

Running Head: CONTROL AND RISK TAKING

INTERACTIVE EFFECTS OF TRAIT LOCUS OF CONTROL
AND SITUATIONAL CONTINGENCY ON RISK TAKING

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The present study examines locus of control (LOC) as a determinant of risk taking behaviour. Sixty participants scoring in the top (Internal) and bottom (External) quartiles on the Rotter I-E Control Scale were employed in the second phase of the experiment. These two groups of 30 were further subdivided into a contingent and non-contingent procedural manipulation. Participants were then asked to play a pre-programmed computer memory game and invited to risk points afterwards. It was hypothesized that there will be an interaction between the effects of personal trait LOC and situational contingency on how much participants will risk. Specifically, it is expected that internally-controlled participants will risk more in contingent situations and, externally-controlled will risk more non-contingent situations. Results confirmed a significant interaction. All sub-comparisons were in the direction predicted, but only one (the difference between Internals and Externals in the non-contingent situation) achieved statistical significance.

The recent rapid growth of the popularity of legalized gambling has led to increased interest in the behavioural components of gambling. Murray (1993) has defined gambling and risk taking behaviour as that which primarily involves taking a chance on a game, an event, a happening, or a venture that is full of uncertainty.

Why is it that one individual will gamble or take risks while another will not? Researchers have ventured to determine factors which mediate risk taking behaviour in games of chance. Although theories are plentiful, usually one of the most intriguing aspects

of the behaviour emerges: the gambler's sense of perceived control. The element of skill is often linked to a gambler's sense of perceived control. Most gamblers seem to prefer games in which they are able to utilize some degree of their skill. It is also these skill-based games which prove to be more habit forming than the games of pure chance.

Research has supported the hypothesis that people with certain types of personality characteristics prefer certain types of games. Prior studies have attempted to isolate possible personality characteristics associated with gambling and taking risks. Personality traits are summary features of the way an individual behaves, in general, across situations. The three studied most extensively to identify risk takers have been sensation-seeking, extroversion, and Locus of Control (LOC).

The Internal-External LOC variable, a construct associated with social psychologist Julian Rotter (1966), has a central idea that certain individuals believe that the reinforcement or outcome of their efforts are controlled by events that are external to themselves. These people are identified as having an External LOC. They perceive the outcome as not

dependent upon their personal attributes or skills, but rather due to factors such as luck, fate, or chance. Other individuals believe that an outcome or reinforcement is caused by their own action. These people are identified as having an Internal LOC because they perceive control an internal matter related to their own efforts.

With regard to gambling, it would seem apparent that an individual with an Internal LOC should not be attracted to games of chance, whereas an External LOC would be congruent with the activity. Available research only weakly supports this hypothesis. Hence, it is plausible to assume that trait LOC by itself is not significant enough to explain the behaviour.

It is then necessary to focus attention on the situation. Situations may also be characterized by degree of direct control referred to as "contingency". In contingent situations, we expect the outcome of an event to be a direct result of our own action. An example would be an outcome that is a consequence of how we have performed in the situation. In contrast, in non-contingent situations, the perception is that the outcome is somehow predetermined, and independent of our control. In this

situation, it would not matter how well or how poorly we performed because it would have no subsequent effect on the outcome.

Earlier studies attempting to determine whether perceived control varied as function of the situation, found that an "illusion of control" could be induced, wherein people believed they exerted control over what was really a chance determined event (Langer, 1975). In a series of experiments, Langer identified several conditions which created an illusion of control including active involvement, familiarity with the task, and the possibility of making choices. The results of the studies suggested that the more a situation is perceived by the individual as requiring skills, the more the individual will develop an illusion of control within it. These conditions were also found to affect level of risk taking. It is then possible to investigate whether certain personality variables interact with certain situations to produce an effect on risk taking behaviour. In this regard, previous studies have produced conflicting results.

Some prior research has contended that internal control leads to increased risk taking (Rosencrance, 1986; Ladoucuer & Mayrand, 1986; Wortman, 1975;

Langer, 1975). Internally oriented persons see a game as a problem to be solved requiring skills, thus the more control they feel in the situation the more they will be willing to risk. Regardless of previous histories of winning or losing, a series of situational wins can also lead to a gambler's increased sense of control and hence larger wagers bet (Ladouceur, Gaboury, Dumont & Rochette, 1987; Malkin & Syme, 1985).

Whereas people with internal trait LOC have the perception of more control in skill situations and tend to prefer them, in contrast, people with an external trait LOC show a greater preference for chance tasks. Past research (Wagenaar, 1988) has suggested that it is unlikely that externals will overestimate the role of skill in chance situations but, rather, it is their perception of chance itself that motivates them to perform.

Most players that are externally oriented do not believe they physically influence the spin of the roulette wheel or the pull of the slot machine. It is their belief in luck that makes any reasoning based on probabilities or the physical proportions of the game irrelevant. Externals expect that fate, chance, or

luck will determine the outcome in their favour or help them select the appropriate bet (Wagenaar, 1988).

