using the interpretation that players who were applying the "thinking aloud method" concentrated more, thus making fewer mistakes. The results also described that regular players can stay on fruit machines longer than non-regular players with respect to number of plays. This proposed that there are skillful aspects to fruit machine playing.

Cebollero et al., Griffiths, and Walker used qualitative approaches to study gamblers' behaviors. However, these methods had some weak points. Cebollero et al. employed ethnography in order to develop a typology of gamblers who play Odyssey slot machines. Cebollero et al. represented some shortcomings about their research methods. For example, they needed more time and more participant interviews to confirm the development of the typologies. Walker and Griffiths used similar methods, in which subjects were asked to verbalize their thoughts they possess during the specific activities. The results they obtained should be dependent on the assumption that what players say relates in a direct way to what they think. If this assumption is not valid, the results are worthless. In addition, in the study of Griffiths the "thinking aloud method" influenced the players' behaviors.

Titz et al. (2001) examined the hedonic differences between table game players and slot game players. The independent variables which these authors used, that is, the hedonic factors examined, were sensation-seeking tendencies, absorbing experience tendencies, emotional tendencies, and analytical tendencies. The authors found that table game players differed from slot game players with respect to their respective experiences and their level of involvement with the games. For example, table game players were not as impulsive as slot game players. In addition, table players tended to be more controlled

than slot players. Titz et al. interestingly concluded that table players tended to be more aware of the complexity of games than slot players. They claimed that table game players appeared to have a more interactional style with the games, using their analytical approaches.

Titz et al. (2001) found some different attitudes between table game players and slot game players: table game players tended to be more controlled than slot gamblers and showed to have a more interactive style. These two tendencies are derived from the analytical approaches of the games. This result is comparable to Kilby and Fox's assertion (1998) on video poker games. Kilby and Fox stated that local casinos provide video poker machines to local gamblers because of their sophistication. Video poker offers a thought process regarding the sophistication to gamblers. This thought process is directly related to the analytical approaches. Based on these two theories, it is assumed that video poker machines have some differences from pull/push slot machines, with respect to gaming style. In order to find the difference, personality traits between the two groups of players are compared. Personality is an important factor to understanding customers, because marketers can comprehend customers' particular decisions through their personalities (Well & Beard, 1973).

Personality and Marketing

Concept of Personality

Personality is an often-used variable in the research of consumer behavior (Markin, 1974). Markin asserted that most parts of purchasing behavior and consumption have been studied within the context of personality—market segmentation, packaging,

product and brand choice, attitude change, and every conceivable variable have been related to personality. Although many researchers have failed empirically to prove the predictive results of personality as a variable in consumer behavior, they continue to make efforts to show the statistical significance of personality in terms of purchase and consumption (Markin).

It is not easy to find consensus on the exact definition of the term "personality" among researchers. Hilgard (1967) has defined personality as "the configuration of individual characteristics and ways of behavior which determine an individual's unique adjustment to his environment" (p. 21). Bonner (1961) defines personality as "the organized needs and abilities of an individual, or the characteristic manner in which he satisfies his needs and actualized this potential" (p. 37). Hebb (1966) has defined personality as "the characteristics that determine the general pattern of behavior in a higher animal, especially as it makes the individual distinctive in relations with others" (p. 9). According to McCurley (1983), personality is generally connected to the concept of responses to stimuli encompassing the individual. The consistency of a man or a woman in dealing with his or her environment stimulates us to type politicians as charismatic or obnoxious, students as aggressive or submissive, and colleagues as charming or "blah" (Kassarjian, 1971).

Mowen and Minor (1998) proposed that the concept of personality has four essential aspects. First, in order to be called a personality, a person's behavior should present consistency across time. The second aspect is that the behaviors should distinguish the person from others: a personality characteristic cannot be shared by all consumers. Third, personality characteristics are not precisely related to particular types

of behavior. In other words, the consumer has to be viewed as a dynamic whole. Finally, personality moderates the effects of advertising messages and marketing situations on consumer behavior. According to Mowen and Minor, a moderating variable is an individual-difference variable, and this interacts with the type of message being communicated and/or the consumer situation. Consumer situations are temporary environmental factors that make the context within which a consumer activity occurs, while personality is a fixed variable (Mowen & Minor).

Personality Theory and Marketing

According to Brill (1995), Sigmund Freud developed the idea of psychoanalytic theory. Freud proposed that personality has three levels, that is, the id, the ego, and the superego. Brill mentioned that the id is related to instincts, an individual reservoir of psychic energy, and is defined as the unconscious level; it does not connect with reality. Contrarily, the ego copes with situations of reality. Finally, because the superego is the moral branch of personality, it deals with what is right or wrong. Brill explained that Freud regarded the personality as an iceberg: most of the personality is below the conscious level, just as most of an iceberg is below the surface of the water. Thus, Freud believed that the greatest part of the important personality processes occurs beneath the conscious level (Brill).

According to Hall (1954), with respect to Freudian psychology, the stress on the unique development of the individual brings idiosyncratic rather than universal motivational or personality patterns. However, this does not mean that Freudian theory is useless in marketing research. Freudian theory can be used in developing a new product basis and in constructing advertising appeals. According to Kassarjian (1971), in the field

of marketing, the work in personality begins with Freud and his disciples. And in the field of consumer behavior, the work dates from the motivation researchers of the post-World War II era. Freud claimed that the human personality arises from a dynamic struggle between social pressures to follow laws, rules, and moral codes and inner physiological drives, including hunger, sex, and aggression (Mowen & Minor, 1998). Freud explained that human beings have a conscious, preconscious, and unconscious mind. He proposed that unconscious mind largely drives our behavior and is hard to scrutinize. This concept that human beings know only a small fraction of the forces that drive their behavior revolutionized the understanding of the human personality (Mowen & Minor). Freud's contributions relating to unconscious motivation and symbolism can be found in mass media that advertise and in the content of advertising itself (Wells & Beard, 1973). According to Mowen and Minor, psychoanalytic thought, including its stress on measuring dreams and symbol, had a major impact on marketing, in order to identify the unconscious motives behind people's actions. Advertising firms hired psychoanalysts to invent promotional themes and packaging that could appeal to consumers' unconscious minds.

McCurley (1983) mentioned that motivation researchers who use Freudian theory, with its emphasis on unconscious motivation, provided American industry with some fresh ideas following World War II. They added a number of explanations of why consumers behave as they do, emerging from their psychoanalytic base, using empirical evidence and wit and presentation skill. Motivation research began to fall off in popularity, because marketers found that there are major differences between problems that arise in marketing and problems that arise in the clinical study of personality

(McCurley). According to Horst (1968), this decline brought a period characterized by the use of paper and pencil instruments for providing quantitative indications of personality traits. This type of test has become famous in recent years.

Two classic researches tried to employ paper and pencil test to connect traits with product use. In the first study, Evans (1959) tried to link choice of an automobile with the buyer's personality. He attempted to match groups of Ford and Chevrolet owners and conducted the Edwards Personal Preference Schedule (EPPS) test. Evans was able to foresee whether a person owned a Ford or Chevrolet in only 63% of the cases, just slightly above chance. Westfall (1962) attempted to distinguish satisfactorily between Ford and Chevrolet owners using the Thurstone Temperament Schedule in place of the Edwards' scale, but also failed.

So far, a wide range of brand preferences and products has been connected to results of paper and pencil tests in studies, such as Evans' (1959) and Westfall's (1962) research in terms of owners of Ford and Chevrolet. The following studies have tried to predict an individual's consumption of services or products through a correlation between questionnaire response and product use.

Table 2

Studies involved in Products and Brand Preferences through Paper and Pencil Tests

Test Names	Researchers
California Personality Inventory	Robertson & Myers (1969)
	Bruce & Witt (1970)
	Boone (1970)
	Vitz & Johnston (1965)
	Fry (1971)
Gordon Personal Inventory	Kernan (1968)
Edwards Personal Preference Schedule	Koponen (1960)
(EPPS)	Massy, Frank, & Lodahl (1968)
	Claycamp (1965)
	Brody & Cunningham (1968)
Thurstone Temperament Schedule	Kamen (1964)
McCloskey Personality Inventory and	Ruch (1966)
Dunnette Adjective Checklist	
Strong Vocational Interest Blank Study	Pennington & Peterson (1969)
16 Personality Factors	Myers (1967)
Compliant-Aggressive-Detached (CAD)	Cohen (1966)
instrument based upon	
The Horney Tripartite Model	

16 Personality Factors

Background of Development of 16PF

The 16 PF Questionnaire started from the unique perspective of an empirical pursuit to find the basic structural elements of personality (Cattell & Scheurger, 2003). This questionnaire was invented through scientific research sampling of the whole domain of human personality. Cattell, the inventor of this questionnaire, thought that human personality must have fundamental structural elements in the same way that the physical world has basic building blocks (e.g., oxygen and hydrogen) (Cattell & Scheurger). Cattell assumed that if the fundamental building blocks of personality were sought and the structure of personality was measurable, then human behavior would be predictable and understandable. Thus, Cattell's goal in inventing this 16PF Questionnaire was to offer a complete research-based map of normal personality.

Cattell thought that if psychologists want psychology to advance as a science, they need scientific measurement procedures for three distinct domains of human characteristics: personality, ability, and motivation (Cattell & Schuerger, 2003). Cattell postulated three types of information or data sources that need to be sampled to find each of these three domains. The three data sources are Life data, Question data, and Test data (Schuerger, 1992).

Through life data source, personality is presented through everyday behavior, and this is reported by someone other than the person who is assessed. For instance, behavioral observations, ratings, school grades, and interview observations are included in this data source. Question Data source is made up of the individual's own conscious verbal self-presentation in a given environment. The presentation could be oral in an

interview, written in essay form, or responses in multiple-choice questions, as on a personality questionnaire. Through test data, personality is explored by an individual's response to an artificially designed environment, such as an ability test or a projective test. This data source is not conscious self-presentation, since the obvious task is not self-description. Personality characteristics are deduced from what the individual does, rather than from direct statements related to what kind of person one is.

Cattell tried to find the basic personality traits from factor-analytic studies covering information from L-, Q-, and T-data sources (Cattell & Schuerger, 2003). He assumed that traits that appeared in all three sources would present true functional unities. Cattell and his colleagues began with Allport and Odbert's (1936) collection of several thousand personal descriptors (Schuerger, 1992). Thus, the researchers started their quest with an exhaustive listing of personality descriptors (Cattell & Scheurger). Their search was based on the belief that "all aspects of human personality which are or have been of importance, interest, or utility have already become recorded in the substance of language" (Cattell, 1943, p. 483). They sought to find the factors underlying the traits through the analysis of the patterns among the descriptors in actual peer ratings, self-report questionnaires, and objective behavioral measures. After the factor-analytic work, the researchers made a list of the basic building blocks of personality that were called *primary traits.* Cattell and Scheurger claimed that these traits were gathered through data from all three research media—peer ratings, self-report tests, and objective behavioral measures—and in a wide range of populations—undergraduates, military personnel, and working adults. Thus, the 16PF Questionnaire has the robustness in terms of its scales and the predictive utility in many kinds of settings (Cattell & Scheurger).

