The structure of preferences for gambling activities.

Mark R. Potashner

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LA THÈSE A ÉTÉ MICROFILMÉE TELLE QUE NOUS L'AVONS RECEUE
THE STRUCTURE OF PREFERENCES
FOR GAMBLING ACTIVITIES

by

Mark R. Potashner

B. Sc. University of Toronto, 1982

A Thesis
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through the Department of Psychology
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1984
ABSTRACT

Over two hundred adult respondents completed a questionnaire entitled "Gambling Interest Survey." The first part of the survey had demographic items and questions concerning previous gambling experience. The second part consisted of paired comparison judgements of nine common gambling activities—Roulette, Bingo, Sports Betting, Dice, Slots, Lottery, Blackjack, Parimutuel Betting, and Poker. Preference scores for the above activities were calculated from the judgements.

It was hypothesized that (1) demographic variables such as age and sex, as well as previous experience with gambling would affect preferences for gambling activities; (2) that the relationships among the gambling preferences could be represented by a few simple dimensions such as casino games versus others and serious versus recreational gambling. The relationship between demographic and experience variables and preference scores was examined with analysis of variance. The relationship among the gambling activities was explored using factor analysis and cluster analysis.

Significant differences in preference for particular gambling activities were found for age, sex, frequency of gambling, and liking for gambling. The preference ordering, with a like-dislike point, revealed that four activities were liked, three disliked, and two were neither liked nor disliked.
The factor analysis and cluster analysis yielded a solution of four clusters embedded in two dimensions. The dimensions were labelled casino versus noncasino; and serious versus recreational gambling. The clusters represented the four distinct quadrants of the two dimensional space (e.g. serious-casino; recreational-noncasino, etc.). The casino-noncasino dimension was entirely qualitative, whereas the serious-recreational dimension had both quantitative and qualitative aspects.

The findings imply that although individuals differ widely in their particular gambling preferences, these preferences are based on a commonly held cognitive organization that is clearly defined, relatively simple, and suggests that certain gambling activities could substitute for others that were unavailable.
ACKNOWLEDGEMENTS

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I would also like to thank my parents for their encouragement, help and advice over the past twenty-three years. They too have been inspirational.

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CHAPTER I

INTRODUCTION

Throughout history gambling has been one of man's most frequent endeavors. In one form or another, gambling has been present in all cultures, all periods of time and widely participated in by those of all societies and social strata (Bolein & Boyd, 1968).

Kusyszyn (1977) has noted that people gamble in virtually the same way as they engage in most other recreational activities. In fact, he has described gambling as adult play behavior. The past decade has seen a dramatic surge in interest in leisure and play activities. One form of play activity, gambling, has been called one of the fastest growing commercial activities in North America (Time, 1976). A recent survey of American gambling activity (Kallick, Suits, Dielman & Hybels, 1979) has found that 61% of adult Americans had engaged in some form of gambling activity during the year 1974, and that somewhere between 10 and 40 billion dollars had been wagered that year.

Despite this widespread activity, little research has been conducted on the psychological domain of gambling. The present study will attempt to fill part of this void in our knowledge by addressing the question of people's preferences for different gambling activities using scaling techniques.

The basic premise of the present research is that people
develop well-structured conceptualizations of their worlds. Individuals organize and simplify their complex worlds through the application of personal schemata. Since a majority of adults place some form of wager (Kallick et al., 1979) and it can be presumed that many of those who do not wager have some familiarity with gambling activities, it should be possible to identify and map people's cognitive organizations with respect to gambling activities.

**Human Preference Studies**

The literature on human preferences has been exhaustive. Researchers have studied people's preferences for a multitude of things: snack foods (Gorn & Goldberg, 1982), surnames (Colman, Sluckin & Hargreaves, 1981) and soft drinks (Bass, Pessemier & Lehman, 1972) to name a few. One method used for studying preferences, paired comparisons, has met with good success. For example, Witryol and Wentworth (1983) have used the method of paired comparisons to study preferences for monetary and material rewards in children. Jaeger and Wolf (1982) have described paired comparisons as a good method in surveys of preferences and found that the paired choice format produced substantially more reliable discriminations among preferences that did a Likert-scale format. Despite the widespread study of preferences, little research has been done on preferences for gambling activities.
Study of Leisure Activities

Gambling activities are best regarded as a subset of the broader domain of leisure activities. Techniques which can be used to uncover the perceived dimensions of leisure activities can also be applied to uncover the dimensions of gambling activities.

The majority of empirical efforts directed towards uncovering these dimensions have employed factor analysis; cluster analysis; and, less frequently, multidimensional scaling. The present study employed both factor and cluster analysis and thus an examination of their use in studies of leisure activities will be useful.

Most factor analytic studies have utilized adult's reports of the frequency with which they participate in different leisure activities (e.g., Witt, 1971; McKechnie, 1974). These participation rates are then inter-correlated and subjected to factor analysis. The factors or dimensions are revealed by interpretation of the patterns in which activities group. These studies typically uncover three to seven factors.

There is a problem in using factor analysis using the correlations between rates of participation as data if the issue of substitutability is to be addressed. The high correlation between participation rates does not imply
that people recognize them as interchangeable. It may merely imply that the two activities are complimentary, with satisfaction with one activity being contingent on participation in the other (Beamon, 1975). In addition, a comprehensive study of gambling (Kallick et al., 1979) found that there may be little correspondence between the rate of participation in an activity and the preference for it.

Gambling Studies

The research that has been conducted in the area of gambling has taken three general perspectives. First, the motivations behind gambling have been studied in terms of various conscious and subconscious psychological dimensions. Much of this work has centered on the behavior of compulsive gamblers. Many psychologists have argued that compulsive gamblers are self-destructive and guilt ridden individuals, and thus their gambling serves in some way as self-punishment (Fenichel, 1945; Bergler, 1957). Although it has been estimated that non-compulsive gamblers outnumber compulsive gamblers at least one thousand to one (Kusyszyn, 1983), their motivation for gambling has not been studied in much depth.

A second way in which gambling has been used in psychological studies has been as the basis of experiments analyzing human choice behavior under conditions of risk and uncertainty. These studies fall into two categories: those that look at risk-taking in artificial laboratory games,
and those that study risk-taking in actual gambling games. Most studies of risk-taking in artificial laboratory games have attempted to relate personality variables to individual differences in risk-taking behavior, with equivocal results (e.g. Casey, 1969; Kogan & Wallach, 1964; Weinstein, 1969, etc.). After reviewing previous studies on the predictions of risk-taking, Kogan and Wallach (1967) concluded that risk-taking is more a function of the situation than of the person. The results of a more recent factor-analytic study help explain the difficulty of previous researchers in trying to establish a relationship between risk-taking and personality. Jackson, Hourany and Vidmar's (1972) multitrait-multimethod analysis revealed four independent facets of a higher order dimension of generalized risk-taking; monetary risk-taking (gambling), physical risk-taking, social risk-taking and ethical risk-taking. Finding that different forms of risk-taking are not necessarily related at a lower level of analysis explains the difficulty in establishing risk-taking as a personality trait.

Studies of choice behavior in actual gambling situations have been conducted both in the laboratory and in the field. These studies have focused on the phenomenon known as "risky-shift" (Stoner, 1961), in which the mere presence of others will lead to more risky decisions than if the decisions were made privately. A series of experiments by
Ginsberg, Blascovich and Howe (1976) have determined that the presence of other people engaged in the same risky activity will lead to a change in risk level. More-risky or less-risky wagers were placed, depending on whether the others' risk-levels were above or below the subject's original risk-level. The experimenters found this to be true both in a laboratory-casino setting (studies A-E) and in actual casinos (study F).

Other studies in the area of the psychology of gambling have sought to identify correlates of gambling participation. Li and Smith (1976), using a sample of 1,565 adults, have found that economic status correlates positively with propensity to gamble, those living in large cities were more likely to gamble than those living in small communities, and as age increases, the propensity to gamble decreases. Downes, Davies, David and Stone (1976) have found that in addition to these factors, there is a negative correlation between gambling participation and church attendance.