The opinions of researchers have differed in that some findings have suggested that external control should lead to an increase in risk taking: When given no choice, a passive condition, gamblers are more likely to increase their objective odds of winning by risking (Liverant & Scodel, 1960; Rosencrance, 1986). Lastly, when a gambler is losing and senses that the outcome is beyond their own skills, he or she is more likely to increase betting as well as make more long shot bets in an effort to recoup losses (Rosencrance, 1986).

The proposed study attempts a resolution of the conflicting results of previous findings by providing a clearer indication of how risk taking is mediated by the both trait locus of control of the individual and the situational control presented to him or her. Hence, the hypotheses that were tested were: a) in a contingent situation (high situational control), participants whose trait locus of control is internal would risk more and, 2) in a non-contingent situation (low situational control), participants whose trait

locus of control is external would be more willing to take risks.

Design

A 2x2 factorial design was employed with both an independent participant variable: Internal or External trait LOC, and an independent group procedural manipulation: contingent or non-contingent situation locus of control.

Subjects

153 participants were selected randomly from a pool of undergraduate students at Sault College and Algoma University. All participants completed the Rotter I-E Locus of Control Scale (Rotter, 1966). This scale consisted of twenty-three forced choice items, along with six filler items added to help disguise the purpose of the test. The questionnaire measured how people develop expectancies differently when they believe that success in a situation is determined by skill rather than by chance factors. Sixty participants scoring in the top (externals) and bottom (internals) quartiles were used in the experiment. The scores of all 153 participants, and means of those 60 actually employed in the experiment are presented in Graph 1.1 These two groups of 30 participants were

further subdivided into a "contingent" and "non-contingent" subgroup for the next phase of the experiment (See Figure 2.1).

Figure 2.1

DESIGN MATRIX

<u>Trait LOC</u>	<u>Situation</u>	
	Contingent	Non-Contingent
External	15 participants	15 participants
Internal	15 participants	15 participants

Apparatus

A modified version of a computer memory game was pre-programmed and color PC's with 13 inch monitors in Sault College's and Algoma University's multimedia computer labs were used. Each participant was given 20 trials in which they were to pick one of five cards in an attempt to "guess" the computer's pattern. After each guess, a pre-determined sequence of "right" or "wrong" feedback was displayed via the computer screen as well as a number of points awarded.

Procedure

Ss arrived according to pre-arranged appointment times were run independently at his/her own computer terminal. After participants were seated, they were given an index card with pre-recorded information on whether they are Internal or External trait LOC (again, predetermined according to results of the Rotters Scale) which was represented by an I or an E, and a corresponding C (contingent) or N (non-contingent) representing the situation they were to be given. Participants were then given the following instructions:

Thankyou for participating. In this study, we are interested in the ways that people play guessing games. What you will be required to do next is play a game on the computer called "Memory Warp". The object of the game is to try and guess the computer's pattern. At the end of the game, you will receive a certain number of points. Those 10 subjects with the highest number of points will have their names in a draw for lottery tickets. Remember, the more points you get, the better your chances are of winning. From this point on, all instructions will be given to you by the computer. Please read carefully.

The experimenter began the game by typing a "C" for contingent or an "N" for non-contingent depending upon what was printed on the participant's index card. The first frame of the computer programme then presented all participants with:

"Welcome to Memory Warp! How to Play: When the computer presents five cards, guess which card is the right one. See if you can guess the computer's pattern. You will get 20 trials to figure out the pattern. In order to "choose" a card, place the mouse pointer on top of the card and click the mouse button. The computer will then tell you if you chose the correct card or not, and may award you some points. You should try and earn as many points as you possibly can. When you finish, the computer will give you your total points and tell you whether your score was better than average, average, or worse than average."

After each guess, the participant would receive feedback that told them either, "Good guess. You're doing well!", or "Sorry, wrong guess. Try again" in a pre-programmed sequence. This feedback occurred in the same sequence regardless of the card number the participant clicked the mouse on but responded to each choice individually. For example, if the choice was Card 3, the computer responded with, "Good guess! Card 3 was the right choice." Also, in order to give participants the impression that they were solving the problem their percentage success was 20% in the first 5 plays, and increased to 40%, 60% and 80% in the remaining 5-trial blocks.

Manipulation of the Independent Variable

All participants received the same game experience for the 20 guessing trials. After the trials were

finished, those 50 participants in the contingent situation were awarded their points by earning them according to their presumed "performance". In the upper right-hand corner of their playing screen points were accumulating by showing "Total Points Earned This Far: 150". The computer informed participants in this condition, "Congratulations! You have earned 450 points! This is an average performance for players of this game." Those participants in the non-contingent situation were randomly given their points. Points also accumulated in the upper right-hand corner of their playing screen and showed "Total Points Given This Far: 150". The computer informed participants in this condition, "You have been given 450 points! This is average for players of this game."