According to Schuerger (1992), other researchers have not constructed a personality questionnaire through this method—systematically sampling the entire field of personality descriptors and then diminishing them to a smaller number of primary traits. This method differs from that used on forming the MMPI, the method of contrasted groups; or the method of writing items directed to a specific theory, as with the Edwards Personality Preference Schedule (EPPS; Edwards, 1959), or the Millon Clinical Multiaxial Inventory (MCMI; Millon, 1989) (Schuerger, 1992). Table 3 shows a list of the 16PF employed in this study.

Table 3

Descriptions of 16 Primary Factors

Factor	Score Direction	
	Low	High
A	*Reserved* Stiff, cool, skeptical, detached, formal, retiring, objective, impersonal, unemotional, and aloof	*Warm* Caring, sympathetic, feeling, generous, affectionate, good natured, attentive to people, outgoing, softhearted, participating, kindly, and likes people
B	*Concrete thinking* Low abstract reasoning ability, less intelligent, less able to solve abstract reasoning problems, slow to learn and grasp, and prefers hands-on training (rather than academic)	*Abstract thinking* High abstract reasoning ability, more intelligent, bright, quick to grasp idea, good problem-solving skills, and performs well in academic settings
C	*Emotional* Reactive, temperamental, reactive to stress, feels unable to cope, avoid dealing with problems, volatile, changeable, fretful, less stable, and easily annoyed	*Calm* Emotionally mature, stable, realistic about life, unruffled, steady, persevering, even-tempered, emotionally resilient, high tolerance for frustration, and copes with stress

Table 3

Descriptions of 16 Primary Factors (continued).

Factor	Score Direction: Low	High
E	*Submissive* Deferential, cooperative, easily led, considerate, adaptable, modest, obedient, passive, docile, often dependent, humble, and accommodating	*Dominant* Assertive, forceful, competitive, controlling, persuasive, authoritative, demanding, headstrong, aggressive, outspoken, rebellious, willful, self-assured, independent-minded, stubborn, and bossy
F	*Serious* Quiet, cautious, deliberate, reflective, prudent, reliable, sober, subdued, careful, takes life seriously, reticent, introspective, sometimes dour, pessimistic, restrained, and smug	*Enthusiastic* Spontaneous, active, talkative, animated, carefree, fun-loving, high-spirited, energetic, exuberant, optimistic, alert, quick, excitement-seeking, impulsive, expressive, heedless, and cheerful
G	*Expedient* Steady in purpose, disregards rules and obligations, self-indulgent, lacking in effort for group undertakings, nonconforming, and undependable	*Conscientious* Dutiful, dominated by a sense of duty, responsible, careful with the rules, conforming, moralistic, staid, and preferring hard-working people to witty companions

Table 3

Descriptions of 16 Primary Factors (continued).

Factor	Score Direction: Low	High
H	*Shy* Withdrawn, cautious, retiring, alert to dangers, easily embarrassed, thin-skinned, sensitive to criticism and stress, threat-sensitive, timid, hesitant, and intimidated	*Bold* Sociable, talkative, gregarious, fearless, risk-taker, not afraid of criticism, thick-skinned, resilient under stress, attention-seeking, spontaneous, pushy, venturesome, uninhibited, and can take stress
I	*Tough-minded* Utilitarian, unsentimental, tough, objective, realistic, rational, has few artistic responses, functional, acts on facts and logic, cynical, practical, masculine, independent, responsible, self-reliant, and rough	*Sensitive* Tender-minded, aesthetic, sentimental, kindly, indulgent, empathic, theatrical, romantic, subjective, sympathetic, daydreams, artistic, fastidious, over-protected, intuitive, refined, impatient, dependent, and impractical

Table 3

Descriptions of 16 Primary Factors (continued).

Factor	Score Direction: Low	Score Direction: High
L	*Trusting* Free of jealous tendencies, unsuspecting, may be taken advantage of by others, tolerant, gullible, adaptable, accepting conditions, and easy to get on with	*Suspicious* Hard to fool, distrustful, skeptical, self-opinionated, interested in internal, mental life, vigilant, wary, alert to others' motives and intentions, thinks strategically, competitive, and resentful
M	*Practical* Concerned over detail, grounded, solution-oriented, pragmatic, literal, unimaginative, concerned with "down to earth" issues, and steady	*Imaginative* Unconventional, idea-oriented, creative, contemplative, unconcerned with everyday matters, self-motivated, absent-minded, absorbed in thought, and impractical
N	*Forthright* Unsophisticated, revealing of personal matters, self-disclosing, sentimental, unguarded, genuine, simple, unpretentious, open, and artless	*Shrewd* Polished, private, discreet, non-disclosing, guarded, socially aware, diplomatic, and calculating

Table 3

Descriptions of 16 Primary Factors (continued).

Factor	Score Direction: Low	High
O	*Composed* Placid, self-assured, unworried, unperturbed, self-confident, insensitive to criticism, not anxious, resilient, secure, untroubled, and self-satisfied	*Apprehensive* Depressed and moody, worried, self-doubting, nervous, lacks confidence, self-reproaching, concerned for others, feels obligations, sensitive to criticism, full of foreboding, self-blaming, guilt-prone, and insecure
Q1	*Conservative* Confident in established beliefs, attached to familiar, prefers status quo, resistant to change, conservative in religion and politics, respecting, and traditional ideas	*Progressive* Be interested in intellectual matters, experimenting, questions established methods, freethinking, skeptical and inquiring, critical, and open to change
Q2	*Group-oriented* Likes and depends on social approval and admiration, prefers to work and makes decisions with other people, and likes to get others' opinions	*Self-sufficient* Independent, accustomed to making decisions and taking action alone, resourceful, individualistic, self-contained, prefers own ideas and opinions, and solitary

Table 3

Descriptions of 16 Primary Factors (continued).

Factor	Score Direction	
	Low	High
Q3	*Spontaneous* Not be bothered with regard for social demands, tolerate disorder, unexacting, flexible, uncontrolled, casual, undisciplined, not overtly considerate, careless, and not concerned about details	*Self-disciplined* Strong control of emotions and general behavior, self-respect, obstinate, perfectionistic, organized, reliable, orderly approach to life, planful, exacting, detailed, and has clear goals and ideas
Q4	*Relaxed* Sedate, tranquil, composed, has low drive, unfrustrated, satisfied, placid, patient, easygoing, laid-back, and not easily upset or aroused	*Tense* Excitable, full of energy and drive, impatient, fast-paced, high-strung, restless, fretful, impatient, frustrated, overworked, and has high drive

Note. This table was made by sources from the studies of Cattell & Schuerger (2003) and Schuerger (1992).

The 16PF personality scales use a sten (standardized-ten) distribution, and these scores range from 1 to 10. The scales are bipolar; in other words, "both high and low poles of the scales have a well-defined meaning rather than just greater or lesser degrees of one end of the scale" (Cattell & Scheurger, 2003, p. 164). According to Cattell, Eber, and Tatsuoka (1970), the sten has some advantages. First, most scientists who were

familiar with the decimal system find it to be simpler to think and work with ten points. Second, the extreme intervals 1 and 10 are not as disproportionate in span as the 1 and 9 intervals in stanines, in order to incorporate the more remote cases; that is, stanines strictly covers only to 2.25 sigmas and leaves approximately 2.5 percent of the population straggling outside, whereas stens range to 2.5 sigmas and leave less than 1 percent of the outside population. Third, in a survey, psychologists, who have equal experience of both systems, said that they prefer stens.

Validity and Reliability

Cattell and Gibbons (1968) claimed that there are two major and well-factored personality-measurement scales in the questionnaire medium. One is an orthogonal series (at the adult level only)—it is now principally embodied in the Guilford-Zimmerman scale—by Guilford and his fellow workers. The other is the oblique series constituted by the 16 Personality Factors (16PF), the High School Personality Questionnaire (HSPQ), the Children's Personality Questionnaire (CPQ), and the Early School Personality Questionnaire (ESPQ), by Cattell and his co-workers. These Cattell's methods aim to measure the same unitary traits in steps over the developmental age range (Cattell & Gibbons, 1968). The 16PF Questionnaire fits various clients, including adults aged 16 years or older, whose reading skill is at the fifth-grade level or higher (Cattell & Scheurger, 2003). This test can be conducted in paper-and-pencil or computer format and administered individually or in groups. (Cattell & Scheurger, 2003). Schuerger (1992) explained that the assessment of personality by questionnaire—the 16PF, the HSPQ, or the CPQ—involves recording a person's conscious self-presentation in some specific environments.

Among these tools, Noel, Michaels, and Levas (2003) mentioned that 16PF is comprehensive personality inventory assessment tools and commonly used. This system ranks individuals as scoring from high to low on different traits (Noel et al., 2003). Noel et al. stated that 16PF is a standard test because it has been factor-analytically derived for a broad application of personality assessments. Noel et al. also mentioned that personality trait theory emphasizes that consistent personality traits underlie habitual behaviors. Based on this approach, researchers can measure traits objectively and use results to understand social relationships (Noel et al., 2003). Lamont and Lundstrom (1977) stressed that 16PF is a result of the multivariate trait model of personality assessment which is an attempt to identify the significant source traits in the realms of ability, temperament, and dynamic.

According to Schuerger (1992), the 16PF family of inventories has been criticized with regard to stability and internal consistency. However, in-depth study of this problem has revealed that the concerns are derived from misunderstandings (Schuerger, 1992). Table 4 shows data from a meta-analysis by Schuerger, Zarrella, and Hotz (1989). They summarized 106 sources and more than eight instruments (Schuerger et al., 1989).

Table 4

Stability and Consistency Reliabilities for the 16PF Family

	Typical Stabilities				
Instrument	Week	6 month	1 year	6 years	Internal Consistency Form A
16PF	.78	.66	.59	.48	.53
HSPQ	.73	.60	.55	.46	.50
CPQ	.62	NA	NA	NA	.45
16PF 2nd Order Factors	NA	.77	.77	.75	.76

Note. Source: Schuerger (1992, p. 236)

Internal consistency reliability that is taken from a single time—unlike temporal stability (test-retest) reliability—is calculated solely from item intercorrelations and the number of items per scale (Schuerger, 1992). In this point, the 16PF holds item intercorrelations slightly above average for personality questionnaire, but has comparatively few items per scale. For instance, it has even fewer items—approximately 16 per scale—than does the MMPI, which has around 50 per scale on average (Schuerger, 1992). Schuerger (1992) claimed that, because of this smaller number of items, the internal consistency values of the 16PF and its junior test are lower than those of the common personality questionnaire.