Shapiro (1981) attempted to ascertain whether different casino games attracted different types of players. He found that people who preferred slot machines and keno did differ significantly from those who preferred blackjack and craps on such variables as: sex, age, religion, family income, and willingness to risk physical injury. Shapiro concluded that a difference exists between serious gamblers, those
who preferred craps and blackjack, and non-serious gamblers, those who preferred slot machines and keno. Specifically, males preferred the serious activities whereas females preferred the non-serious activities. The index used to assess gambling seriousness was the amount of money a person was willing to risk.

Several studies have been performed looking at the differences between males and females in their preferences for activities requiring skill and activities requiring only chance. Deaux, White, and Farris (1975) found that males preferred tasks requiring skill and females preferred the chance tasks. A recent study by Karabenick, Sweeny and Penrose (1983) criticized the Deaux et al. study for its reliance on masculine sex-typed tasks. These authors attempted to replicate the previous study and, in addition, attempted to evaluate the effect of sex-relatedness of the task on preferences. They found that males preferred tasks involving skill more than females did when the tasks were masculine in nature, thus replicating the Deaux et al. findings. However, on tasks that were feminine in nature, females preferred skill more than males did.

**Michigan Study.** The most comprehensive research on gambling activities to date was conducted by the University of Michigan's Survey Research Center (Vallick, Suits, Dielman & Hybels, 1979). This report surveyed the attitudes
and participation rates of 1,736 respondents in order to determine the extent of gambling activity in the United States. This study looked at: the types of wagers placed, who placed them, why, and how much money was wagered. The results indicated that: an estimated 61% of all adult Americans placed some form of wager in 1974; although there were differences from game to game, overall, more males placed wagers than did females; participation was higher among whites than blacks and other races; the higher the income and education, the more likely the individual was to have bet; and single people bet more frequently than did married people.

The survey also found that certain activities are wagered on more frequently than others. Betting on card games was done most often, followed by betting on sporting events, purchasing of lottery tickets, betting at the horse or dog track, playing bingo, and gambling at a casino.

The reasons given for gambling on particular games varied from game to game; however, certain games had similar patterns of motivation. For example, the authors found that betting on horses, at casinos and sports betting all had 'having a good time' as the main reason for participating, followed by 'excitement and challenge' and 'to make money'. The patterns of motivation found for both bingo and lottery-playing were distinctive. Bingo players' main reason for
participating was 'to have a good time' followed by 'to pass the time'. Lottery players' main motivation was 'to make money' with a small percentage saying 'for excitement' or 'to have a good time'.

Although these findings enable us to better understand gambling participation, they tell us nothing about the actual preferences people have for the different gambling activities. Since another finding of the Michigan Survey (Kallick et al., 1979) was that gambling participation varied widely depending on the availability of the activity, there can be a great difference between the results of the survey (which activities are played), and which activities are preferred. A further problem with the Michigan Survey was that the data for the various casino games were grouped together despite the differences that exist between the various casino gambling activities.

The present study seeks to improve upon the Michigan Survey in two ways. By including five different casino activities as stimulus materials rather than grouping them together as one activity, it was hoped that a clearer representation of gambling preferences could be achieved. A second improvement was using subjects' preference judgements for gambling activities as the main dependent measure as opposed to simply surveying the frequency of participation in gambling activities, thus enabling the issue of
substitutability to be addressed.

The main question being asked in the present study is what is the cognitive organization underlying judgements of preferences for gambling activities. The approach towards answering this question requires a method of gathering responses about the gambling activities and deriving from them configurations and clusters which can be interpreted. Previous research (Witryol & Wentworth, 1983; Jaeger & Wolf, 1982) indicates that the method of paired comparisons is such an approach.

The present study employed nine gambling activities as stimuli: roulette, bingo, sports betting, dice, lottery, slot machines, blackjack, parimutuel betting and poker. These stimuli were selected as representing the basic gambling activities and consciously noting the differences between activities played primarily in a casino and activities played primarily in noncasino settings. Questions were included in the body of the questionnaire to assess the adequacy of the stimulus list as a representation of the domain of gambling activities.

**Expectations**

Although the previous literature in the field of gambling has been sparse, several predictions as to the probable nature of the results can be stated. First, there should be a clear, simple, interpretable configuration of preferences for gambling activities. From the configuration, several
dimensions should be identifiable. Among these could be categorical dimensions such as casino versus noncasino and card games versus others; and quantitative dimensions such as amount of money involved, and immediacy of payoff.

Secondly, since people have been found to differ in terms of gambling participation according to sex, age, and income (Shapiro, 1981; Kallick et al., 1979) it is expected that there will be demographic differences in preferred gambling activities. Specifically, based on the results of the Karabenick et al. (1983); and Shapiro (1981) studies, it is expected that the older the individual is, especially in the case of males, the more likely it will be that they prefer the "serious" games: dice, poker, sports betting, and blackjack, whereas females might be expected to prefer bingo, lotteries and slot machines.

Finally, it is expected that the more experience the individual has with gambling activities, the greater the preferences for "serious" gambling activities will be.

For the present study, the definition of how serious a gambling activity is will be based on the amount of skill, as opposed to pure chance, the activity necessitates. Thus, activities such as poker, blackjack, and sports betting are deemed more "serious" than activities such as slot machines, bingo, and lotteries.
Chapter II

METHÓD

Subjects

The sample consisted of 209 adults. Seventy-three persons were tested at a meeting of the Rotary Club, and the remaining 136 persons were tested individually either by the experimenter or by his supervisor. Twelve protocols were discarded because of failure to follow the instructions in filling out the questionnaire. The remaining 197 subjects had the following demographic breakdown. The age range was from 21 to 81 years, with a median of 42 years, and one with no response, where 102 respondents were under 42 years of age and 95 were 42 years of age or older. There were 24 single, 162 married, and 11 respondents classed as other. One hundred and ninety-two subjects reported English to be their first language whereas five did not.

Research Instrument

The research instrument was a questionnaire entitled "Gambling Interest Survey". The questionnaire consisted of four sections: (a) personal characteristics; (b) gambling experience; (c) preference judgements; and (d) overall like-dislike judgements.

In section (a) subjects were asked to indicate: sex, age, marital status, occupation and whether English was their first language. Section (b) asked subjects to indicate
their previous experience with gambling activities. Following section (b) the nine gambling activities to be used as stimuli for the preference and like-dislike judgements were presented along with short definitions or descriptions of the activity. The stimuli (with abbreviations used on the questionnaire given in parentheses) were:

1. Roulette
2. Bingo
3. Sports Betting (Sports)
4. Dice
5. Lottery
6. Slot Machines (Slots)
7. Blackjack
8. Racetrack
9. Poker

The instructions on the questionnaire explicitly informed the subject how to make the judgements. The instructions and sample items appear in Table 1. A copy of the complete questionnaire appears in Appendix A.

Data Gathering Procedure

Subjects were asked for their age, sex, marital status, occupation, and whether English was their first language. Next, subjects answered ten questions concerning previous gambling experience and familiarity with the nine stimuli to be used in the preference judgements.
Table 1

Instruction and Sample Items for Questionnaire Entitled: Gambling Interest Survey

Preference Judgements

In this section we would like you to indicate your preference for each gambling activity when it is compared to another gambling activity. The gambling activities will be presented in pairs. Examine each pair carefully and indicate the ONE gambling activity in the pair that you like better by placing an X in the blank beside it. BE SURE THAT YOU HAVE ONLY ONE X FOR EVERY PAIR IN THIS SECTION. PLEASE BE SURE TO ANSWER EVERY ITEM. Feel free to refer back to the description of the gambling activities to refresh your memory.

1. Poker ______  2. Slots ______
Bingo ______  Blackjack ______

Like-Dislike Judgements

In this section we would like you to indicate in a general way whether you like or dislike each of the gambling activities presented. Place an L for like, or a D for dislike beside each of the activities in the following list. Feel free to refer back to the description of the activity if you so desire.

1. Roulette ______
2. Bingo ______
3. Sports ______
The preference data were gathered using the method of paired comparisons. There were 36 unique pairs and four repeated comparisons for a total of 40 pairings. Subjects were asked to mark which of the gambling activities in the pair they preferred. Finally, subjects indicated like or dislike for each of the nine stimuli. This acted as an indifference or zero point for the comparative judgement data.