Phase Two

The computer then told all participants:

"You now have a chance to risk some, or all, of your points on a double or nothing coin toss. If you choose not to bet any points, your total will remain at 450. If you choose to bet some number of points, that number will be added or subtracted from 450 depending on whether you win or lose the coin toss. Please write the number of points you wish to bet (from 0 - 450) on the card provided, and take it to the experimenter. Thank you."

All participants were then directed to a separate room where a complete debriefing occurred. Participants were told that this was the end of the study and thanked. The decision to wager and the percentage of total points wagered were recorded as a measure of the dependent variable - risk taking.

Results

A 2 (LOC) x2 (Contingency) analysis of variance was performed on risk. The mean levels of risk are presented in Table 3.1. The analysis of variance, as presented in Table 3.2, indicated a significant LOC X Contingency interaction ($F=5.78$, $df=1/56$, $p<.05$) showing that risk taking varied as a function of both the trait LOC of the individual and the situational control presented to him/her.

Table 3.1 THE EFFECTS OF TRAIT LOCUS OF CONTROL AND SITUATIONAL CONTINGENCY ON RISK TAKING

	CONTINGENT	NON-CONTINGENT
EXTERNAL LOC	185	317
INTERNAL LOC	275	205

The first post hoc comparison involved the difference between the amount risked by external

participants in a contingent situation (185) and the amount risked by external participants in the non-contingent situation (317). The difference was in the predicted direction and was significant ($p=.03$).

The second comparison involved the difference between amount risked by an internal participant in a contingent situation (275) and the amount risked by internal participants in the non-contingent situation (205). This difference was in the predicted direction but was nonsignificant ($p=.26$). The results are presented in Graph 1.2.

Table 3.2 ANALYSIS OF VARIANCE FOR RISK

SOURCE	DF	SS	MS	F	P
LOC	1	1760	1760	0.07	0.797
CONT	1	14260	14260	0.54	0.465
LOC*CONT	1	152510	152510	5.78	0.020
ERROR	56	1478333	25399		
TOTAL	59	1646865			

Discussion

The results indicated that trait LOC and situational control interacted such that higher levels of risk taking were made when a person whose trait LOC was external and they were presented with a non-

contingent situation, and when a person whose trait LOC was internal and they were presented with a contingent situation. For the condition where Internals were presented with a non-contingent situation, they risked less points. This was probably due to their perception of the situation being out of their control. Internals treat gambling as problem-solving, hence a skill task. Therefore, the more control they feel in the situation, the more they will risk. Results indicated support of this hypothesis. For the condition where Externals were presented with a contingent situation, they risked a significantly lesser amount of points. People with an External LOC see events as caused by fate, thus the results indicate that they perceived a difference between the two procedural manipulations and tended to risk more in a situation more like that of a chance game.