A personality trait scale also has to be reliable and valid. According to Mowen and Minor (1998), reliability is proved when the trait scale is internally consistent, that is, when each question measures the same general construct and provides the same results when a person takes the same test again after a period of time. Validity is proved when trait scale is revealed to assess the trait that it is intended to measure. Reliability for the 16PF Fifth Edition's primary is summarized in Table 5. Internal consistency

reliabilities—how highly the items in a scale correlate with each other—for the primary scales are .76 on average (ranging from .68 to .87 over the 16 scales) in the normative sample of 10,261 persons (Cattell & Schuerger, 2003). Test-retest reliabilities, that is, the calculation of the consistency of scores over time, for a 2-week interval ranged from .69 to .87 having a median of .80. Two-month test-retest reliabilities ranged from .56 to .79 having a median of .69.

Table 5

Reliability Estimates for 16PF Fifth Edition Scales

	Primary Scales	Internal Consistency (Cronbach's alpha) (N = 10,261)	Test-Retest Interval 2-week (N = 204)	Test-Retest Interval 2-month (N = 159)
A	Warmth	.69	.83	.77
B	Reasoning	.75	.69	.65
C	Emotional Stability	.79	.75	.67
E	Dominance	.68	.77	.69
F	Liveliness	.73	.82	.69
G	Rule-Consciousness	.77	.80	.76
H	Social Boldness	.87	.87	.79
I	Sensitivity	.79	.82	.76
L	Vigilance	.73	.76	.56
M	Abstractedness	.78	.84	.67
N	Privateness	.77	.77	.70
O	Apprehension	.80	.79	.64
Q1	Openness to Change	.68	.83	.70
Q2	Self-Reliance	.79	.86	.69
Q3	Perfectionism	.74	.80	.77
Q4	Tension	.79	.78	.68
Mean		.76	.80	.70

Note. Source: Cattell & Schuerger (2003, p. 14)

Because the 16PF dimensions were invented using factor analysis, construct validity is offered by research verifying its factor structure (e.g., Cattell & Krug, 1986; Chernyshenko, Stark, & Chan, 2001; Conn & Rieke, 1994; Gerbing & Tuley, 1991;

Hofer, Horn, & Eber, 1997). In addition, the factor structure has been proved in a range of languages (e.g., *Italian*: Barbaranelli & Caprara, 1996; *Japanese*: Motegi, 1982, and *Spanish:* Prieto, Gouveia, & Fernandez, 1996). An extensive body of research going back a half century offers evidences of the tests' applied validity; it has been utilized in clinical, counseling, career development , personnel selection, and research settings (Cattell & Schuerger, 2003). Graham and Lilly (1984) stated that the 16PF Questionnaire was positioned among the highest in number of research articles by the 1980s. Hofer and Eber (2002) also mentioned that since 1974, the number of references is estimated to be in more than 2,000 publications. In addition, according to Goldberg (in press), in a recent comparative study among popular personality questionnaires for predicting six behavioral clusters in their ability, the 16PF dimensions had the highest predictive validity.

Studies used in Settings of School and Industry with respect to Cattell's 16 PF

The 16PF Questionnaire offers an objective, comprehensive, and efficient source of information in employment and career settings, including the area of career development and career counseling; employee selection, promotion, and outplacement; and employee development, training, and coaching (Cattell & Schuerger, 2003). According to Cattell and Schuerger, research using the 16PF has produced a various realm of occupational profiles, such as for executives and managers (Brindle, 1992), salespeople (Lamont and Lundstrom, 1977), and customer service people, law enforcement officers and security personnel, social workers and teachers, scientists and engineers, and writers and artists (Cattell & Schuerger, 2003). Noel et al. (2003) tried to use the 16PF to find personality information about students taking particular majors, such as accounting, marketing, and management information systems. Some researchers

(Davidson & Dalby, 1993; Johnson & Dierks, 1982) attempted to study personality traits of women accountants using the 16PF.

According to Holland's "congruence" principle (Holland, 1973), a person's job satisfaction could be revealed from personality information through the way that a person's characteristics compare with those of other persons in various jobs. In other words, the more similar an individual is to others on the job, the more likely it is that the person will feel comfortable (Schuerger, 1992). In order to advise an individual about his or her fit to a job, one must realize what personality profiles characterize various occupations (Schuerger, 1992). For instance, DiFiore (1981), Franklin (1983), and Anonsen (1985) have contributed to the understanding of particular jobs with respect to 16PF occupational patterns. Guyer (1984), Johns (1985), and Nasvytis (1988) have handled a wide range of issues of fit to occupation with regard to personality.

In addition, this questionnaire has been used to research the effects of birth order on personality (Beer, 2001), investigate differences in learning styles (Macgregor, 2000), understand the effects of social desirability on tests (Ellington, Smith, & Sackett, 2001), and improve selection and training of military pilots (Bartram, 1995). Research related to the 16PF Questionnaire has continued and, this questionnaire also has been refined since it was first published in 1949 (Cattell & Scheurger, 2003). Consequently, new editions were published in 1956, 1962, and 1968 and in the 16PF Fifth Edition Questionnaire in 1993 (Cattell & Scheurger).

Conclusion

Even though much research was conducted on gamblers' behaviors, only a few studies were performed about gamblers' personality. In the findings of Kilby and Fox (1998) and Titz, Andrus, and Miller (2001), it is assumed that video poker players have different attitudes from traditional pull/push slot machine gamblers with respect to gaming styles of the two games. In order to find these differences, personality traits of the two groups of players are compared. Some researchers stressed the importance of studies relating to customers' personality in terms of customers' behaviors (Marking, 1974; McGuire, 1976; Well & Beard, 1973).

Although some researchers studied gamblers' behaviors through qualitative methods, the approaches had shortcomings. These methods needed more time and respondents and influenced gamblers' behaviors. Thus, in this study the personality traits are measured through Cattell's 16PF. This method has been used for half a century and been applied diverse fields, such as clinical settings, counseling, and career development (Cattell & Schuerger, 2003). Moreover, the 16PF dimensions have high internal consistency reliabilities and test-retest reliabilities.

Even if many studies using 16PF have been conducted, most studies have placed much weight on research about employment and career settings. No attention has been given to gamblers, especially slot machine players' personality traits. Thus, this study concentrates on the analysis of players' personality traits through the 16PF.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Introduction

In this chapter, the research methodology used for this research is explained. This chapter includes the research hypotheses, the method of measurement and instruments, sample, and data collection. In addition, data entry and assumptions for using the Independent-Samples T-test are also discussed.

Research Hypothesis

The findings of the literature review proposed that video poker machines have different playing styles from pull/push slot machines in terms of a thought process (Kilby & Fox, 1998; Titz, Andrus, & Miller, 2001). It can be assumed that the two types of players, video poker and pull/push machine gamblers, might present different personality traits when they play their games, because each machinery game has different gaming styles. Based on this assumption, this study focuses on comparing personality traits between video poker and pull/push slot machine players, when they play either video poker or pull/push slot machines.

The purpose of this study is to compare personality traits of the two players, using the 16 Personality Factors. Thus, the hypothesis can be presented that there are

differences in personality traits between video poker and pull/push machine players, when they play either video poker or pull/push slot machines.

Measurement Method and Instruments

Measurement Method

The hypotheses of this study were tested with data collected via survey. The questionnaire for this survey was composed of three parts. The first part was a screening question to verify whether participants are the people who spend significant time playing on either video poker or pull/push slot machines. The second part was comprised of questions about slot gamblers' personality traits. The last part was made up of questions related to gambling behavior and background information with respect to demographics of respondents.

To be eligible for selection of respondents, the subject must spend either 90 percent or more of their gambling time either on video poker or pull/push slot machines. Respondents could select either 'Y (Yes)' or 'N (No)', and the questionnaires marked 'N' were excluded from data analysis. After that the participants checked one of the two blanks, which ask whether the players are video poker players or pull/push slot machine gamblers.

The second part consisted of questions to measure the personality traits. These questions consisted of 16 items. 16PF scales are bipolar—in other words, each end of each scale has a distinct definition and meaning regarding personality traits (Cattell & Schuerger, 2003). Participants were asked that they circle only one number from 1 to 10 that best represents how they feel when gambling. The questions included the standard

forced-choice, 10-point scale developed by Cattell. Results obtained from these questions were analyzed with the outcomes from other parts, such as slot gamblers' behaviors and demographic information. In order to help respondents better understand the presented personality traits, an explanation about each personality was given to them.

In the last part, respondents were asked questions about their gambling behaviors and background information about demographics of respondents. The questions relative to the gambling behaviors include:

Approximately how long have you been gambling?

How long have you been playing the video poker or the pull/push slot machines?

What is your favorite game? Why?

On average, whenever you visit casinos, how long do you play the video poker or the pull/push slot machines?

On average, how much money do you spend to play slot machines per gambling visit?

The background information in terms of demographic questions include sex, age, marital status, racial background, total amount of income, and the highest grade or year of school completed.

A pilot test was performed to verify content validity. This test was conducted in the place where many casinos are crowded. Thirty gamblers who play either video poker or pull/push slot machines participated in the pilot test. After filling out the questionnaire, the respondents were interviewed about understandability and readability of the questionnaire. Most respondents understood the content of the questionnaire. Only a few parts were amended to improve the measurement reliability.

Because this study involved collecting human subject data, approval from the Office for the Protection of Research Subjects (OPRS) was required. A protocol proposal describing the purpose, subject, and questionnaire for this study was handed in the OPRS. The protocol proposal was approved by the OPRS.

Description of Instruments

This method which uses the accomplished forced-choice scale is proper because of the nature of the questions (Noel, Michaels, & Levas, 2003). Malhotra (2003) said that "no neutral of indifferent response exists, a rating-scale with an even number of categories should be used" (p. 290). Further explanations about the Cattell's 16PF are not necessary, because each personality trait is described in popular terms (Johnson & Dierks, 1982). Several letters are missed from the alphabetic designations of the 16PF primary scales, such as D, J, K, or P, because these scales proved inconsistent in early factor analyses and were dropped (Cattell & Schuerger, 2003). The scales are bipolar, and even if they are selected high or low, a high score should not be judged a good score, and a low score should not be considered bad (Cattell & Schuerger, 2003). In other words, both high and low scores have both strengths and weaknesses, depending on the situation (Cattell & Schuerger, 2003).

Each item has a sten (standard ten) score, which ranges from 1 to 10. Stens 5 and 6 extend, respectively, a half standard deviation below and above the mean, and these numbers constitute the center of the population (Staff of the Institute for Personality and Ability Testing (IPAT), 1979). Sten scores from 4 to 7 are normally regarded as average (Staff of the IPAT). Low sten scores of 1, 2, 3, and high sten scores of 8, 9, 10 are selected far less frequently and regarded to be of greater significance in profile

interpretation (Staff of the IPAT). The sten score is compared with established norms (Johnson & Dierks, 1982). If a respondent has a low sten score, that is, from 1 to 3, he or she shows behavior very much like the traits listed on the left (Johnson & Dierks). If a person receives mid-range, from 4 to 7, he or she is in the middle; from 4 to 5, a little to the left, and from 6 to 7, a little to the right (Johnson & Dierks). If the respondent receives a high sten score, from 8 to10, he or she expresses personality traits more like those listed on the right (Johnson & Dierks, 1982). Cattell and Scheurger (2003) explained that in interpreting scores for individuals, scores below 4 are regarded low and scores above 7 are considered high.