**Order of Presentation of Stimuli.** Order effects in the presentation of preference judgements were controlled for in the following manner: (a) the pairs of stimuli were constructed such that each gambling activity was in the top position of a pair when compared to four activities, and in the bottom position of a pair when compared to the other four activities; and (b) the pairs were arranged such that no two adjacent pairs contained any of the same gambling activities.

**Testing Procedure.** At the group testing session, the questionnaires were individually distributed and collected by the experimenter. The experimenter also answered individually all questions subjects had about the procedure for filling out the questionnaire. The same procedure was followed for subjects who were tested individually. All subjects were allowed as much time as needed to complete the questionnaire. After completing the questionnaire, the experimenter briefly explained the purpose of the
research. The group testing session lasted 30 minutes, and the individual testing lasted approximately 20 minutes.

Data Analysis Procedure

The data analysis was undertaken in four steps:

1. The raw data was processed to a form amenable to statistical analysis.
2. The reliability of the preference judgements was assessed.
3. The role of demographic and previous gambling experience variables was assessed.
4. The dimensions of gambling activities underlying the preference judgements were determined.

Preliminary Processing of Raw Data. Sex was coded 1 for male, and 2 for female. Age was recorded in years. Marital status was coded 1 for single, 2 for married, and 3 for other. Questions pertaining to previous gambling experience and familiarity with the stimuli to be used were coded 1 for yes, and 2 for no. Frequency of gambling was coded on a scale ranging from 1, never gamble, to 6, gamble more than once a week. The number of gambling activities in the stimulus list that had been played was coded numerically from 0, for no games played, to 9, for played all games. Occupation and favorite gambling activity were recorded alphabetically. Missing values for questions were recorded as blanks.

For preference judgements, each paired comparison had
the preferred activity coded 3 and the non-preferred activity coded 1. If no preference was indicated in a pair, each activity was coded 2. The 40 paired comparisons gave 80 individual judgements, of which the first and last eight were repeats for reliability. Each of the eight repeated judgements were averaged. This left 72 unique judgements. These judgements consisted of eight preference scores for each of the nine stimuli. These eight scores, for each of the nine stimuli, were summed and the like-dislike value was added to the sum. An overall like-dislike score was also calculated by summing all the like-dislike scores, thus yielding a total of 10 preference estimates for each subject.  

**Item Reliability Analysis.** As has been noted elsewhere, four paired comparisons appeared twice on the questionnaire, at the beginning and at the end. These repeated items were used to calculate approximate reliability measures. Correlation coefficients indicated the degree of consistency over repeated responses. Whether significant differences in preference judgements occurred or not were indicated by t tests. Contingency tables gave an indication of the degree to which the same activities were selected on the repeated judgements.  

**Univariate Analysis of Preference.** Possible differences in preferences among gambling activities, and between gambling activities on demographic and experience variables was assessed by the following methods:
1. An age by sex by activity analysis of variance (ANOVA) was performed with the vectors of preference scores as the dependent variable.

2. Enjoy gambling by activity, and frequency of gambling by activity ANOVA's were performed with the vectors of preference scores as the dependent variable.

**Configuration Analysis.** Principal components analysis (PCA) and cluster analysis were employed to determine the dimensions used by the respondents in their preference judgements.

PCA was performed using the Factor procedure of the Statistical Analysis System (SAS) (SAS Institute Inc., 1982). This analysis used the vector of preference scores for each subject as input. The cluster analysis was performed using the Cluster procedure (Ward's method) of SAS (SAS Institute Inc., 1982). The input for this procedure was the first eight factors derived from the PCA.
CHAPTER III

RESULTS

The results will be presented in four sections. The first section contains information concerning the demographic make-up of the sample. The second section contains item reliability information. The third section presents the univariate analysis of the preference judgements, and the fourth section presents the configurations and hierarchical clustering of the preference judgements.

Demographic Data

The sample consisted of 197 subjects. The age ranged from 21 to 80 with a median of 42. There were 120 males and 77 females. There were 24 single, 162 married and 11 classed as other. 192 subjects said English was their first language, whereas five did not. In terms of previous gambling experience; 186 of the 197 subjects indicated that they had gambled for money, 183 indicated that they had purchased a lottery ticket, 171 indicated that they had placed a wager on a horserace or sporting event, 116 subjects indicated that they had visited a casino, and 105 subjects indicated that they had taken a vacation to a place where gambling was a major tourist attraction. With respect to how frequently they gambled, two subjects did not respond, seven indicated that they never gambled, 37 indicated that they gambled once a year, 63 indicated that they gambled
3-4 times a year, 36 indicated that they gambled once a month, 43 indicated that they gambled once a week, and 9 subjects indicated that they gambled more than once a week. With respect to favorite gambling activity there was a wide range of responses. Thirty-five subjects had no stated preference, 42 subjects indicated that lotteries were their favorite gambling activity, 27 subjects indicated that blackjack was their favorite gambling activity, followed by parimutual betting (23 S's), non-specified card games (22 S's), sports betting (10 S's), slot machines (5 S's), dice (5 S's), bingo (3 S's), nonspecified casino games (3 S's), and roulette (1 S).

One hundred and thirty nine subjects indicated that they enjoyed gambling, 56 indicated that they did not, and there were 2 no responses. Only 23 subjects indicated that there were activities in the stimulus list with which they were unfamiliar, and only 33 subjects indicated that there were other gambling activities that they had played that were not mentioned in the list. This indicated that the set of stimuli used in the present study, although not exhaustive, were a good representation of familiar gambling activities.

In terms of how many of the nine activities in the stimulus list they had played, there was a fairly even distribution of subjects; 56 had played three or fewer
activities, 68 had played four to six activities and 73 had played 7 or more activities.

In general, the demographic data indicated that the subjects sampled had a good deal of familiarity and experience with gambling activities. This is essential if preference judgements are to be reliable.

Certain demographic variables were used in subsequent analyses. They were ones that were quantitative and had reasonable distributions, namely; sex, age, enjoy gambling, and frequency of gambling.

Reliability Data

Approximate estimates of reliability for the preference judgements were obtained for the repeated comparisons (four pairs). These estimates were made using (a) correlations, (b) t tests, and (c) contingency analyses, which are summarized in Table 2. The contingency tables are given in Table 12, Appendix B.

As can be seen from Table 2, the reliability for the repeated preference judgements was excellent. There were no significant differences found in the mean liking for an activity from one presentation to the next, the correlation coefficients between presentations were all large and highly significant, and the contingency tables indicated a marked consistency in preference judgements.

Univariate Analyses of Preference Judgements

Descriptive statistics for the preference (P) scores
Table 2

Reliability Data for Preference Judgements on Repeated Measures

<table>
<thead>
<tr>
<th>Item Pairs</th>
<th>X</th>
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<th>t</th>
<th>r</th>
<th>X^2</th>
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<td>A1</td>
<td>2.374</td>
<td>.930</td>
<td>.00</td>
<td>.000</td>
<td>.833**</td>
<td>135.31**</td>
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<tr>
<td>A74</td>
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<td>.930</td>
<td>.00</td>
<td>.000</td>
<td>.833**</td>
<td>135.31**</td>
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<td>A3</td>
<td>1.728</td>
<td>.965</td>
<td>.04</td>
<td>.412</td>
<td>.821**</td>
<td>131.59**</td>
</tr>
<tr>
<td>A76</td>
<td>1.687</td>
<td>.952</td>
<td>.04</td>
<td>.412</td>
<td>.821**</td>
<td>131.59**</td>
</tr>
<tr>
<td>A5</td>
<td>2.600</td>
<td>.802</td>
<td>.02</td>
<td>.244</td>
<td>.749**</td>
<td>109.34**</td>
</tr>
<tr>
<td>A78</td>
<td>2.579</td>
<td>.817</td>
<td>.02</td>
<td>.244</td>
<td>.749**</td>
<td>109.34**</td>
</tr>
<tr>
<td>A7</td>
<td>2.518</td>
<td>.858</td>
<td>.08</td>
<td>.897</td>
<td>.739**</td>
<td>106.56**</td>
</tr>
<tr>
<td>A80</td>
<td>2.436</td>
<td>.902</td>
<td>.08</td>
<td>.897</td>
<td>.739**</td>
<td>106.56**</td>
</tr>
</tbody>
</table>

**p < .001.**
on the total sample are given in Table 3. The P scores were characterized by relatively large, but homogeneous standard deviations. This indicated differences in gambling activity preference orders across judges, so that judgements were not likely to yield a unidimensional scale. Also, there seemed to be quite large differences in relative desirability across gambling activities, indicating that, in general, the activities fall along some sort of preference continuum.