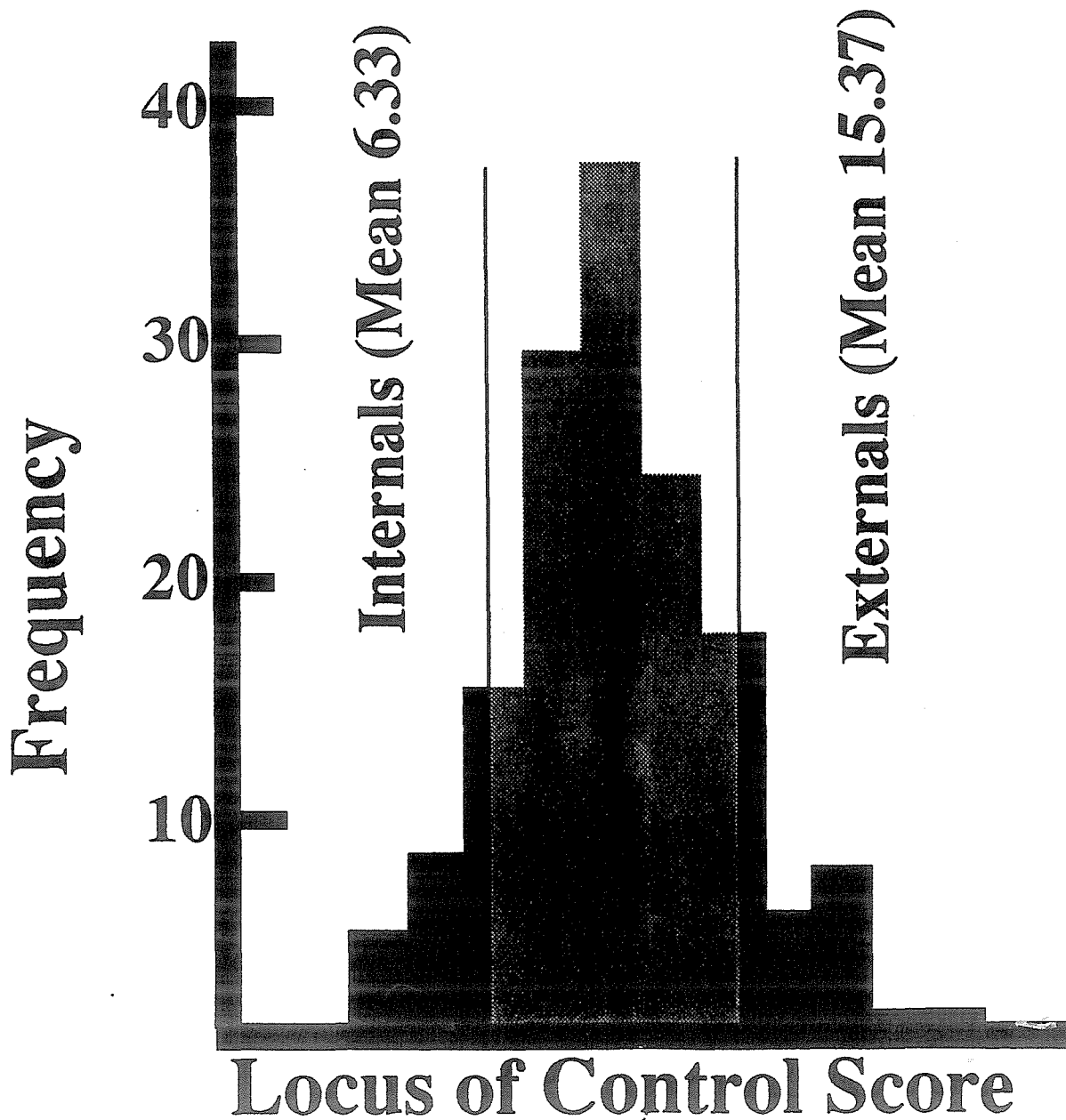
The present results suggest that given certain situations, individuals with different types of personalities can be influenced to take risks. We can also conclude that individuals with particular personality traits are attracted to specific categories of games and situations. This is important information to those who are designing and marketing new games in

order to entice their target consumers. In the case of compulsive gambling, the most prominent symptom is that these individuals are entirely out of control. To effectively treat problem gambling, therapy should certainly take into consideration the individual's personality. By improving their sense of the objectivity in the situation, rather than having them view it so subjectively or unrealistically, it could demonstrate that changes in cognitive behaviour can reduce the habit. This is critical information to know for counsellors and others because, as the trend toward legalized gambling continues, the number of problem gamblers is likely to increase as well.

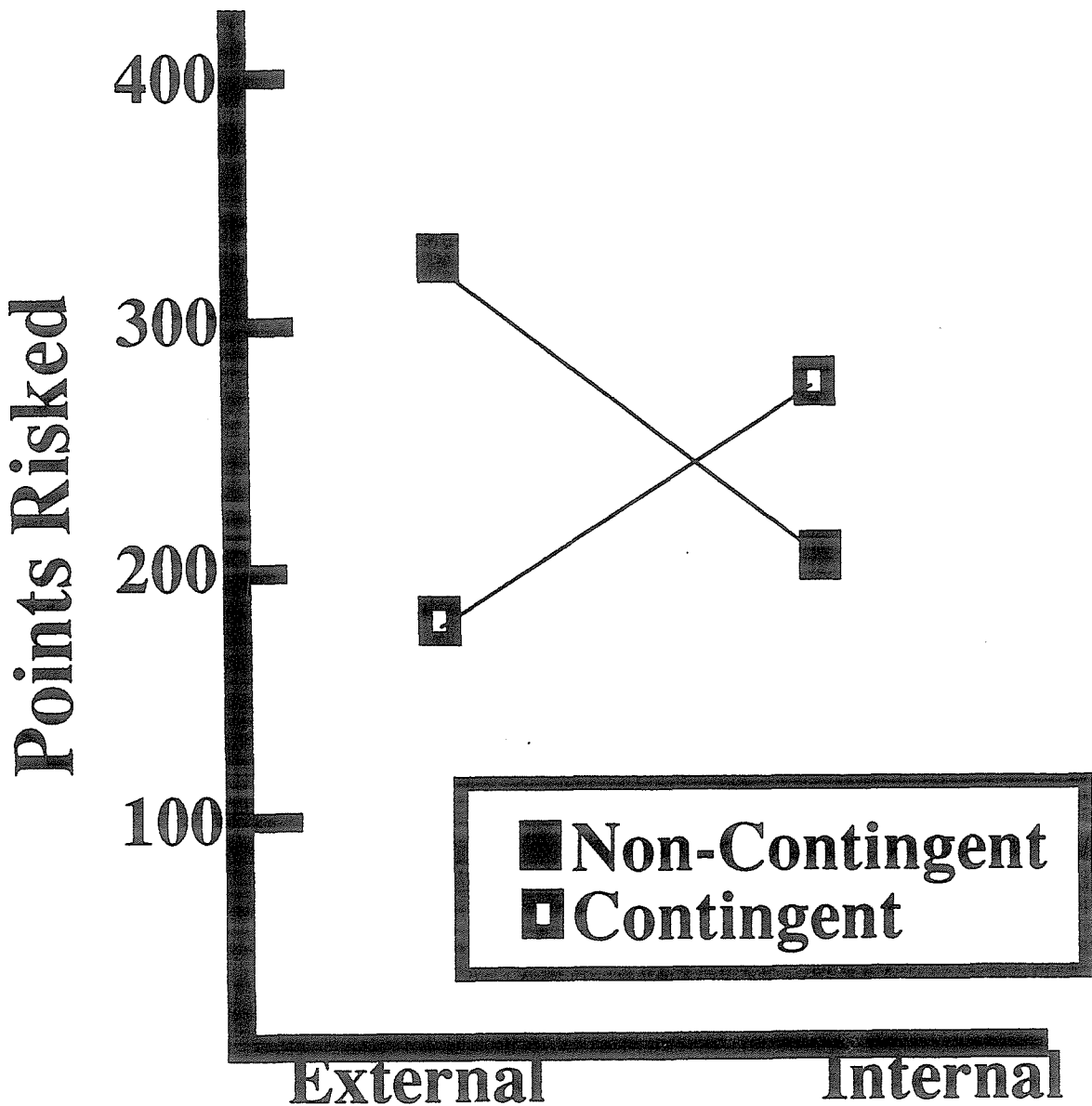
What is still left uncertain in terms of personality traits, however, is whether or not these explanations are circular. In order to answer the question of whether or not the personality traits preceded the onset of gambling or if it was the gambling behaviour itself that caused the personality trait, longitudinal research should be conducted.