Table 6 shows the sten-score ranges for the 16PF scales. The sten-score ranges were made by scores based on current standardization sample, which was released in 2002 and has data on more than 10,000 persons. These people are representative of the 2000 U.S. census for sex, race, and age (Cattell & Scheurger, 2003). Each item receives a raw score which is transformed into a sten (standard ten) score, which ranges from 1 to 10, with a mean of 5.5 and a standard deviation of 2 (Cattell & Scheurger, 2003).

In this study, *a*verage scores on 16 individual personality factors between the two types of subjects, video poker and pull/push slot machine players are compared through the Independent-Samples T-test.

Table 6

Sten-Score Ranges for the 16PF Questionnaire

Sten Score	Percentile	Range
1—3	16%	Low
4	15%	Low average
5—6	38%	Average
7	15%	High average
8—10	16%	High

Note. Source: Cattell & Schuerger (2003, p. 29)

Sample and Data Collection

Respondents were chosen from people who were in a crowd to see a popular tourist spot in front of a famous hotel in Las Vegas. The survey was conducted from March 13, 2006 to March 31, 2006. The survey was performed on both weekdays and weekend from 2 pm to 6 pm, for 4 hours a day. A field study approach was used, allowing for the subjects to remain in the environment while responding to the questionnaire. Only one interviewer who knew the questionnaire well conducted the survey. Before asking the main questions, the interviewer randomly asked the respondents whether they live in Las Vegas. Most participants were tourists who came from other states. The interviewer started with a question that asks whether the respondent plays either video poker or pull/push slot machines. The questionnaire included an introductory page describing the researcher, the purpose of the study, and instructions. Respondents completed their questionnaires voluntarily. The questionnaires were filled out unsupervised and individually. The interviewer made every effort to maintain the anonymity and confidentiality of participants. A total of 180 questionnaires

were gathered during the research period. Among these questionnaires 29 were excluded. These questionnaires were assumed invalid because respondents marked on 'N' at the first question asking whether they spend either 90 percent or more of their gambling time either on video poker or pull/push machines. Thus, a total of 151 questionnaires were used for this study.

Data Entry

Data analyses were conducted using SPSS (version 13.0). Descriptive statistics for all items in the questionnaire were computed in order to check for missing data and errors in data entry. Data entries were then listed and examined against the original questionnaires. Once the data were entered and coded, the assumptions were checked and the Independent-Sample T-test was conducted in order to test the hypothesis. This test method is useful when comparing the mean values between two groups, such as video poker and pull/push slot machine players.

CHAPTER IV

DATA ANALYSIS AND RESULTS

Introduction

This chapter describes the data analysis and the results obtained from this study. The data were analyzed to show whether video poker and pull/push slot machine players have different personality traits when they play the two games. This chapter presents the demographic information of the participants. The information related to respondents' gambling behaviors is also described. Finally, the results of the Independent-Sample T-test are discussed.

Profile of the Participants

Among the participants 42.4% were male, and approximately 57.6% were female (see Table 7). Among male, 46.9% were video poker players, and 53.1% were pull/push slot machine gamblers. 25.3% of female were video poker players, and 74.7% were pull/push slot machine gamblers.

Table 7

Gender of Participants

Gender	Type of Player	N	%	N[a]	%[b]
Male	Video poker	30	46.9	64	42.4
	other slots	34	53.1		
Female	Video poker	22	25.3	87	57.6
	other slots	65	74.7		
Missing		0			0.0
Total		151		151	100.0

Note. N[a] presents the total number of each gender, and %[b] appears the ratio of each gender out of entire respondents.

Age of the respondents was classified into six different groups. Because legal age for gambling in Nevada is 21 years or older, all participants were over 21. 31.8% of the respondents range from 21 to 29 years old, as the greatest number of respondents. 26.5% were 30 to 39 years old, 23.2% were 40 to 49 years old, 12.6% were 50 to 59 years old, 4.0% were 60 to 69 years old, and 2.0% were over 70 years old (see Table 8). 42.4% of the participants were married, 39.1% were single, 11.3% were divorced, and only 1.3% were separated, and 6.0% were others, for example widow or widower (see Table 9).

Table 8

Age of Respondents

Age	Type of Player	N	%	N[a]	%[b]
21 – 29	video poker	16	33.3	48	31.8
	other slots	32	66.7		
30 – 39	video poker	8	20.0	40	26.5
	other slots	32	80.0		
40 – 49	video poker	16	45.7	35	23.2
	other slots	19	54.3		
50 – 59	video poker	6	31.6	19	12.6
	other slots	13	68.4		
60 – 69	video poker	4	66.7	6	4.0
	other slots	2	33.3		
Over 70	video poker	2	66.7	3	2.0
	other slots	1	33.3		
Total		151		151	100.0

Note. N[a] presents the total number of each age level, and %[b] appears the ratio of each age level out of entire respondents.

Table 9

Marital Status of Participants

Marital Status	Type of Player	N	%	N[a]	%[b]
Single	video poker	22	37.3	59	39.1
	other slots	37	62.7		
Married	video poker	19	29.7	64	42.4
	other slots	45	70.3		
Divorced	video poker	7	41.2	17	11.3
	other slots	17	58.8		
Separated	video poker	1	50.0	2	1.3
	other slots	1	50.0		
Others	video poker	3	33.3	9	6.0
	other slots	6	66.7		
Missing		0		0	0.0
Total		151		151	100.0

Note. N[a] presents the total number of each marital status level, and %[b] appears the ratio of each marital status level out of entire respondents.

Participants could be divided into six groups in terms of their racial background: Native American, Asian or Pacific Islander, Black or African-American, Caucasian, Hispanic, and others. Approximately 83% of the respondents were Caucasian (White), as the majority in this study. 8.6% were Black or African-American, 4% were Hispanic, 3.3% were Asian or Pacific Islander, and 0.7% were others, such as racial mixture. 0.7% of the respondents did not give his or her racial background. There was no Native American among the participants (see Table 10).

Table 10

Racial Background

Background	Type of Player	N	%	N[a]	%[b]
Native American	video poker	0	0.0	0	0.0
	other slots	0	0.0		
Asian or Pacific Islander	video poker	1	20.0	5	3.3
	other slots	4	80.0		
Black or African American	video poker	2	15.4	13	8.6
	other slots	11	84.6		
Caucasian (White)	video poker	46	36.8	125	82.8
	other slots	79	63.2		
Hispanic	video poker	2	33.3	6	4.0
	other slots	4	66.7		
Other	video poker	0	0.0	1	0.7
	other slots	1	100.0		
Missing		1		1	0.7
Total		151		151	100.0

Note. N[a] presents the total number of each racial background level, and %[b] appears the ratio of each racial background level out of entire respondents.

41.7% of respondents approximately had an annual household income in the range of $50,000 to $99,000. 37.0% of participants had an approximate household income of the range from $10,000 to $49,000. 13.2% had between $100,000 and $200,000, 5.3% had less than $10,000, and 2.6% had more than $200,000 as an annual household income (see Table 11).

Table 11

Annual Household Income

Income	Type of Player	N	%	N[a]	%[b]
Less than $10,000	video poker	3	37.5	8	5.3
	other slots	5	62.5		
$10,000 ~ $49,000	video poker	19	33.9	56	37.0
	other slots	37	66.1		
$50,000 ~ $99,000	video poker	20	31.7	63	41.7
	other slots	43	68.3		
$100,000 ~ $200,000	video poker	10	50.0	20	13.2
	other slots	10	50.0		
More than $200,000	video poker	0	0.0	4	2.6
	other slots	4	100.0		
Missing		0		0	0.0
Total		151		151	100.0

Note. N[a] presents the total number of each income level, and %[b] appears the ratio of each income level out of entire respondents.

With regard to the highest educational level, 31.8% had a college degree, and 28.5% had gone to college but did not graduate. 19.2% had a post-college graduate degree, and 16.6% had a high school diploma. 3.3% had gone to high school, but did not graduate, and 0.7% did not answer this question (see Table 12).

Table 12

Highest Educational Level

Education	Type of Player	N	%	N[a]	%[b]
Some high school	video poker	3	60.0	5	3.3
	other slots	2	40.0		
High school graduate	video poker	9	36.0	25	16.6
	other slots	16	64.0		
Some college	video poker	16	37.2	43	28.5
	other slots	27	62.8		
College graduate	video poker	14	29.2	48	31.8
	other slots	34	70.8		
Post-college graduate	video poker	9	31.0	29	19.2
	other slots	20	69.0		
Missing		1		1	0.7
Total		151		151	100.0

Note. N[a] presents the total number of each educational level, and %[b] appears the ratio of each educational level out of entire respondents.

The profile of participants can be compared with 2005 Las Vegas Visitor Profile issued by the Las Vegas Convention and Visitors Authority (LVCVA, 2005). With the exception of marital status, there were no significant differences between the figures investigated by LVCVA and those examined by this study. With regard to the marital status, according to the LVCVA, 74% (2005), 73% (2004), and 73% (2003) of respondents were married. 16% (2005), 17% (2004), and 16% (2003) were single. 10% (2005), 10% (2004), and 11% (2003) were separated/divorced or widowed. However, in this study, 42.4% were married, 39.1% were single, and 18.6% were separated/divorced or widowed.

Table 13 shows descriptive statistics of respondents' gambling behaviors. The first question was how long the respondent has been gambling. 147 out of 151 respondents answered this question. Minimum gambling period was .08 years, and maximum period was 54 years (M = 9.56 years, s = 9.67 years). The second question asked how long the respondent has been playing video poker or pull/push slot machines. 4 out of participants did not answer this question. Minimum period was .03 years, and maximum period was 50 years (M = 7.84 years, s = 7.91years). The third question was how long the participant plays video poker or pull/push slot machine per visit. 146 respondents out of 151 answered to this question. Minimum time was .08 hours, and maximum time was 12 hours per gambling visit (M = 2.8 hours, s = 2.43 hours). The last question was how much money the respondent spends whenever he or she visits casinos. Minimum was $5, and maximum was $3,000 per visit (M = $190.18, s = $321.43) (refer to Table 13).

Table 13

Descriptive Statistics of Participants' Gambling Behaviors

Gambling Behaviors	Type of Player	N	Min.	Max.	M	SD
How long have you been gambling? (years)	video poker	52	.25	54.00	11.54	12.06
	other slots	95	.08	39.00	8.48	7.95
	together	147	.08	54.00	9.56	9.67
How long have you been playing video poker or slot machines? (years)	video poker	52	.25	50.00	8.21	9.00
	other slots	95	.03	30.00	7.63	7.29
	together	147	.03	50.00	7.84	7.91
How long do you play video poker or slot machines per visit? (hours)	video poker	51	.08	12.00	3.51	2.68
	other slots	95	.08	12.00	2.42	2.21
	together	146	.08	12.00	2.80	2.43
How much money do you spend to play slot machines per visit? (dollars)	video poker	52	10.00	1000.00	210.00	257.26
	other slots	99	5.00	3000.00	179.77	351.26
	together	151	5.00	3000.00	190.18	321.43

Testing of Hypothesis

Independent-Sample T-test examines whether mean values of two populations are equal, based on the results observed in two independent samples—one from each of the populations of interest (Norušis, 2004).