A repeated measures analysis of variance was performed on the P scores. The summary statistics for this analysis are given in Table 4. As expected, there was a significant gambling activity effect. The results of a Duncan's multiple range test yielded the following groupings: the most preferred stimuli were blackjack, racetrack, poker, and lottery; slots and sports had intermediate levels of preference, followed by the indifference point, bingo, roulette, and dice.

In order to explore the differences in preference among gambling activities, and between activities across the demographic characteristics of age and sex, an activity by age by sex analysis of variance was performed. In addition, separate analyses were performed to explore the effects of the experience variables of enjoy gambling and frequency of gambling. The summary statistics for these
Table 3
Preference Score Statistics for the Total Sample

<table>
<thead>
<tr>
<th>Gambling Activity</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 - Roulette</td>
<td>15.005</td>
<td>4.211</td>
</tr>
<tr>
<td>P2 - Bingo</td>
<td>15.594</td>
<td>5.599</td>
</tr>
<tr>
<td>P3 - Sports</td>
<td>17.462</td>
<td>5.868</td>
</tr>
<tr>
<td>P4 - Dice</td>
<td>14.604</td>
<td>4.769</td>
</tr>
<tr>
<td>P5 - Lottery</td>
<td>20.391</td>
<td>5.157</td>
</tr>
<tr>
<td>P6 - Slots</td>
<td>18.284</td>
<td>5.269</td>
</tr>
<tr>
<td>P7 - Blackjack</td>
<td>20.736</td>
<td>5.295</td>
</tr>
<tr>
<td>P8 - Track</td>
<td>20.548</td>
<td>4.801</td>
</tr>
<tr>
<td>P9 - Poker</td>
<td>20.426</td>
<td>5.687</td>
</tr>
<tr>
<td>P10 - Dislike for Gambling</td>
<td>16.949</td>
<td>3.867</td>
</tr>
</tbody>
</table>

Note. Means are preferences, where the higher the score, the greater the liking for the activity, with the exception of P10, where the higher the score, the greater the dislike for all gambling activities. The maximum score was 27.0 and the minimum, 9.0.
Table 4

ANOVA Summary Table for Activity Preferences

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>9</td>
<td>10509.69</td>
<td>1167.74</td>
<td>45.09**</td>
</tr>
<tr>
<td>Error Within</td>
<td>1960</td>
<td>50764.31</td>
<td>25.90</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1969</td>
<td>61274.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p ≤ .001.
three analyses are given in Table 5.

With respect to demographic characteristics, there was a significant activity by sex interaction, $F(10, 1930) = 10.09$, $p < .001$; and a significant activity by age by sex interaction, $F(10, 1930) = 2.71$, $p < .01$, however, the activity by age interaction only approached significance, $F(10, 1930) = 2.11$, $p < .05$. With respect to the experience variables, there was a significant activity by enjoy gambling interaction, $F(10, 1930) = 8.18$, $p < .001$; and a significant activity by frequency of gambling interaction, $F(30, 1910) = 2.30$, $p < .001$. It should be noted that since the data are ipsative in nature, the above interaction effects are equivalent to the main effects for sex, age, enjoy gambling and frequency of gambling, and the interaction of age by sex.

These findings suggested a breakdown of the analysis to simple effects (individual comparisons). Summary statistics for the demographic characteristics age, sex, and age by sex are given in Table 6, and summary statistics for the experience variables enjoy gambling and frequency of gambling are given in Table 7.

The age split showed significant differences in preference for roulette, $F(1, 1930) = 7.68$, $p < .01$; and poker $F(1, 1930) = 11.27$, $p < .001$. The sex split showed significant differences in preference for bingo, $F(1, 1930) = 50.90$, $p < .001$; dice, $F(1, 1930) = 8.32$, $p < .01$; blackjack, $F(1, 1930) = 8.31$, $p < .01$ and poker, $F(1, 1930) = 25.94$, $p < .001$. The age by sex split
Table 5

ANOVA Summary Table for Analyses of Activity Preferences by Age and Sex, Enjoy Gambling, and Frequency of Gambling

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity X Age</td>
<td>10</td>
<td>511.06</td>
<td>51.11</td>
<td>2.11</td>
</tr>
<tr>
<td>Activity X Sex</td>
<td>10</td>
<td>2443.77</td>
<td>244.38</td>
<td>10.09</td>
</tr>
<tr>
<td>Activity X Age X Sex</td>
<td>10</td>
<td>655.82</td>
<td>65.58</td>
<td>2.71</td>
</tr>
<tr>
<td>Error Within</td>
<td>1930</td>
<td>46755.25</td>
<td>24.22</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1969</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity X Enjoy Gambling</td>
<td>10</td>
<td>2045.82</td>
<td>204.58</td>
<td>8.18</td>
</tr>
<tr>
<td>Error Within</td>
<td>1930</td>
<td>48241.14</td>
<td>25.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1949</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity X Frequency of Gambling</td>
<td>30</td>
<td>1747.73</td>
<td>58.21</td>
<td>2.30</td>
</tr>
<tr>
<td>Error Within</td>
<td>1910</td>
<td>48347.58</td>
<td>25.31</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1949</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. These results are from three separate analyses. There are no main effects for Age, Sex, Age X Sex, Enjoy Gambling or Frequency of Gambling since the data are ipsative.

* p < .01.

** p < .001.
Table 6
Preference Score Statistics for Age, Sex, and Age X Sex

<table>
<thead>
<tr>
<th>Gambling Activity</th>
<th>Age</th>
<th>Sex</th>
<th>Age X Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Young (102)</td>
<td>Old (95)</td>
<td>Young Male (49)</td>
</tr>
<tr>
<td></td>
<td>Male (120)</td>
<td>Female (77)</td>
<td></td>
</tr>
<tr>
<td>Roulette</td>
<td>15.79</td>
<td>14.16</td>
<td>15.53</td>
</tr>
<tr>
<td></td>
<td>F 7.68*</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Bingo</td>
<td>16.00</td>
<td>15.16</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td>F 1.11</td>
<td>50.90</td>
<td></td>
</tr>
<tr>
<td>Sports</td>
<td>17.50</td>
<td>17.42</td>
<td>19.25</td>
</tr>
<tr>
<td></td>
<td>F 0.01</td>
<td>3.39</td>
<td></td>
</tr>
<tr>
<td>Dice</td>
<td>14.17</td>
<td>15.07</td>
<td>14.65</td>
</tr>
<tr>
<td></td>
<td>F 1.79</td>
<td>8.32*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 1.68</td>
<td>4.96</td>
<td></td>
</tr>
<tr>
<td>Slots</td>
<td>18.53</td>
<td>18.02</td>
<td>16.74</td>
</tr>
<tr>
<td></td>
<td>F 0.46</td>
<td>3.61</td>
<td></td>
</tr>
<tr>
<td>Blackjack</td>
<td>21.21</td>
<td>20.23</td>
<td>22.96</td>
</tr>
<tr>
<td></td>
<td>F 1.67</td>
<td>8.31*</td>
<td></td>
</tr>
<tr>
<td>Track</td>
<td>20.75</td>
<td>20.34</td>
<td>21.06</td>
</tr>
<tr>
<td></td>
<td>F 0.35</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 11.27**</td>
<td>25.94**</td>
<td></td>
</tr>
<tr>
<td>Dislike for Gambling</td>
<td>16.98 16.92</td>
<td>16.60 17.49</td>
<td>16.59 16.61 17.34 17.83</td>
</tr>
</tbody>
</table>

Note. The numbers in parentheses are the number of subjects in that particular group.