GRAPH 1.1 PARTICIPANT SCORES ON THE ROTTER INTERNAL-EXTERNAL LOCUS OF CONTROL SCALE

Rotter Scale



GRAPH 1.2 THE INTERACTION EFFECT ON LEVEL OF RISK TAKING WHEN THE INDIVIDUAL'S TRAIT LOC IS EXTERNAL/INTERNAL AND WHEN PRESENTED WITH A CONTINGENT/NON-CONTINGENT PROCEDURAL MANIPULATION



**Participant Differences
in Locus of Control**

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The recent and rapid growth in the popularity of legalized gambling has led to increased interest in the behavioural components of gambling. Theories to explain the phenomenon of gambling are abundant and complex and, though it may sometimes seem as if the theories contradict one other, they are simply revealing different aspects of the behaviour (Walker, 1992).

In trying to illustrate the causes of the gambling phenomenon, one would have to take into consideration several things. These would include the cultural circumstances into which a person is born, the life experiences which define the personality, the history and impact of gambling on the individual, and the current situation with its perceived potentials and rewards for gambling among other alternatives (Frey, 1984; Walker, 1992).

By 'gambling', a bettor places an amount of money or other property at stake for the opportunity to win more. Risk essentially involves taking a chance on a game, an event, a happening, or a venture that is full of uncertainty (Murray, 1993). Every gambling situation involves the element of risk considering whatever is wagered has the potential to be lost.

Traditionally, gambling has been condemned and outlawed by governments and later supported and regulated by those same governments (Peck, 1986). They approve of gambling on and off, and right now more proposals for gambling casinos are being reviewed for approval.

One frequent observation made from available research is that gamblers continue to gamble despite persistent, and knowing losses (Gilovich, 1983). Gamblers are well aware of the fact that, over the long run, they will suffer more losses than wins. This should be quite obvious considering structured gambling casinos are so successful and profitable. So why is it that people gamble? Typically, it can be summarized as 'the dream of winning a large sum of money', although other reasons may include the social aspects of gambling such as amusement, excitement, and having a good time (Walker, 1992).

While a person who gambles may lose a great amount of money over the long run, there are other motivations given for pursuing the activity. It is these impulses or incentives that must be considered more closely. Most people consider gambling to be a social and recreational type of behaviour (Peck, 1986). Growing numbers of people continue to participate

enthusiastically in gambling - sports, cards, dice, lotteries, bingos, casinos, and so on.

Compulsive Gambling

Although it is true that, for most people, gambling is social and creates a diversion from everyday life, for others gambling involves total personal and family destruction (Frey, 1984; Peck, 1986). These are compulsive gamblers and they are a potentially growing population. Social gamblers differ from problem gamblers in that they can quit gambling anytime, win or lose. This seems to be due to three important factors:

- a) there is no self-value tied to winning or losing.
- b) other aspects of life are more important and rewarding.
- c) they rarely have a big win.