In order to test for the difference between the means, the assumption should be made that the populations are normally distributed with equal variances (Berenson, Levine, & Krehbiel, 2003). Normal probability plots were used to test the assumption of normality. According to Norušis (2004), normal probability plot, also called Q-Q plot, is a special plot that makes it easier for researchers to assess normality. The Levene test was

used to examine the assumption of equal variances. All assumptions were checked and they were not violated.

The hypothesis was established to find the differences of personality traits between video poker and pull/push machine players, when they play either video poker or pull/push slot machines. In order to test this hypothesis, Independent-Sample T-test was run, with the 16 personality factors as dependent variables, and the two types of players (video poker and pull/push machine players) as independent variables.

Table 14 shows descriptive statistics of 16 personality traits according to the two types of players. Table 15 indicates results of the Independent-Sample T-test. Among the 16 personality traits, only a significant difference was found ($t(148)=1.95$, $p < .05$), with the video poker players scoring higher ($M=6.60$, $s=2.50$) than the pull/push slot machine players ($M=5.77$, $s=2.48$) in terms of Submissive to Dominant. The rest of 15 personality factors, except the Submissive to Dominant, failed to show significant differences between the two independent variables, such as video poker and pull/push slot machine players.

When a person receives mid-range, from 4 to 7, he or she is in the middle; from 4 to 5, a little to the left, and from 6 to 7, a little to the right (Johnson & Dierks, 1982). Based on this standard, those two mean values are included in the middle of the scales. However, the mean value of video poker players was slightly closer to dominant than that of pull/push slot machine players. On the contrary, the mean value of pull/push machine gamblers was a little closer to submissive than that of video poker players. This result can be interpreted using two directions, one to dominant and one to submissive, because the scales are bipolar. In the standard of the dominant factor, this result indicates that video

poker players presented slightly more dominant personality trait than pull/push slot gamblers, when they played the two games. From the standpoint of the submissive factor, this finding suggests that pull/push slot machine gamblers showed a somewhat more submissive personality trait than video poker players.

Table 14

Descriptive Statistics of 16PF

16PF	Type of Player	N	Mean	SD	Std. Error Mean
Reserved to Warm	video poker	52	5.73	2.44	.34
	other slots	99	5.91	2.26	.23
Concrete to Abstract	video poker	52	5.38	2.61	.36
	other slots	99	5.76	2.58	.26
Emotional to Calm	video poker	52	6.23	2.79	.39
	other slots	99	6.76	2.56	.26
Submissive to Dominant	video poker	52	6.60	2.50	.35
	other slots	98	5.77	2.48	.25
Serious to Enthusiastic	video poker	52	6.06	2.65	.37
	other slots	99	6.50	2.77	.28
Expedient to Conscientious	video poker	51	6.31	2.52	.35
	other slots	99	6.44	2.37	.24
Shy to Bold	video poker	52	6.40	2.39	.33
	other slots	99	5.97	2.73	.27
Tough-minded to Sensitive	video poker	52	5.56	2.65	.37
	other slots	99	5.62	2.59	.26
Trusting to Suspicious	video poker	52	6.00	2.77	.38
	other slots	99	6.02	2.81	.28
Practical to Imaginative	video poker	52	4.56	2.67	.37
	other slots	99	4.97	2.71	.27
Forthright to Shrewd	video poker	52	4.54	2.26	.31
	other slots	98	4.56	2.22	.22

Table 14

Descriptive Statistics of 16PF (continued).

16PF	Type of Player	N	Mean	SD	Std. Error Mean
Composed to Apprehensive	video poker	52	4.52	2.76	.38
	other slots	99	5.01	2.48	.25
Conservative to Progressive	video poker	52	5.29	3.19	.44
	other slots	99	5.20	2.86	.29
Group-oriented to Self-sufficient	video poker	52	7.00	2.92	.41
	other slots	99	6.84	2.90	.29
Spontaneous to Self-disciplined	video poker	52	5.50	3.17	.44
	other slots	99	5.83	2.83	.28
Relaxed to Tense	video poker	52	4.96	2.25	.31
	other slots	99	4.96	2.58	.26

Table 15

Results of T-test for Equality of Means

	T-test for Equality of Means		
16PF	T	df	Sig.(one-tailed)
Reserved to Warm	-.45	149	0.328
Concrete to Abstract	-.84	149	0.201
Emotional to Calm	-1.17	149	0.123
Submissive to Dominant	1.95	148	0.027*
Serious to Enthusiastic	-.94	149	0.176
Expedient to Conscientious	-.31	148	0.378
Shy to Bold	.97	149	0.167
Tough-minded to Sensitive	-.13	149	0.448
Trusting to Suspicious	-.04	149	0.483
Practical to Imaginative	-.89	149	0.187
Forthright to Shrewd	-.06	148	0.477
Composed to Apprehensive	-1.11	149	0.134
Conservative to Progressive	.17	149	0.433
Group-oriented to Self-sufficient	.33	149	0.373
Spontaneous to Self-disciplined	.65	149	0.259
Relaxed to Tense	.005	149	0.498

Note. *$p < .05$.

Figure 1 shows a group profile of 16 personality factors for video poker and pull/push machine players using a line graph. Among the alphabetical factors, 'E' indicates Submissive to Dominant. Factor 'E' presents a significant gap between the two lines.

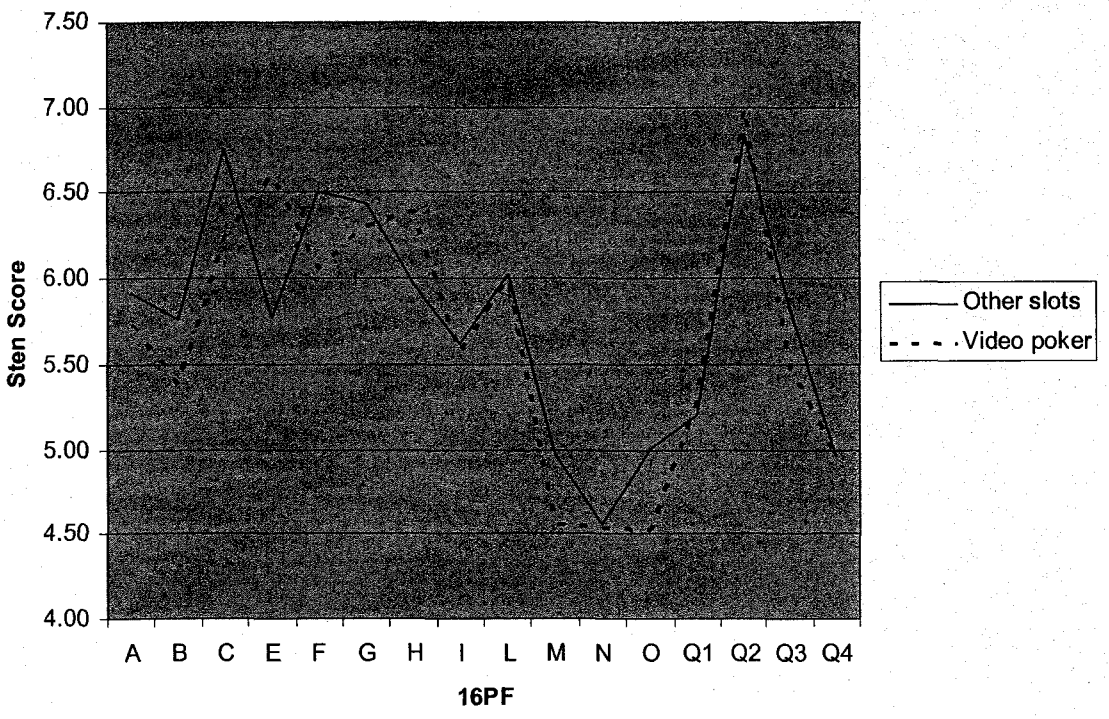

Figure 1. 16PF group profile for video poker and pull/push machine players

Four questions asking respondents' gambling behaviors were included in the questionnaire: how long the respondent has been gambling; how long the respondent has been playing either video poker or slot machines; on average, how long the respondent plays either video poker or slot machines per gambling visit; and on average, how much money the respondent spends to play either video poker or slot machines per gambling visit. Among the four questions, meaningful results were found through the comparison of personality traits of the two types of players, according to the gambling hours and the money spent. Only one factor among 16 personality factors, Submissive to Dominant, appeared as different personality traits between the two players, video poker and pull/push slot machine players, in terms of their gambling hours. Table 16 shows results

gained from the comparison of Submissive to Dominant factor between the two groups of gamblers, using participants' gambling hours. There was no significant difference between the two types of gamblers, who play either video poker or pull/push slot machines for less than 1 hour per gambling visit ($t(40)= -.07$, $p > .05$). However, significant differences were found between the two groups of players, who play the games for more than 2 hours and more than 6 hours per visit. In the analysis of the gamblers who play for more than 2 hours per visit, a significant difference was found ($t(106)=2.15$, $p < .05$), with the video poker players scoring higher ($M=6.77$, $s=2.50$) than the pull/push slot machine players ($M=5.72$, $s=2.45$). In addition, a significant difference was also discovered ($t(20)=2.81$, $p < .05$) between the two groups of players who play the games for more than 6 hours per visit.

The video poker gamblers recorded a higher score ($M=7.60$, $s=2.17$) than the pull/push slot machine players did ($M=4.83$, $s=2.41$). These results represent that, among the players who spend more than 2 hours per gambling visit, video poker players presented slightly more dominant personality traits than pull/push slot gamblers, when they played. Also these findings present that pull/push slot machine gamblers showed slightly more submissive personality trait than video poker players, when they played the two games.

Table 16

Submissive to Dominant according to Gambling Hours

Hours per visit	Type of Player	Descriptive Statistics N	M	SD	T-test t	df.	Sig. (one-tailed)
Less than 1 Hour	video poker	9	5.78	2.49	-.07	40	.471
	other slots	33	5.85	2.58			
More than 2 hours	video poker	43	6.77	2.50	2.15	106	.017*
	other slots	65	5.72	2.45			
More than 6 hours	video poker	10	7.60	2.17	2.81	20	.006
	other slots	12	4.83	2.41			

Note. *$p < .05$.

Table 17 and 18 represent the results of the comparison of personality traits between video poker and pull/push slot machine players, in terms of gambling money. Only two factors, Reserved to Warm and Submissive to Dominant, presented differences of personality traits between the two types of gamblers, according to their gambling money. Table 17 shows the comparison of Reserved to Warm personality trait between video poker and pull/push slot machine players, with regard to their spending money for gamble. No significant difference was found between the two groups of gamblers who spend not more than $50 per gambling visit ($t(64)= 1.29$, $p > .05$). However, significant differences were discovered between the two types of gamblers who spend more than $51 whenever they visit casinos ($t(83)= -1.72$, $p < .05$).