*P < 0.01.
**P < 0.001.
Table 7
Preference Score Statistics for Enjoy Gambling
and Frequency of Gambling

<table>
<thead>
<tr>
<th>Gambling Activity</th>
<th>Enjoy Gambling</th>
<th>Frequency of Gambling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (139)</td>
<td>No (56)</td>
</tr>
<tr>
<td>Roulette</td>
<td>X 14.81</td>
<td>15.63</td>
</tr>
<tr>
<td></td>
<td>F 1.49</td>
<td></td>
</tr>
<tr>
<td>Bingo</td>
<td>X 14.75</td>
<td>17.64</td>
</tr>
<tr>
<td></td>
<td>F 11.12**</td>
<td></td>
</tr>
<tr>
<td>Sports</td>
<td>X 16.87</td>
<td>18.84</td>
</tr>
<tr>
<td></td>
<td>F 4.54</td>
<td></td>
</tr>
<tr>
<td>Dice</td>
<td>X 15.09</td>
<td>13.48</td>
</tr>
<tr>
<td></td>
<td>F 4.61</td>
<td></td>
</tr>
<tr>
<td>Lottery</td>
<td>X 20.25</td>
<td>20.64</td>
</tr>
<tr>
<td></td>
<td>F 0.23</td>
<td></td>
</tr>
<tr>
<td>Slots</td>
<td>X 18.57</td>
<td>17.63</td>
</tr>
<tr>
<td></td>
<td>F 1.28</td>
<td></td>
</tr>
<tr>
<td>Blackjack</td>
<td>X 21.64</td>
<td>18.63</td>
</tr>
<tr>
<td></td>
<td>F 14.07**</td>
<td></td>
</tr>
<tr>
<td>Track</td>
<td>X 21.17</td>
<td>18.88</td>
</tr>
<tr>
<td></td>
<td>F 9.50*</td>
<td></td>
</tr>
<tr>
<td>Foker</td>
<td>X 21.05</td>
<td>18.81</td>
</tr>
<tr>
<td></td>
<td>F 5.92</td>
<td></td>
</tr>
</tbody>
</table>

Dislike for Gambling

|                 | X 15.79        | 19.75                 | 19.14          | 16.40             | 16.57            | 15.89               |
|                 | F 53.29**      |                       |                |                   | 7.18             |                    |

Note: The numbers in parentheses are the number of subjects in that particular group.

*P < .01
**P < .001
showed a significant difference in preference for slots, $F(1, 1930) = 9.71, p < .01$. Examining the means presented in Table 6 indicated the following. Younger persons preferred roulette more than older persons. Older persons preferred poker more than younger persons. Females preferred bingo more than males. Males preferred dice, blackjack, and poker more than females. Young females preferred slots more than old males who in turn preferred slots more than both old females and young males.

The enjoy gambling variable showed significant differences in preferences for bingo, $F(1, 1930) = 11.12, p < .001$; blackjack, $F(1, 1930) = 14.07, p < .001$; racetrack, $F(1, 1930) = 9.50, p < .01$; and dislike for gambling, $F(1, 1930) = 53.29, p < .001$. The frequency of gambling variable showed significant differences in preferences for roulette, $F(3, 1930) = 6.86, p < .001$; lottery, $F(3, 1930) = 5.92, p < .001$; and dislike for gambling, $F(3, 1930) = 7.18, p < .001$. Examining the means presented in Table 7 indicated that persons who enjoy gambling preferred blackjack and track more than persons who do not enjoy gambling. Those who do not enjoy gambling preferred bingo and, not surprisingly, had a greater dislike for gambling than those persons who enjoy gambling. Those who gamble once a month or more preferred lottery more than those who gamble less frequently. Those who gamble once a year or less preferred roulette more than those
who gamble more frequently. The less frequently people gamble, the greater their dislike for gambling was found to be.

Results of the analysis of simple effects (using the Newman-Kuels procedure, Winer, 1975, pp. 191-196) are given in Table 8. Only those subsamples showing the most statistical validity are presented, however, the results were consistent across subsamples. For the total sample, and all subsamples with the exception of females (old and young), dice, roulette and bingo all fall below the dislike for gambling point. That is, for all subsamples besides the aforementioned exceptions, dice, roulette, and bingo are even less desirable than no gambling activity at all. For all females, bingo was one of the better-liked activities.

The dislike for gambling point was consistent across age, sex, and for most other subsamples. Specifically, six activities fall above the dislike for gambling point and three activities fall below it for every subsample with the following exceptions: for those subjects who do not enjoy gambling, only lottery was more desirable than no gambling activity at all; for those subjects who gambled once a year or less, only blackjack and track were more desirable than no gambling activity at all; and for the young female subsample, four activities fall below the
Table 8

Schematic Pattern of Gambling Activity Individual Comparisons

<table>
<thead>
<tr>
<th>Total Sample</th>
<th>Male</th>
<th>Female</th>
<th>Young</th>
<th>Old</th>
<th>Enjoy</th>
<th>Don't Enjoy</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. Stimuli connected by a solid line are not significantly different using the Newman-Keuls procedure, and a 0.01 significance level. See Table 3 for stimulus names.
dislike for gambling point.

Factor Analysis and Cluster Analysis of Preference Data

The vector of preference scores for each subject was (a) dimensionalized using principal components analysis (PCA); and (b) hierarchically clustered, using Ward's minimum variance hierarchical cluster analysis (HCA).

The five factor configuration obtained from PCA is given in Table 9. This configuration provided the best compromise between accurate representation of the properties of the preference vectors and a parsimonious representation of their spatial configuration. Examination of this configuration showed the following. Factor one had negative loadings for bingo, sports, lottery, track, and dislike for gambling, a small negative loading for slots, and positive loadings for roulette, dice, blackjack, and poker. These loadings appear to indicate a casino -- noncasino dichotomy. Factor two had positive loadings for roulette, bingo, and slots, near zero loadings for dice, lottery, and blackjack, and negative loadings for sports, track, poker, and dislike for gambling. These loadings appear to indicate a serious -- recreational dichotomy.

Factors three, four, and five appeared to be specific factors, in that each had only one activity that had a sizeable loading. The activities that loaded highly on these specific factors were: roulette, sports, and track, respectively.
<table>
<thead>
<tr>
<th>Gambling Activity</th>
<th>Fac 1</th>
<th>Fac 2</th>
<th>Fac 3</th>
<th>Fac 4</th>
<th>Fac 5</th>
<th>h²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roulette</td>
<td>.308</td>
<td>.483</td>
<td>.640</td>
<td>.035</td>
<td>.161</td>
<td>.765</td>
</tr>
<tr>
<td>Bingo</td>
<td>-.692</td>
<td>.227</td>
<td>-.146</td>
<td>.367</td>
<td>-.067</td>
<td>.691</td>
</tr>
<tr>
<td>Sports</td>
<td>-.227</td>
<td>-.538</td>
<td>.438</td>
<td>-.631</td>
<td>-.003</td>
<td>.931</td>
</tr>
<tr>
<td>Dice</td>
<td>.678</td>
<td>.047</td>
<td>.244</td>
<td>.337</td>
<td>-.168</td>
<td>.663</td>
</tr>
<tr>
<td>Lottery</td>
<td>-.634</td>
<td>.097</td>
<td>-.374</td>
<td>-.199</td>
<td>-.272</td>
<td>.665</td>
</tr>
<tr>
<td>Slots</td>
<td>-.148</td>
<td>.774</td>
<td>-.116</td>
<td>-.313</td>
<td>.221</td>
<td>.781</td>
</tr>
<tr>
<td>Blackjack</td>
<td>.752</td>
<td>.078</td>
<td>-.324</td>
<td>.029</td>
<td>.089</td>
<td>.685</td>
</tr>
<tr>
<td>Track</td>
<td>-.207</td>
<td>-.518</td>
<td>-.152</td>
<td>.274</td>
<td>.742</td>
<td>.960</td>
</tr>
<tr>
<td>Poker</td>
<td>.662</td>
<td>-.339</td>
<td>-.343</td>
<td>-.081</td>
<td>-.336</td>
<td>.791</td>
</tr>
<tr>
<td>Dislike for Gambling</td>
<td>-.524</td>
<td>-.196</td>
<td>.341</td>
<td>.405</td>
<td>-.355</td>
<td>.719</td>
</tr>
<tr>
<td>SSQ</td>
<td>2.830</td>
<td>1.573</td>
<td>1.198</td>
<td>1.031</td>
<td>.979</td>
<td></td>
</tr>
</tbody>
</table>
Only the common factors (factors one and two) were retained and rotated. This rotated configuration is given in Table 10. Examination of the rotated two factor configuration showed the following. Factor one had positive loadings for roulette, dice, slots, blackjack, and poker; and negative loadings for bingo, sports, lottery, track, and dislike for gambling. Factor two had positive loadings for sports, dice, blackjack, track, and poker; and negative loadings for roulette, bingo, lottery, slots and dislike for gambling. A plot of this configuration is given in Figure 1.