In the case of compulsive gamblers, the opposites are characteristics (Peck, 1986). There is a self-value attached to winning and losing. When the gambler is winning they feel important and powerful. When the gambler is losing he or she feels inadequate, as well as a loss in both self-esteem and control. Losing seems to compel the gambler to return to the comforts of gambling, perhaps to attempt to recoup losses. If

winning occurs, a euphoric sense of self-confidence is produced and efforts are made to continue gambling. As Peck summarizes, "Add to this the pleasure of gambling activity called 'action' and its not hard to see why a pathological gambler can't quit".

The Diagnostic and Statistical Manual of Mental Disorders-III-R (1987) places pathological gambling "among impulsive control problems that are broadly defined as mental disorders characterized by an irresistible impulse to perform harmful acts" (Lesiuer & Custer, 1984). Pathological gambling has been linked to that of a 'drugless' impulse disorder. Gamblers' descriptions of sensations experienced may be similar to those felt by substance abusers or chemically dependent persons (Peck, 1986).

The compulsive gambler's career "progresses in intensity and urgency with increasing problems in all spheres of life" (Lesiuer & Custer, 1984). This includes relations with family members and friends, gambling associates, employment, and finances. Up to half of the gamblers in the early stages of their 'career' report a big win (Frey, 1984). This begins the potential emotional dependence on gambling, loss of

control, and interference with normal functioning (Rosencrance, 1986; Leisiur & Custer, 1984).

Personal Attribution Theory

Why is it that one individual will gambler or take risks while another individual will not? Researchers have ventured to determine factors which mediate risk taking in games of chance. In doing so, one of the most intriguing aspects of the behaviour emerges: the gamblers' sense of perceived control. The element of skill of often linked to a gamblers' sense of perceived control (hong & Chui, 1987; Langer & Roth, 1975; Letarte et al, 1986). Most gambler's seem to prefer games in which they are able to utilize some degree of skill. It is also these skill-based games which prove to be more habit forming than the games of pure chance.

Research has supported the hypothesis that people with certain types of personality characteristics prefer certain types of games. Prior studies have attempted to isolate possible personality characteristics associated with gambling and risk taking. Personality traits are summary features of the way an individual behaves, in general, across situations. The three studied most extensively to

identify risk takers have been sensation-seeking, extroversion and Locus of Control (LOC).

This internal-external notion first emerged from Rotter's Social Learning Theory in the mid 1950's and it is believed to be a fairly stable, global, and enduring personality trait. Referred to as both Internal-External Control of Reinforcement (I-E) and locus of control (LOC), the concept is outlined by Rotter and defined as follows:

When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labelled this a belief in external control. If the person conceived that the event is contingent upon his own behaviour or his own relatively permanent characteristics, we have termed this a belief in internal control (Rotter, 1966).

With regard to gambling, it would seem apparent that an individual with an internal LOC shouldn't be attracted to games of chance, whereas an external LOC would be congruent with the activity. Available research only weakly supports this hypothesis. Hence, it would be plausible to assume that trait LOC by

itself is not a significant enough factor to explain the behaviour.

Situational Contingency

It is then necessary to focus some attention on the situation. Situations may also be characterized by degree of direct control referred to as "contingency". In contingent situations, we expect the outcome of an event to be a direct result of our own action. An example would be an outcome that is a consequence of how we have performed in the situation. In contrast, in non-contingent situations, the perception is that the outcome is somehow predetermined and independent of our control. In this situation, it would not matter how well or how poorly we performed because it would have no subsequent effect on the outcome.

Langer (1975) has discussed what she calls the "illusion of control". This exists when people believe they exert control over what is really a chance determined event. The more a situation is perceived by the individual as requiring skills, the more the individual will develop an illusory control within it. In a series of empirical studies, Langer (1975) identified several conditions which created the illusion of control including familiarity with the

task, being able to make choices, and active involvement. For example, she showed that individuals who manipulated a pointer reported a greater perception of control than did those whose pointer was manipulated by the experimenter, even if according to the instructions.

Wortman (1975) emphasized that active involvement of the participant induces an attitude of skill and control in a situation of chance. When participants threw a ball and determined the winning marble (the active condition), they reported a greater perception of control than they did when the winning marble was determined by the experimenter (passive condition). From an objective point of view, neither of these conditions offers a real advantage to the player.

Turnbull (1982) postulated that players try to gain control over events determined by chance only if the issue is determined after they place their bet. The participants had to predict the result of a roll of the die before or after throwing it. Results clearly indicated that bets placed in the first condition were much larger than those placed after the throw. Turnbull (1982) also pointed out that, "the period of anticipation preceding the outcome permits a whole

series of more or less rational and logical behaviours that create the impression of greater involvement in the game. This condition creates the occasion to elaborate on the hypothesis and to target strategies aimed to influence the outcome".