Video poker players recorded lower score ($M=5.52$, $s=2.69$) than pull/push slot machine gamblers did ($M=6.42$, $s=2.15$). In addition, in the analyses of the gamblers who spend more than $101 ($t(54)= -1.93$, $p < .05$), $201 ($t(35)= -2.08$, $p < .05$), and $301

($t(20) = -1.91$, $p < .05$) per visit, significant differences were found in these levels of gambling money spent. In these levels, video poker players presented lower scores than pull/push slot machine gamblers did, with respect to Reserved to Warm factor (see Table 17). These results represent that, among the gamblers who spend more than $51 per gambling visit, video poker players presented a little more reserved personality trait than pull/push slot machine gamblers, when they played either video poker or pull/push slot machines. In regard to Warm factor, it can be shown that pull/push slot machine gamblers appeared to have slightly warmer personality trait than video poker players, when they played the two games.

Table 18 compares Submissive to Dominant factor between video poker and pull/push slot machine players, in terms of their gambling money. No significant differences were discovered between the two types of gamblers who spend not more than $50 ($t(63) = .89$, $p > .05$) and more than $51 ($t(83) = 1.56$, $p > .05$) per gambling visit. Significant difference, however, was found between video poker and pull/push slot machine players who spend more than $101 per visit ($t(54) = 2.69$, $p < .05$). Video poker players appeared to have higher scores ($M=7.33$, $s=2.04$) than pull/push slot machine gamblers did ($M=5.59$, $s=2.63$). Additionally, in the analysis of gamblers who spend more than $201 ($t(35) = 2.23$, $p < .05$) and more than $301 ($t(20) = 2.44$, $p < .05$) per gambling visit, significant differences were found in the two levels of gambling money. In the two levels, video poker players recorded higher scores than pull/push slot machine gamblers did, with respect to Submissive to Dominant factor (refer to Table 18). These results describe that, among the gamblers who spend more than $101 per gambling visit, video poker players showed slightly more dominant personality trait than pull/push slot

machine gamblers, when they played either video poker or pull/push slot machines. With respect to Submissive factor, it can be interpreted that pull/push slot machine gamblers presented a little more submissive personality trait than video poker players, when the two groups of players played the two games.

Table 17

Reserved to Warm according to Gambling Money

		Descriptive Statistics			T-test		
Dollars per visit	Type of Player	N	M	SD	t	df.	Sig. (one-tailed)
Not more than $50	video poker	19	6.11	1.94	1.29	64	.100
	other slots	47	5.34	2.26			
More than $51	video poker	33	5.52	2.69	-1.72	83	.045*
	other slots	52	6.42	2.15			
More than $101	video poker	24	5.50	2.54	-1.93	54	.010
	other slots	32	6.72	2.17			
More than $201	video poker	13	4.92	2.81	-2.08	35	.023
	other slots	24	6.71	2.31			
More than $301	video poker	11	4.73	3.00	-1.91	20	.036
	other slots	11	7.00	2.57			

Note. *$p < .05$.

Table 18

Submissive to Dominant according to Gambling Money

		Descriptive Statistics			T-test		
Dollars per visit	Type of Player	N	M	SD	t	df.	Sig. (one-tailed)
Not more than $50	video poker	19	6.00	2.60	.89	63	.190
	other slots	46	5.39	2.49			
More than $51	video poker	33	6.94	2.41	1.56	83	.062
	other slots	52	6.10	2.44			
More than $101	video poker	24	7.33	2.04	2.69	54	.005*
	other slots	32	5.59	2.63			
More than $201	video poker	13	7.62	2.36	2.23	35	.017
	other slots	24	5.67	2.63			
More than $301	video poker	11	7.64	2.58	2.44	20	.012
	other slots	11	4.91	2.66			

Note. *$p < .05$.

CHAPTER V

DISCUSSION AND IMPLICATIONS

Introduction

This chapter presents major findings obtained from the data analysis. This chapter contains a discussion of and implications from the analysis and results. Also, managerial implications are discussed. Finally, the limitations of this study and recommendations for future research are discussed.

Discussion of Results

Some meaningful results were found in this study. Video poker players presented slightly more dominant personality traits than pull/push slot machine gamblers, when they played either video poker or pull/push slot machines. In the standard of submissive factor, this finding shows that pull/push slot machine gamblers appeared to have slightly more submissive personality trait than did video poker players. Similar results were discovered from the findings of the comparison of personality traits between the two groups of players, using the players' gambling hours and money per visit. In the analysis of gamblers who play either video poker or pull/push slot machines for more than 2 hours per gambling visit, video poker players showed a little more dominant personality trait than pull/push slot machine gamblers. On the other hand, with respect to Submissive to Dominant, there was no significant difference between the two types of players who play

less than 1 hour per visit. Also, the comparison of gamblers who spend more than $101 to play either video poker or pull/push slot machines per visit showed that video poker players had slightly more dominant personality trait than pull/push slot machine gamblers. Any significant differences were not discovered between the two groups of players, who spend not more than $101 per gambling visit. This means that, to identify one's personality with the game, he or she needs to spend certain amount of time or money for gambling.

The result was that video poker players appeared to possess more dominant personality trait than pull/push slot machine gamblers. This can be shown through the relation between the description of the dominant and submissive personality and the thought processes. According to Karson, Karson, and O' Dell (1997), individuals having the dominant disposition are powerful figures in groups, sometimes seeming confident and persuasive and at other times controlling. These individuals may achieve leadership positions in which they can be commanding or controlling (Cattell & Scheurger, 2003). Cattell (1989) also explained that extremely high scorers of this factor frequently present a desire to overpower or control others. On the other hand, low scorers tend to be cooperative and humble versus competitive, and deferential and obedient versus controlling. Decision processes derived from the analytical approaches could be related to controlling behaviors of players against the game. In order to progress the game, video poker players need to repeat more decision processes than do pull/push slot machine gamblers. In other words, the video poker players should have more controlling behaviors against the game than do pull/push slot gamblers.

However, pull/push slot machine gamblers do not have as many decision processes as video poker players do. Pull/push slot machines provide the very simple decision processes, such as push or pull the starting buttons or the levers. Thus, it can be interpreted that video poker players showed more dominant personality traits than pull/push slot machine gamblers when they play their games, because video poker provide more decision processes, that is, the controlling behaviors to the players. On the other hand, this finding can also be interpreted to mean that pull/push slot machine gamblers presented more submissive personality trait than video poker players, because pull/push slot machines offer less decision processes to the gamblers. This result is also supported through the answers obtained from the questions that asking what the players' favorite game was and why. Most respondents who answered that video poker is their favorite game said that they like to play it, because it involves a thinking process and some degree of control, and has high odds against casinos. Most respondents, however, who like pull/push slot machines answered that they like the game because it is simple, easy, and mindless.

Reversed to Warm factor also presented significant differences between the two types of players, according to their gambling money. In the comparison of personality traits of gamblers who spend more than $51 per gambling visit, video poker players showed a little more reserved personality trait than pull/push slot machine gamblers, when they played their machines. However, there was no significant difference between the two groups of players who spend not more than $50 per gambling visit. According to Cattell and Scheurger (2003), high scorers on this scale tend to focus their attention on others and have many of the basic traits necessary for making an emotionally intimate

relationship (Cattell, 1989). On the other hand, low scorers have a tendency to keep a certain emotional distance between themselves and others, thus showing them to be detached, impersonal, or formal (Cattell & Scheurger).

Although the dispositions of the high scorers are often recognized as positive in society, individuals recording high scores may be less effective in situations in which they must work alone (Cattell & Scheurger, 2003). Cattell (1989) claimed that such people may not be comfortable in situations where interpersonal connection is not accessible. Because intellectual development usually depends on spending time alone concentrating and studying, persons with extremely high scores may underachieve (Cattell & Scheurger, 2003). On the other hand, persons having low scores tend to show a strong capability to work independently on tasks that are related to theoretical ideas or technology (Cattell & Scheurger). When one considers that video poker provides analytical approaches to playing the game alone, the results that video poker players presented more reserved personality trait than pull/push slot machine gamblers, when playing their games might be interpreted through the assertions proposed by Cattell (1989) and Cattell and Scheurger (2003).

In the analyses of personality factors between the two groups of gamblers, using their gambling hours and money, significant differences were found only in the comparisons of personality traits of gamblers, who play their games for more than 2 hours (Submissive to Dominant), spend more than $51 (Reserved and Warm), and spend more than $101 (Submissive to Dominant) per gambling visit respectively. There were no significant differences between the two groups of players who play the games for less than 1 hour (Submissive to Dominant), spend not more than $50 (Reserved to Warm),

and spend not more than $100 (Submissive to Dominant) per visit. These results suggest that persons who spend significant hours or money to play their games per visit could show clearer personality traits, such as Submissive to Dominant and Reserved to Warm, when they play the games, than individuals who spend fewer hours or less money. This finding will be discussed further.

Although this study found some different personality traits between the two types of players, on the whole video poker and traditional pull/push slot machine gamblers did not appear huge different personality traits among the 16 personality factors. Most mean values were included in the middle of the scales. This is discussed in the limitation. Mean values of all gamblers including the two groups of players also did not present particularly high or low values among the 16 factors. Moderately high scores were Group-oriented to Self-sufficient (M=6.89, s=2.9) and Emotional to Calm (M=6.58, s=2.64). In other words, the gamblers who participated in this study were slightly self-sufficient rather than group-oriented and a little calm rather than emotional. Low scores were Practical to Imaginative (M=4.83, s=2.69), Forthright to Shrewd (M=4.56, s=2.23), and Composed to Apprehensive (M=4.84, s=2.58). That is, the gamblers were somewhat practical, forthright, and composed rather than imaginative, shrewd, and apprehensive.

Managerial Implications

The major finding of this study is that video poker players showed more dominant personality trait than pull/push slot machine gamblers, when they played their machines. From the standpoint of submissive factor, pull/push slot machine gamblers presented more submissive personality trait than video poker gamblers. This finding was explained

through the connection of dominant and submissive personality traits and decision processes, that is, controlling behaviors of players. This result also was supported by the answers obtained from the questions asked the participants about their favorite games and the reason why they liked the games. Based on these findings, developers of machine games can consider the reason why the two types of players, video poker and pull/push slot machine players, prefer their favorite games.