Factor loadings on the first eight dimensions were used as the input for the cluster analysis of the gambling activities. This was done since the first eight factors accounted for almost all of the variance of the preference judgements. Although the cubic clustering criterion would indicate that, not surprisingly, all of the stimuli belong to one group: gambling activities, clustering levels two and four (as shown in Table 11) were selected for further interpretation and are graphically displayed in Figure 1.

At level four, the clusters were: (roulette and slots); (dice, blackjack, and poker); (bingo, lottery, and dislike for gambling); and (sports and track). At level two, the clusters were: (roulette, slots, dice, blackjack, and poker); and (bingo, lottery, dislike for gambling, sports, and track).
<table>
<thead>
<tr>
<th>Gambling Activity</th>
<th>Fac 1</th>
<th>Fac 2</th>
<th>$h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roulette</td>
<td>0.498</td>
<td>-0.213</td>
<td>0.293</td>
</tr>
<tr>
<td>Bingo</td>
<td>-0.515</td>
<td>-0.532</td>
<td>0.548</td>
</tr>
<tr>
<td>Sports</td>
<td>-0.457</td>
<td>0.351</td>
<td>0.332</td>
</tr>
<tr>
<td>Dice</td>
<td>0.601</td>
<td>0.335</td>
<td>0.473</td>
</tr>
<tr>
<td>Lottery</td>
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<td>-0.417</td>
<td>0.482</td>
</tr>
<tr>
<td>Slots</td>
<td>0.278</td>
<td>-0.755</td>
<td>0.647</td>
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<tr>
<td>Poker</td>
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<td>0.619</td>
<td>0.545</td>
</tr>
<tr>
<td>Dislike for Gambling</td>
<td>-0.555</td>
<td>-0.084</td>
<td>0.315</td>
</tr>
<tr>
<td>SSQ</td>
<td>2.557</td>
<td>1.898</td>
<td></td>
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</tbody>
</table>
Figure 1. Plot of 30° Rotated Two Factor Configuration showing RCA Clusters.
Table 11

Cluster Tree Diagram Using Factor Patterns

<table>
<thead>
<tr>
<th>Clustering Level</th>
<th>ROUS</th>
<th>BDOS</th>
<th>LISP</th>
<th>1STP</th>
<th>2STP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LSDL</td>
<td>LPBT</td>
<td>ESTP</td>
<td>TLST</td>
<td>LRST</td>
</tr>
<tr>
<td></td>
<td>ELDJOITLOR</td>
<td>TAKN EIRAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TCTCCEGRKTTC</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ESEKKOYESK</td>
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<td></td>
</tr>
</tbody>
</table>

1

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

2

xxxxxxxxxxxx xxxxxxxxxx

3

xxx xxxxxxx xxxxxxxxxx

4

xxx xxxxxxx xxxxxxxxxx xxx

5

xxx xxxxxxx xxxxxxxxxx . .

6

. . xxxxxxx xxxxxxx . .

7

. . xxxxxxx xxx . .

8

. . xxx xxx xxx . .

9

. . xxx xxx . . .

10

. . xxx . . .
Interpretation of the Configuration. Rotated factor one and clustering level two, taken together, clearly indicated a casino -- noncasino dichotomy. This distinction appears to be purely qualitative since all the casino activities (blackjack, poker, dice, roulette, and slots) occupy almost equivalent positions on the positive end of the dimension, and all the noncasino activities (bingo, sports, track, and lottery) occupy almost equivalent positions on the negative end of the dimension.

Rotated factor two and clustering level four, taken together, clearly indicated the presence of another dichotomy that could be labelled serious -- recreational. This distinction appears to have both quantitative and qualitative attributes. Within the noncasino activities, there appears to be a qualitative distinction between the serious activities (track and sports) and the recreational activities (bingo and lottery). However, within the casino activities, the stimuli appear to be ordered, with poker being the most serious and slots being the least serious. Dice and blackjack occupy roughly equivalent positions on the serious side of the axis, with roulette falling between blackjack and slots on the recreational side of the axis.

As seen in Figure 1, the clusters group activities into four distinct quadrants of the two-space. These are: serious-casino, which includes poker, dice, and blackjack;
serious—noncasino, which includes sports and track;
recreational—casino, which includes roulette and slots;
and recreational—noncasino, which includes bingo, lottery,
and the dislike for gambling point.

**Summary of Results**

Results of the demographic and previous gambling experience items indicated that the sample had a good representation of ages and sex, and that subjects had a good deal of familiarity with gambling activities and a fair amount of previous gambling experience.

Analyses of variance indicated significant differences in preference for gambling activities existed on the following variables: sex, enjoy gambling, and frequency of gambling. In addition, an age by sex interaction was found.

The overall preference ordering indicated that blackjack, track, poker, and lottery were liked; bingo, roulette, and dice were disliked, and slots and sports were neither liked nor disliked.

The factor analysis and cluster analysis gave a solution of four clusters embedded in two dimensions. The dimensions were labelled casino versus noncasino gambling; and serious versus recreational gambling. The four clusters represented the four quadrants of the two-dimensional space.
CHAPTER IV

DISCUSSION

The dimensions along which gambling activities are perceived to vary can be readily determined from the results of this study. As expected, a readily interpretable configuration in two dimensions was found for gambling activities. Other expectations about the outcome of this research were also supported by the data. Differences in preferred gambling activities were found for the demographic variables of age and sex, and previous gambling experience was found to have an effect on preference for gambling activities. The data also revealed considerably more about the cognitive organization of gambling activities than was needed to fulfill these three general expectations.

The discussion to follow will attempt to organize and interpret the information gained from the various data analyses. The present findings will then be compared to the previous efforts in the area of gambling; and finally, implications for recreational planning and future studies will be noted.

It should first be noted that individuals' judgements about their preferred gambling activities are remarkably stable, at least over the twenty minutes it takes to respond to the Gambling Interest Survey. The high item reliability (average $r$ on repeated items = .79) indicates
that the items are measuring more than random responses. In short, the individuals' judgements are stable and meaningful.

These judgements appear to be made on the basis of a relatively small number of dimensions. The PCA reveals two general dimensions which underly the domain of gambling activities used in the present study. The dimensions uncovered were similar to those expected. It was expected that dimensions would be found from the following possibilities: casino versus noncasino, card games versus others, amount of money involved, and immediacy of payoff. The casino versus noncasino dimension was uncovered, and since one component of the definition of gambling seriousness involves the amount of money wagered, this dimension was also, in part, uncovered.

The two-dimensional PCA solution displays an interesting combination of quantitative and qualitative properties. The first dimension is entirely qualitative; while the second reflects a complex concept which had both qualitative and quantitative aspects. On the first dimension, the gambling activities are distinguished into either casino or noncasino activities on the basis of where they are played. The loadings of the casino activities (roulette, dice, blackjack, and poker) on this dimension are all similar and positive, and the loadings of the noncasino activities (bingo, sports,
lottery, and track) are all similar and negative. Although poker is played in both casino and noncasino settings, its similarity to blackjack in terms of materials used and skills involved is the probable cause of its loading with the casino activities.