Do Personalities Interact With Situations ?

From this then, it would be possible to investigate whether certain personality variables interact with certain situations to produce an effect on risk taking behaviour. In this regard, previous studies have produced conflicting results. Some prior research has contended that internal control leads to increased risk taking (Rosencrance, 1986; Ladoucer & Mayrand, 1986; Wortman, 1975; Langer, 1975). Internally oriented persons see a game as a problem to be solved requiring skills, thus the more control they feel in the situation the more they will be willing to risk. Regardless of previous histories of winning or losing, a series of situational wins can also lead to a gambler's increased sense of control and hence larger wagers bet (Ladoucuer & Mayrand, 1986; Ladoucuer et al, 1987; Morgan, 1983).

Whereas people with an internal trait LOC have the perception of more control in skill situations and tend

to prefer them, in contrast, people with an external trait LOC show a greater preference for chance tasks. Past research (Wagenaar, 1988) has suggested that it is unlikely that externals will overestimate the role of skill in chance situations but, rather, it is their perception of chance itself that motivates them to perform.

Most players that are externally oriented do not believe they physically influence the spin of the roulette wheel or the pull of the slot machine. It is their belief in luck that makes any reasoning based on the physical proportions of the game irrelevant. Externals expect that fate, chance, or luck will determine the outcome in their favour or help them select the appropriate bet (Wagenaar, 1988).

The opinions of researchers have differed in that some findings have suggested that external control should lead to an increase in risk taking (Liverant & Scodel, 1960; Rosencrance, 1986). Lastly, when a gambler is losing and sense that the outcome is beyond their own skills, he or she is more likely to increase betting as well as make more long shot bets in an effort to recoup losses (Rosencrance, 1986).

Future Research and Implications

Future research should attempt to propose a resolution of the conflicting results of previous findings in order to provide a clearer indication of how risk taking is mediated by both the trait LOC of the individual and the situational contingency presented to him or her. This research should also investigate the question of whether or not individuals with certain personality characteristics, given the right situation, would influence their risk taking behaviour.

The results could have several important implications. If it is in fact found that certain personalities are attracted to certain types of situations, this would have a important impact on those who design and market new games. Also, as the trend toward legalized gambling continues, it is likely that the number of problem gamblers will also increase. Following additional research, social reforms may need to be designed to encourage more self-directed and self-determined behaviour. To effectively treat problem gambling, therapy should certainly take into consideration the individual's personality. By learning in what situations they do have control and in

what situations they do not have control would assist them in being more responsible about the decisions they make. I believe gambling will best be regulated in this way.

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This study investigated what influence situation-specific expertise might have on LOC. Student-athletes completed Rotter's LOC Scale and the Dalhouser Sports LOC inventory. Analysis supported the hypothesis that Ps expertise within a situation-specific environment would yield a LOC score significantly more internalized.

Frey, J.H. (1984). Gambling: A sociological review. The Annals of the American Academy, 474, 107-121.

The article reviewed the application of various sociological theories to gambling behaviour as well as the results of research efforts prompted by the impact of gambling on social institutions.

Gilovich, T. (1983). Biased evaluation and persistence in gambling. Journal of Personality and Social Psychology, 44, 1110-1126.

This study investigated persistence in gambling due to gambler's biased evaluation of outcomes. Hypothesis was tested by recording Ps explanations of outcomes of bets. It was supported in that gamblers tend to spend more time explaining away their losses than their wins. Also, gamblers tended to discount their losses but 'bolster' their wins.

Hong, Y. & Chiu, C. (1987). Sex, locus of control, and illusion of control in Hong Kong as correlates of gambling involvement. The Journal of Social Psychology, 128(5), 667-673.

This study investigated whether LOC influences gambling involvement directly (ie externals seek out chance situations) or whether their relationship is mediated by illusory control. Male and female Ps from all strata of Hong Kong society were used. Results supported mediating hypothesis for men and self-confirmation for women.

Ladoucuer, R., Gaboury, A., Dumont, M., & Rochette, P. (1987). Gambling: Relationship between the frequency of wins and irrational thinking. The Journal of Psychology, 122(4), 409-414.

In this study, they evaluated the relationship between the number of wins and the number of irrational verbalizations on part of individuals playing roulette. Results showed that irrational verbalizations outnumbered rational verbalizations and that a few wins were enough to evoke an illusory perception of control.

Ladoucuer, R.L. & Mayrand, M. (1986). The level of involvement and the timing of betting in roulette. The Journal of Psychology, 121(2), 169-176.

This study verified an effect on the level of involvement and the timing in betting in roulette. Forty Ps in 4 groups according to 2 levels of involvement (active, P threw ball; passive, experimenter threw ball) and 2 types of timing (Ps bet before or after throw). Ps who bet before throw took greater risks than those who bet after. Also, Ps who threw ball reported greater control and assumed greater risk.