Kilby and Fox (1998) suggested two answers to the question of why local casinos predominantly offer video poker to local gamblers. Those were first, the higher level of sophistication of the gamblers and second, the thought processes produced by video poker games. The higher level of sophistication of gamblers means that local players know that video poker machines give a lower advantage to casinos. This might provide an answer to the question of why video poker players prefer video poker to pull/push slot machines. However, this answer cannot offer an answer to the question of why pull/push slot machine gamblers like playing the pull/push slot machines. The answer for these two questions can be found in this study. Video poker players presented slightly more dominant personality traits than pull/push slot machine gamblers, when they played either video poker or pull/push slot machines. This result could also mean that pull/push slot machine gamblers showed a little more submissive personality trait than video poker players. The reason that, with respect to Submissive to Dominant factor, there were differences between the two groups of players can be explained by the fact that the two machinery games provide different playing styles. Video poker offers more decision processes to the players than do pull/push slot machines. Pull/push slot machines serve simpler, easier, and more mindless processes to gamblers. In other words, the two types

of players play their preferred games because the two groups of players like different playing styles. Thus, developers of machine games need to consider these two different gaming styles when they develop new machine games. They need to develop two different kinds of machine games, which have one factor of those two gaming styles respectively. One kind should require thought processes based on analytical approaches. The other should possess simple and easy processes.

From the managerial standpoint, slot managers should consider that there are two groups of players who like different playing styles when they distribute machine games on their floor. Slot managers should organize the slot floor with a reasonable ratio between the two types of games. In other words the managers should avoid organizing slot floors only using machines, which have one out of the two gaming styles.

Limitations

There are some limitations related to methodology for this study.

First, the data collection was conducted against only video poker and pull/push machine players who crowed in front of a famous tourist spot in Las Vegas. This fact makes the findings in this study unsuitable to generalize. In addition, this study was performed with a small sample size. Although the Independent-Sample T-test is robust against small sample size, a bigger sample size would help to obtain more reliable findings.

Second, not every model which can enable researchers to measure personality traits of people was used in this study. There are many psychological models with which to measure individuals' personality traits. The Cattell's 16 Personality Factors is only one

model that can measure personality traits. Thus, even though the 16PF is a useful tool for measuring personality traits, it cannot be said that this study reached a firm and absolute conclusion.

Third, most participants in this study were tourists in Las Vegas, which may have affected the findings in this study, since they probably do not gamble very often and may not have found a game more suited to their personality styles. Thus, if the data collection were performed against local gamblers, more differences in personality traits might have been found. According to Kilby and Fox (1998), the Las Vegas local casino market derives a substantial portion of its revenues from the local clientele. Therefore, the primary target market for local casinos is their local clientele. The authors mentioned that, in terms of different kinds of machine games, one reason for the difference in preference between the locals and tourists is the level of sophistication of the gamblers. Kilby and Fox stated that local clienteles seem to be more astute gamblers who know that video poker machines may have a lower casino advantage. Based on the explanations of Kilby and Fox related to local customers and their high frequency of visiting casinos, it can be thought that local clienteles are more likely to have specific preferences for types of slot machines and may have games that are more suitable to their personality trait. Thus, it can be presumed that local gamblers, who play in local casinos, are more proper subjects than tourists, to examine the difference of personality traits between video poker and pull/push machine players.

Fourth, the 16PF has scales ranged from 1 to 10. As staff of the Institute for Personality and Ability Testing (Staff of the Institute for Personality and Ability Testing (IPAT), 1979) pointed out, low sten scores of 1, 2, 3, and high sten scores of 8, 9, 10 are

selected much less frequently and are regarded to be of greater significance in profile interpretation. In other words, most answers are easy to concentrate on from 4, 5, 6, and 7. This limitation of 16PF also showed in the findings of this study. Although, in terms of Submissive to Dominant factor, there was a slight, but significant difference between the two groups of players, the gap of mean values between the groups was not huge. Thus, it is hard to conclude that the two types of players have significantly different personality traits, with regard to Submissive to Dominant factor.

Finally, weaknesses of the surveying method through questionnaires become limitations to this study. Surveys have some advantages. For example, through surveys, researchers can study a wide range of issues and elicit information from many respondents. In addition, it is fast and inexpensive, and can maximize standardization. Although these advantages can help researchers to perform excellent studies, the surveys themselves can put limitations on the studies. According to Zikmund (2003), surveys can induce some biases, such as non-response error or response bias, in the process of conducting the surveys.

Non-response error is that the statistical difference in results between a survey that contains only persons who responded and a perfect survey that would also contain individuals who failed to respond (Zikmund). There were some refusals for doing the surveys in this study. Refusals come about when people are unwilling to participate in the research and can seriously bias survey data (Zikmund). People who refused the surveys might have felt annoyance for filling out the questionnaires, because the weather was hot during the survey period. Other people refused the survey because they were distracted

by tourist attraction. People's refusals in the surveys might influence the results in this study.

A response bias happens when participants tend to give answers in a certain direction, that is, when they consciously or unconsciously do not represent the truth (Zikmund). Occasionally some people knowingly misrepresent answers. Respondents who become bored with the interview simply give answers just to remove the interviewer (Zikmund). This bias might have occurred in the process of performing the surveys, because the questionnaire included a significant amount of questions. Although when a respondent is consciously attempting to represent the truth, response bias can happen from question format and content (Zikmund). Even though the 16 Personality factors are well-defined English words indicating personality traits, people who do not use English as their first language might have misinterpreted them. Also, some respondents might not have understood how to use the sten scores. This response bias could affect the results in this study.

Recommendations for Future Research

Since this study is the first trial to elicit differences of personality traits between two types of gamblers, those who play either video poker or pull/push slot machines, using Cattell's 16PF, it is expected that researchers will conduct similar studies in the future. These researchers should consider using a bigger sample size, in order to achieve the external generalizability or applicability of the findings. In addition, similar studies should be conducted with local gamblers, in order to find clearer differences of personality traits between the two groups of gamblers.

Researchers who want to conduct similar research can apply other methods to measure personality traits of the gamblers. A number of methods for measuring personality traits exist in the field of psychology. Results gained from these different approaches enable researchers to compare these results with findings by obtained from other methods.

Finally, research would be meaningful if personality traits between table game players and pull/push slot machine gamblers are compared through the Cattell's 16PF or other methods for measuring personality.

APPENDIX

QUESTIONNAIRE FOR MEASURING OF GAMBLERS' BEHAVIROS

Background Information

1. Approximately how long have you been gambling? (Please circle months or years)
_____ (months or years)

2. How long have you been playing video poker or slot machines?
_____ (months or years)

3. What is your favorite game? _____Why? _____

☺ Please give your answer or circle on the following numbers, and choose only one answer.

4. On average, whenever you visit casinos, how long do you play video poker or slot machines? (Please circle minutes or hours) _____ (minutes or hours)

5. One average, how much money do you spend to play slot machines per gambling visit?

$_____

---

6. Gender: 1) Male 2) Female

7. Age: _____

8 What is your relationship status? (circle one)
1) Single 2) Married 3) Divorced 4) Separated 5) Other ( )

9. What racial background best describes you?
1) Native American 2) Asian or Pacific Islander
3) Black or African American 4) Caucasian (White)
5) Hispanic 6) Another group (Which one? _____)

10. Please circle the number that is the closest estimate to the total amount of income your household received during the past 12 months. Please indicate the amount before taxes.
1) Less than $10,000
2) $10,000-$24,000
3) $25,000-$49,000
4) $50,000-$99,000
5) $100,000-$200,000
6) More than $200,000

11. What is the highest grade or year of school you have ever attended, even if you did not complete that grade or year?
1) Some high school 2) High school graduate
3) Some college 4) College graduate
5) Post-college graduate studies

BIBLIOGRAPHY

Allport, G. W., & Odbert, H. S. (1936). Trait-names, a psycholexical study. *Psychological Monographs*, 41(1, whole No. 211).

Anonsen, M. K. (1985). *Personality and interests of artists and accountants.* Unpublished master's thesis, Cleveland State University, Cleveland, Ohio.

Anonymous (2003). Casino executive reports: Death of the tables? *Casino Journal*, 15(3), 26-28.

Barbaranelli, C., & Caprara, G. B. (1996). How many dimensions to describe personality: A comparison of Cattell, Comrey, and the Big Five taxonomies of personality traits. *European Review of Applied Psychology*, 46(1), 15-24.

Bartram, D. (1995). The predictive validity of the EPI and the 16PF for military flying training. *Journal of Occupational & Organizational Psychology*, 68(3), 219-236.

Beer, J. M. (2001). The influence of rearing order on personality: Data from biological adoptive siblings. *Dissertation Abstracts International*, 61(8), 4462B.

Berenson, M. L., Levine, D. M., & Krehbiel, T. C. (2003). *Basic business statistics.* (9th ed.). Englewood Cliffs NJ: Prentice Hall.

Bonner, H. (1961). *Psychology of personality.* New York: The Ronald Press Company.

Boone, L. E. (1970). The search for the consumer innovator. *Journal of Business*, 43(2), 135-140.

Brewer, K. P., & Cummings, L. E. (1995). Gaming language: Getting a handle on slots. *Cornell Hotel and Restaurant Administration Quarterly*, 36(2), 74-78.

Brill, A. A. (1995). *The basic writings of Sigmund Freud.* New York: Modern Library.

Brindle, L. (1992). How do executives get better jobs? *Executive Development*, 5(1), 20-22.

Brody, R. P., & Cunningham, S. M. (1968). Personality variables and the consumer decision process. *Journal of Marketing Research*, 5(1), 50-57.

Bruce, G. D., & Witt, R. E. (1970). Personality correlates of innovative buying behavior. *Journal of Marketing Research*, 7(2), 259-260.

Cattell, H. B. (1989). *The 16PF: Personality in depth.* Champaign, IL: Institute for Personality and Ability Testings.

Cattell, H. E. P., & Schuerger, J. M. (2003). *Essentials of 16PF assessment.* NY: Wiley.

Cattell, R. B. (1943). The description of personality: Basic traits resolved into clusters. *Journal of Abnormal and Social Psychology*, 38, 476-506.

Cattell, R. B., Eber, H. W., & Tatsuoka, M. M. (1970). *Handbook for the sixteen personality factor questionnaire.* Champaign, Illinois: Institute for Personality and Ability Testing Inc.

Cattell, R. B. & Gibbons, B. D. (1968). Personality factor structure of the combined Guilford and Cattell personality questionnaires. *Journal of Personality and Social Psychology*, 9(1), 107-120.

Cattell, R. B., & Krug, S. E. (1986). The number of factors in the 16PF: A review of the evidence with special emphasis on the methodological problems. *Educational and Psychological Measurement*, 46(3), 509-522.

Cebollero, L., Mayer, K., & Pinkos, S. (2000). A proposed typology of odyssey slot machine gamblers. *Gaming Research & Review Journal.* 5(2), 15-26.

Claycamp, H. J. (1965). Characteristics of owners of thrift deposits in commercial banks and savings and loan associations. *Journal of Marketing Research*, 2(2), 163-170.

Chernyshenko, O., Stark, S., & Chan, K. Y. (2001). Investigating the hierarchical factor structure of the Fifth Edition of the 16PF: An application of the Schmid-Leiman orthogonalization procedure. *Educational and Psychological Measurement*, 61(2), 290-302.