On the second dimension, the gambling activities seem to be distinguished into either serious or recreational categories. The serious activities: sports, track, dice, blackjack, and poker are distinguished from the rest on the basis of their being gambling activities which involve relatively larger amounts of money being wagered, and necessitate greater skill in terms of knowledge of past events, as in the cases of sports and track, and knowledge of the probability of future events as in the cases of dice, blackjack, and poker. In terms of a concept of seriousness, the noncasino activities fall into two distinct categories. Sports and track require some skill and may involve large amounts of money and are thus serious. Bingo and lottery involve small wagers and require little or no skill and are thus recreational. However, the casino games order along a continuum in terms of inherent "seriousness": The order from least to most seriousness is: slots, roulette, blackjack, dice, and poker. This ordering reflects the degree to which the amount of money wagered and the amount of skill (as opposed to pure chance) required to play, are
involved. Slots usually involve relatively small wagers and are based purely on chance. Roulette usually involves larger wagers than slots and some skill is required in terms of knowledge of probabilities. Blackjack and dice usually involve similar-sized wagers to roulette, but necessitate more skill in terms of correct decision making based on the knowledge of probabilities. Finally, poker, which has the most seriousness, is characterized not only by larger wagers and the need for greater knowledge of probabilities, but also necessitates the skill of analyzing the actions of the other participants since it is the only casino activity that is played against other bettors who have the same options available to them and not against the "house" whose options are limited by the rules of the game (e.g. in blackjack the dealer must hit on 16 or under and stand on 17 or greater).

Degree of seriousness and locale of activity (casino versus noncasino) are both concepts by which most gambling activities can be described and so can be considered as two major dimensions of the gambling activity domain.

The two-dimensional PCA solution was embedded in a five-dimensional configuration and this point merits further amplification. Factor three appeared to be necessary to fit the activity roulette, since it is the only
activity that has a sizeable loading on this factor. Roulette is seen as being substantively different from every other activity, and this is being picked up on factor three. One possible reason for this is roulette's relative unpopularity in North America in comparison with Europe. Roulette is the most popular casino activity in continental Europe, yet among those who had visited casinos in the United States, roulette was less popular than slots, blackjack, keno, and poker (Kallick et al., 1979). Thus roulette is different not only from activities that are not played in a casino, but different from other casino activities that are played frequently in casinos in North America.

Factors four and five appeared to be necessary to fit the relationship between sports and track, and are thus best understood when considered together. Factor four had a sizeable loading for sports, and no other sizeable loadings, and factor five only had a sizeable loading for track. These two activities have virtually identical loadings on factors one and two, reflecting the many characteristics they share (e.g. outside casino setting, involve similar "handicapping" skills etc.). It appears that factors four and five are indicating that sports and track are not as similar as they appear to be based on the two factor solutions. Factor four defines the activity sports as separate and distinct from track, and factor five defines
the activity track as distinct from sports. Further justification for this interpretation is that in the cluster solution, sports and track are the first activity pair to separate and form their own individual clusters.

The cluster analysis reveals characteristics specific to groups of gambling activities. The clusters found in the present study group activities on the basis of whether or not they are played in a casino, and on the basis of how serious (as previously defined) they are. At the four cluster level, the clusters represent the four distinct quadrants of the two dimensional configuration.

The PCA and cluster solutions combine to aid in understanding how individuals organize the gambling activities in the stimulus domain. Distinctions among these activities seem to be made along the dimension of casino -- noncasino, and seriousness. This study employed a wide range of familiar gambling activities, but by no means included all forms of gambling. From the results of this study one can speculate as to how other, less familiar gambling activities, would be located along these dimensions. Keno, because it is played in a casino, would be expected to load on the casino end of the casino -- noncasino dimension, and since the amount of money wagered is usually small and little skill is required, it would be expected to load on the recreational end of the serious -- recreational
dimension, and thus cluster with the other recreational-casino activities. Bridge and gin rummy, played for money, would be expected to load on the noncasino end of the casino -- noncasino dimension, and since they require a fair amount of skill, they would be expected to load on the serious end of the serious -- recreational dimension, and thus cluster with the other serious-noncasino activities. Coin flipping and check pools would be expected to load on the noncasino end of the casino -- noncasino dimension, and since they involve little money and virtually no skill, they would be expected to load on the recreational end of the serious -- recreational dimension, and thus cluster with the other recreational-noncasino activities.

The dimensions uncovered in this study may not apply to a broader gambling activity domain. If the domain were broader, other dimensions may emerge. For example, if more card games were included, such as baccarat, bridge, or gin rummy, a dimension involving the use of cards may appear. The generalizability of the dimensions found in this study to such broader domains is a question for future study.

Individual Differences

The differences in gambling activity preferences found along the demographic variables of age and sex, and the experience variable enjoy gambling are very interesting.
Using the classifications of gambling activities derived from the PCA and HCA, it was found that, overall, those who enjoy gambling preferred the serious activities, whereas those who do not enjoy gambling preferred the recreational activities. Since the data indicated that those who enjoy gambling gambled more frequently and have played more of the activities than those who do not enjoy gambling, the above finding is in accordance with the expectation that the greater the previous experience with gambling activities, the greater the preference for serious forms of gambling.

It was also found, in accordance with previously noted expectations, that males preferred serious gambling activities and females preferred the recreational activities of bingo, lottery and slots.

The differences in the pattern of preferences along demographic and experience variables merits further amplification. Males and females had similar orders of preferences for gambling activities. However, the distinctions between activities are much clearer for males, they know which activities they like and which activities they dislike. For females, there is a considerable amount of overlap of activities, indicating that few clear preference distinctions exist. A similar situation exists when the young and old subsamples are considered. The order of preferences for gambling activities are virtually
identical, however, the older individuals exhibit clear preferences and the younger individuals have less well-defined preference structures. However, this last finding may be, in part, an artifact due to the over-representation of males in the old subsample.

Both these findings may have something to do with the fact that males in this sample have had more experience with gambling activities and thus, having more information, are better able to decide which activities they do or do not prefer. Since experience plays a role in the ability to clearly organize preferences, it would follow that those who enjoy gambling, and thus have more experience with gambling activities, would have clearer preference distinctions than those who do not enjoy gambling. This is indeed what is happening. For those who do not enjoy gambling, there is almost complete overlap of stimuli, indicating that they do not prefer one gambling activity over another. For those who enjoy gambling, there is little overlap, indicating that clear distinctions between the gambling activities are being made.

Although some individual differences were identifiable using the present analyses, these differences are not strong enough to detract from the representativeness of the aggregate principal components and cluster solutions. Nevertheless, future studies should focus on how the
stimulus configuration may vary among the differing groups. Of special interest is whether or not differences in preferences reflect differences in weights assigned to dimensions by different groups, or reflect the use of different dimensions. One might find, for example, that dimensions three, four, and five, which were uninterpretable in the group solution, have meaning for one or more of the groups in a sub-aggregate analysis.

Relation to Past Studies

Although stated preferences and actual betting may not match in reality, Kallick et al. (1979) found a similar order for actual wagering frequencies, with card games wagered—on most often, followed by sports betting, lotteries, racetrack, bingo, and casino games. If the proportions for sports betting and racetrack are reversed, and the card games played in casinos separated from casino games not using cards, the rankings for the present study are equivalent to those found by Kallick et al.. An explanation for the greater preference for racetrack betting in the present study is the proximity and hence greater accessibility to this type of wagering in the area where this sample was taken.

In terms of individual differences, previous research has indicated that males and older individuals will prefer the serious activities; those involving skill, and females
would prefer the non-serious activities, those involving chance (Shapiro, 1981; Karabenick et al., 1983). If one can consider gambling to be a masculine-type activity, the results of the present study are in keeping with the findings of the previous research.

It is interesting that Kallick et al. (1979) found that gambling activities cluster together in terms of motivation for participation. Specifically, they found that racetrack, sports betting, and casino gambling had similar motivations and that bingo and lottery had similar motivations. These groupings parallel those found in the present study. The first grouping found by Kallick et al. seems to be similar to the cluster of serious gambling activities found in the present study, and the grouping of lottery and bingo seems to correspond to the recreational-noncasino cluster found in the present study.

Implications

In terms of recreational planning, the present study has significant impact. Since the present study used actual preferences for gambling activities as a dependent variable, rather than participation rates, the activities that were found to group together can be considered interchangeable. Thus, in the absence of slot machines, those who would normally play the slots would probably be content playing roulette. In the same manner, lottery and bingo could most
probably substitute for one another, and the triad of dice, blackjack, and poker are probably interchangeable as well. For the area where this sample was taken, the interchangeability of sports and track leads to some interesting possibilities. Overall, track was one of the most preferred activities in the stimulus list, in part, due to its ready availability. However, for part of the year, the racetracks in this area are closed on account of the weather. If the results of this sample can generalize to the entire population of the area, an organized sports betting scheme, operating during the periods when the racetracks are closed, would likely attract the people who normally bet on the races, and would thus do very well.