Langer, E.J. (1975). The illusion of control. Journal of Personality and Social Psychology, 32, 311-328.

A series of studies were conducted to induce phenomenon called "illusion of control". Predicted that skill factors introduced into purely chance situations caused individuals to felt inappropriately confident. Indicators of confidence in all 6 studies supported the prediction.

Langer, E.J., & Roth, J. (1975). Heads I win, tails it's chance: The illusion of control as a function of the sequence of outcomes in a purely chance task. Journal of Personality and Social Psychology, 32, 951-955.

Attributions in a purely chance task (predicting coin tosses) were studied as a function of either a descending, ascending, or random sequences of outcomes and as a function of whether Ps performed task by self or observed

someone else do it. It was predicted that early successes would induce a skill orientation toward the task. Results indicated that the group in the descending condition overremembered past successes, thought that they predicted outcomes better than other two groups, and expected more future successes.

Lesieur, H.R., Custer, R.L. (1984). Pathological gambling: Roots, phases and treatment. The Annals of the American Academy, 474, 146-157.

The article traces to roots, causes, and phases of pathological gambling. Three phases of the gambling career are discussed: the winning, losing, and desperation phases. Two major sources of help, Gamblers Anonymous and professional counselling, are examined.

Letarte, A., Ladoucer, R. & Mayrand, M. (1986). Primary and secondary illusory control and risk taking in gambling (roulette). Psychological Reports, 58, 299-302.

This study investigated the perception of personal control and number of wins and losses in gambling. Ps played roulette and monetary risk behaviour was recorded. Results showed that most Ps reported some degree of primary control (being able to modify environment according to individual's objectives) and secondary control (individuals cannot modify environment) during the game. Frequent wins induced more personal control than infrequent wins.

Liverant, S. & Scodel, A. (1960). Internal and external control as determinants of decision making under conditions of risk. Psychological Reports. 7, 59-67.

For this investigation they suggested that externally controlled Ps should be more likely to ignore objective probabilities. Their hypotheses were that internal Ps would select more highly probable bets as well as be less variable in their choices which means they will never select an extremely

high or low bet. All hypotheses were supported.

Morgan, R.L. (1983). Risk preference as a function of the number of wins and the amount won. American Journal of Psychology, 96(4), 469-475.

This study examined the decision strategies of winning and losing. Results indicated that prior decision outcomes can effect decision strategies. It was found that Ps who lost in the early trials of the experiment chose riskier decisions during the losing period than during a period of trials where winning was more regular.

Murray, J.B. (1993). Review of research on pathological gambling. Psychological Reports, 72, 791-810.

This literature review examined personality test profiles of pathological gamblers, whether or not they have control over their behaviour, and if psychotherapy and GA have been successful for them. It is concluded that much more information is still needed to build on existing research.

Peck, C.P. (1986). Risk taking behaviour and compulsive gambling. American Psychologist, 41(4), 461-465.

In this public mental health issue, the author discusses pathological gambling as a growing population, the differences between social and problem gamblers, and the differing stages of their career. The author pleads for public/professional awareness and understanding for coping with pathological gambling behaviour in vulnerable persons.

Rosencrance, J. (1986). Attributions and the origins of problem gambling. The Sociological Quarterly, 27(4), 463-477.

This study, drawing data from a natural setting, attempts to demonstrate that a bad beat (a significant monetary loss resulting from a seeming inexplicable turn of events) is often a catalyst for the development of problem gambling. The attempt to cope with bad beats

can discount perceptions and lead to a continuing pattern of financial loss. Attribution theory provides a useful framework for understanding the process.

Rotter, J. (1966). Generalized expectancies for internal-external control of reinforcement. Psychological Monographs, 80, 1-28.

The effects of preceding behaviour depend in part on whether the person perceives the reward as contingent on his own behaviour or independent of it. Their report summarized several experiments which define group differences in behaviour when Ps perceive reinforcement as contingent on their behaviour versus chance or experimenter control. Internals are said to prefer skill determined tasks and value reinforcement for skill much more than chance.

Turnbull, W. (1982). The evaluation of chance determined outcomes. Canadian Journal of Behavioural Science, 14, 152-162.

This study investigated whether gamblers will try to gain control over a chance event if the outcome is determined after they place their bet. Results showed that bets in this condition were much larger than in other conditions.

Wagenaar, W.A. (1988). Paradoxes of gambling behaviour. London: Lawrence Erlbaum.

Walker, M.B. (1992). The psychology of gambling. Pergamon Press.

Wortman, C.B. (1975). Some determinants of perceived control. Journal of Personality and Social Psychology, 31, 282-294.

This study investigated whether an individual will feel control over an outcome if he causes that outcome if he knows before he cause it what he hopes to obtain. The result supported hypothesis: Ps who caused their own outcomes and knew what they hoped to obtain perceived to have more control and more responsibility for the outcome.