Cohen, J. B. (1966). *Interpersonal response traits and consumer behavior*. Unpublished doctoral dissertation, University of California, Los Angeles. (University Microfilms No. 66-11, 901).

Conn, S. R., & Rieke, M. L. (1994). *16PF Fifth Edition Technical Manual*. Champaign, IL: Institute for Personality and Ability Testing.

Davidson, R. A., & Dalby, J. T. (1993). Personality profile of female public accountants. *Accounting, Auditing & Accountability Journal*, 6(2), 81-97.

DiFiore, E. W. (1981). *Personality, occupational interests, and job preferences of R. and D. engineers*. Unpublished master's thesis, Cleveland State University, Cleveland, Ohio.

Edwards, A. L. (1959). *Edwards Personal Preference Schedule manual*. New York: Psychological Corporation.

Ellington, J., Smith, D. B., & Sackett, P. R. (2001). Investigating the influence of social desirability on personality factor structure. *Journal of Applied Psychology*, 86(1), 122-133.

Evans, F. B. (1959). Psychological and objective factors in the prediction of brand choice. *Journal of Business*, 32(4), 340-369.

Franklin, E. C. (1983). *A comparison among the sex-role orientation, self-esteem/general*

adjustment, and personality profiles of men and women in male dominated and female-dominated professions. Unpublished doctoral dissertation, Kent State University, Kent, Ohio.

Fry, J. N. (1971). Personality variables and cigarette brand choice. *Journal of Marketing Research*, 8(3), 298-304.

Gaming Studies Research Center. (2002). The Las Vegas "Strip" tourist industry. Retrieved April 20, 2006, from http://gaming.unlv.edu/Xanadu/report3.html

Gerbing, D. W., & Tuley, M. R. (1991). The 16PF related to the five-factor model of personality: Multiple-indicator measurement versus the a priori scales. *Multivariate Behavioral Research*, 26(2), 271-289.

Goldberg, L. R. (in press). *The comparative validity of adult personality inventories: Applications of a consumer-testing framework. Handbook of adult personality inventories*. New York: Plenum Press.

Graham, J. R., & Lilly, R. S. (1984). *Psychological testing*. Englewood Cliffs, NJ: Prentice Hall.

Griffiths, M. (1993). A study of the cognitive activity of fruit machine players. In W. R. Eadington, & J. A. Cornelius (Eds.), *Gambling Behavior and Problem Gambling,* 85-109. Reno, NV: Institute for the Study of Gambling and Commercial Gaming, University of Nevada, Reno.

Guilford, J. P. (1959). *Personality.* New York: McGraw Hill.

Guyer, M. B. (1984). *Personality profiles of engineers across samples and instruments.* Unpublished master's thesis, Cleveland State University, Cleveland, Ohio.

Hall, B. S. (1954). *A primer of Freudian psychology*. New York: World.

Hebb, D. O. (1966). *A textbook of psychology*. Philadelphia: W. B. Saunders Company.

Hilgard, E. R. (1967). *Introduction to psychology*. New York: Harcourt Brace Jovanovich, Inc.

Hofer, S. M., & Eber, H. W. (2002). *Second-order factor structure of the Cattell Sixteen Personality Factor Inventory (16PF)*. Ashland, OH: Hogrefe & Huber.

Hofer, S. M., Horn, J. L., & Eber, H. W. (1997). A robust five-factor structure of the 16PF: Evidence from independent rotation and confirmatory factorial invariance procedures. *Personality and Individual Differences*, 23(2), 247-269.

Holland, J. L. (1973). *Making vocational choice: A theory of careers*. Englewood Cliffs, NJ: Prentice-Hall.

Horst, P. (1968). *Personality: measurement of dimensions*. San Francisco: Jossey-Bass.

Johns, E. F. (1985). *Holland's occupational taxonomy in terms of personality traits and discriminant functions*. Unpublished master's thesis. Cleveland State University, Cleveland Ohio.

Johnson, P. L., & Dierks, P. A. (1982). What are women accountants really like? *Management Accouting*, 63(9), 24-28.

Kamen, J. M. (1964). Personality and food preferences. *Journal of Advertising Research*, 4(3), 29-32.

Karson, S., Karson, M., & O'Dell, J. W. (1997). *16PF interpretation in clinical practice: A guide to the Fifth Edition*. Champaign, IL: Institute for Personality and Ability Testings.

Kassarjian, H. H. (1971). Personality and consumer behavior. *Journal of Marketing Research*, 8(4), 409-418.

Kernan, J. B. (1968). Choice criteria, decision behavior, and personality. *Journal of Marketing Research*, 5(2), 155-164.

Kilby, J., & Fox, J. (1998). Casino operations management. New York: Wiley.

Koponen, A. (1960). Personality characteristics of purchasers. *Journal of Advertising Research*, 1(1), 6-12.

Kosslyn, S. M., & Rosenberg, R. S. (2004). *Psychology: The brain, the person, the world*, (2nd ed.). Boston: Pearson Education, Inc.

Lamont, L. M., & Lundstrom, W. J. (1977). Identifying successful industrial salesman by personality and personal characteristics. *Journal of Marketing Research*, 14, 517-529.

Las Vegas Convention & Visitor's Authority (2005). Visitor profile studies: 2005 Las Vegas Summary. Retrieved March 2, 2006, from http://www.lvcva.com/press/statistics-facts/index.jsp?whichDept=stats

Macgregor, C. J. (2000). Does personality matter: A comparison of student experiences in traditional and online classrooms. *Dissertation Abstracts International*, 61(5), 1696A.

Malhotra, N. K. (2003). *Basic marketing research: Applications to contemporary issues.* Englewood Cliffs, NJ: Prentice Hall.

Markin, R. J. (1974). *Consumer Behavior; A cognitive orientation.* New York: Macmillan.

Massy, W. F., Frank, R. E., & Lodahl, T. M. (1968). *Purchasing behavior and personal attributes*. Philadelphia: University of Pennsylvania Press.

McCurley, S. P. (1983). *The development, validation, and application of the consumer personality survey*. Unpublished doctoral dissertation, University of Alabama.

McGuire, W. J. (1976). Some internal psychological factors influencing consumer choice. *Journal of Consumer Research*, 2(4), 302-314.

Millon, T. (1989). *Manual for the millon multiaxial clinical inventory*. Minneapolis: National Computer Systems.

Mischel W. (1977). On the future of personality measurement, *American Psychologist*, 32(4), 246-254.

Motegi, M. (1982). *Japanese translation and adaptation of the 16PF*. Tokyo: Nihon Bunka Kagakusha.

Mowen, J. C., & Minor, M. (1998). *Consumer behavior*, (5th ed). Upper Saddle River, NJ: Prentice-Hall, Inc.

Myers, J. G. (1967). Determinants of private brand attitudes. *Journal of Marketing Research*, 4(1), 73-81.

Nasvytis, V. R. (1988). *Occupational similarity, satisfaction, and personal well-being*. Unpublished master's thesis, Cleveland State University, Cleveland, Ohio.

Nevada Gaming Control Board (2001, June 30). Gaming revenue report index. Retrieved April 20, 2005, from http://gaming.nv.gov/gaming_revenue_rpt.htm

Noel, N. M., Michaels, C., & Levas, M. G. (2003). The relationship of personality traits and self-monitoring behavior to choice of business major. *Journal of Education for Business*, 78(3), 153-157.

Norušis, M. J. (2004). *SPSS 12.0 guide to data analysis*. Upper Saddle River, New Jersey: Prentice Hall.

Pennington, A. A., & Peterson, R. A. (1969). Interest patterns and product preferences: An exploratory analysis. *Journal of Marketing Research*, 6(3), 284-290.

Plume, J. (2001). *Slots are king. Casino Executive Reports*, June, 22-26

POKERNEWS (2003) "Video Poker Machine" definition. Retrieved November 9, 2005, from http://www.pokernews.com/pokerterms/video-poker-machine.html

Prieto, J. M., Gouveia, V. V., & Fernandez, M. A. (1996). Evidence on the primary source-trait structure in the Spanish 16PF, (5th ed.). *European Review of Applied Psychology*, 46(1), 33-43.

Robertson, T. S., & Myers, J. H. (1969). Personality correlates of opinion leadership and innovative buying behavior. *Journal of Marketing Research*, 6(2), 164-168.

Ruch, D. M. (1966). *Limitations of current approaches to understanding brand buying behavior. On knowing the consumer*. New York: John Wiley & Sons, Inc.

Schuerger, J.M. (1992). The sixteen personality factor questionnaire and its junior versions. *Journal of Counseling and Development*, 71(2), 231-244.

Schuerger, J. M., Zarrella, K., & Hotz, A. (1989). Factors which influence the stability of personality by questionnaire. *Journal of Personality & Social Psychology*, 56(5), 777-783.

Span, P. (2003, Feb. 16). Dream machines; Today's slots are fancier, flashier and even talk as they take your cash. *The Washington post*, pp. F01.

Staff of the Institute for Personality and Ability Testing (1979). *Administrator's manual for the 16PF*. Champaign: Institute for Personality and Ability Testing.

Titz, K., Andurs, D., & Miller, J. (2001). Hedonistic differences between mechanical game players and table game players: An exploratory investigation on the road to acomprehensive theory for gambling. *UNLV Gaming Research & Review Journal*, 6(1), 23-32.

Vitz, P. C., & Johnston, D. (1965). Masculinity of smokers and the masculinity of cigarette images. *Journal of Applied Psychology*, 49, 155-159.

Walker, M. B. (1992). The presence of irrational thinking among poker machine players. In W. R. Eadington, & J. A. Cornelius (Eds.), *Gambling and Commercial Gaming*: *Essays in Business, Economics, Philosophy and Science* , 485-498. Reno, NV: Institute for the Study of Gambling and Commercial Gaming, University of Nevada, Reno.

Wells, W. D. & Beard, A. D. (1973). *Personality and consumer behavior. Consumer behavior: Theoretical sources.* Englewood Cliffs, New Jersey: Prentice-Hall.

Westfall, R. (1962). Psychological factors in predicting product choice. *Journal of Marketing*, 26(2), 34-40.

Wikimedia Foundation. (2006). The free encyclopedia. Retrieved April 21, 2006, from http://en.wikipedia.org

Zikmund, W. G. (2003). *Business research methods,* (7th ed.). Mason, Ohio: South-Western.

VITA

Graduate College
University of Nevada, Las Vegas

Jungjin Hwang

Home Address:
1880 E. Rochelle Ave. Apt 31
Las Vegas, Nevada 89119

Degree:
Bachelor of Business Administration, Hospitality Management, 2003
Soonchunhyang University

Thesis Title: A Comparative Study of Personality Traits between Gamblers Who Play Video Poker or Traditional Pull/Push Machines through Cattell's 16 Personality Factors

Thesis Examination Committee:
Chairperson, Dr. Kathryn LaTour, Ph.D.
Committee Member, Dr. Billy Bai, Ph.D.
Committee Member, Dr. Bo Bernhard, Ph.D.
Graduate Faculty Representative, Dr. Taedong Han, Ph,D.