A second implication of the present study addresses the area of human cognitive organization. In the same manner as previous research on human preferences, the results of the present study indicate that there is a rational organization underlying preferences. Thus, irrespective of the stimulus domain used to study preferences, empirical evidence demonstrates that individuals organize, process, and evaluate information that impinges on their senses, through the application of personal schemata, into concise, well-structured, rational conceptualizations. The present study serves as an example of a method that effectively yields a map representing the underlying
structure used to organize a set of stimuli, in this case, gambling activities. This method can be used to uncover the underlying cognitive organization of other important human activities.

One direction for further research involves an extension of the present study. Some of the individual difference variables used in the present study were found to influence preferences for gambling activities. However, some items included on the questionnaire were not able to get at other potentially important variables. Specifically, the present study should be replicated with the item concerning occupation replaced by a better measure of income, and a question concerning the level of education attained should be included. In addition, the sample used should include a greater representation of single individuals so as to allow a single versus married comparison.

Not only should these new individual difference variables be studied, a more intricate method should be used to study them. As previously noted, another direction that future research should take is the further breakdown of individual differences. It is possible that the stimulus configurations for different subgroups may vary not only in the weights assigned to the different dimensions, but perhaps different subgroups are using entirely different dimensions to organize the set of stimuli. One method that can be used
to further study individual differences is a multidimensional unfolding analysis. The majority of previous research using this technique (e.g., Green & Rao, 1972) has found that the configurations usually do not differ between subgroups, but that the weights assigned to the dimensions may differ.

Another extension of the present research involves wider sampling of the gambling activities domain. The inclusion of more gambling activities may facilitate the identification and definition of gambling activity attributes. However, there are two problems with an extended list of gambling activities to be judged. First, the results of the present study indicate that the majority of familiar gambling activities were included in the present stimulus list, and though assessment of the attributes of other gambling activities may be useful, the lack of familiarity with them could interfere with clear judgements from the respondents. This is especially true since the present study found that those who were more familiar with gambling activities by virtue of having greater previous experience with them, were able to make clearer distinctions among the activities.

The second problem is methodological and concerns data gathering procedures. The paired comparison method used in the present study becomes cumbersome and extremely time consuming when more than a small number of stimuli are used.
The advantage of this method is that judgements are simple and tend to give very stable results, as was the case in the present study. Categorical judgement methods such as Torgerson's (1958) would solve the problem of number of judgements, but may yield solutions which are far less stable. Perhaps using the present stable solution for nine gambling activities as a frame of reference, an extension to more gambling activities could be worthwhile.

The finding that the overall preference order found in the present study was similar to the order of actual wagering participation found by Kallick et al. (1979) leads to the final extension of the present research. Specifically, future studies should address the question of how these preference judgements for gambling activities relate to actual participation in gambling activities. This can be explored, within the limits of reliability of self-report, by including a section scaling gambling activity participation in a new questionnaire.

Conclusions

Preference judgements of gambling activities yielded a simple, interpretable configuration. The two dimensions found to underly the cognitive organization of the gambling activities in the stimulus domain were: casino versus noncasino and serious versus recreational.

Cluster analysis revealed that gambling activities
group into the four distinct quadrants of the two-dimensional space. Activities that did cluster together are thought to be substitutable one for another.

The analyses of individual differences revealed that differences do exist across the variables age, sex, and enjoy gambling. The patterns of preferences were also found to differ across these variables, with those having more experience with gambling activities having clearer distinctions among activities than those with less experience.

The present research has proved valuable in suggesting directions for further inquiry into the nature of gambling activities, with specific reference to the effects of individual difference variables on the cognitive organization of preferences and the relation between preferences and actual participation.
REFERENCES


Kusyszyn, I. The psychology of gambling. Unpublished manuscript, York University, 1983.


The business of gambling. Time, September 14, 1976, pp. 36-44.


APPENDIX A

SAMPLE QUESTIONNAIRE
GAMBLING INTEREST SURVEY

I am interested in finding out about some of your experiences with and preferences for gambling activities. (Gambling can be defined as risking money or other stakes on games, events, or occurrences having uncertain outcomes). I would like you to respond as honestly and completely as possible to the items on this survey. You are not asked to identify yourself in any way. Therefore you can be assured of the complete personal confidentiality of any information given.

M. W. Starr, Ph.D.
Principal Investigator
GAMBLING INTEREST SURVEY

A. Personal Characteristics

1. Sex M___ F___

2. Age ___ (years)

3. Marital Status ___ Single
   ___ Married
   ___ Other

4. Occupation __________________________

5. Is English your first language? Yes___ No___

B. Gambling Experience

1. Have you ever gambled for money? Yes___ No___

2. Have you ever purchased a lottery ticket? Yes___ No___

3. Have you ever placed a bet on a horserace or a sports event? Yes___ No___

4. Have you ever visited a gambling casino? Yes___ No___

5. Have you ever taken a vacation to a location where gambling is a major tourist attraction? Yes___ No___

6. How often would you say you gamble?
   once a year ___ once a year ___ once a month ___ once a week ___
   never ___ times ___
   ___ 3 or 4 ___

7. What is your favorite gambling activity? __________________________

8. Do you enjoy gambling? Yes___ No___
Since some of the gambling activities used in this survey require long names or descriptions, you will find below one word names underlined which will be used in sections C and D instead of the full name of the activities. With each of the names you will find a short definition or description to familiarize you with that particular activity. Please read these descriptions carefully and feel free to refer back to them, if necessary, when making your judgments in parts C and D of the survey.

**Blackjack:** Blackjack or "21" is a card game where the individual bettor competes against a dealer to see whose cards total closest to "21" without surpassing it. All face-cards count as 10, all other cards count as their face value except the ace, which, at the player's option may count as 1 or 11. The player may continue to add cards to her or his hand, one at a time, until she/he elects to stop or until "21" is exceeded. The term "Blackjack" denotes a 2 card hand totalling "21".

**Roulette:** Roulette is a game where a small ball is placed onto the top of a spinning wheel that is divided into 38 numbered, red, black, and green coloured slots. When the wheel stops spinning the ball comes to rest in one of these slots. Players can wager on several outcomes: individual numbers, groups of numbers, odd or even, red or black, with the payoff based on the probability of that outcome.

**Lottery:** Lottery is used to designate any game where a ticket is issued with numbers on it, either chosen by the player or predetermined, and a drawing is conducted. Large payoffs are made if the number on the ticket exactly matches the number that is drawn, and smaller payoffs are made for partial matching.

**Racetrack:** Racetrack is used to designate horse racing, harness racing, dog racing, and other contests where a parimutual system is used to assign odds on the contestants based on the proportion of money bet on each, and pay off the winning bettors according to these odds, less track expenses and government taxes.
Sports: Sports betting refers to wagering money on the outcome of sports events such as football, baseball, basketball, or hockey games; or boxing, tennis or golf matches. These wagers could be in the form of office pools, private bets, or bets with professional bookmakers.

Dice: Dice or "Craps" is played by throwing two small cubes, called dice, on a flat surface. Each cube has six faces with from one to six dots on each face. Players bet on the outcome of the throw of the pair of dice which is determined by adding the number of dots on the faces showing up and giving a total from two to 12.

Poker: Poker is a card game which comes in a variety of popular forms and is played by at least two, but usually more persons. Common to all forms of poker is a ranking of sets of five cards called "hands," for example: two pair; three of a kind; a flush. The "best" hand of the players remaining in the game after a series of bets wins all money bet.

Slots: Slots is used to designate any machine (called a slot machine) where coin(s) are inserted and a handle is pulled to spin reels containing different decals. Payoffs are made if the sequence of decals that turns up matches any of several prearranged patterns. The more unlikely it is to match the pattern, the higher the payoff will be.

Bingo: Bingo is a board game played for cash prizes in licensed public halls. Cards are purchased having rows and columns of numbers on them. Random numbers are selected and covered with disks on these cards. A player wins a small amount when a row of 5 numbers is covered, and he declares bingo. The game continues until one player declares a full-card bingo and collects a large amount.

Were there any gambling activities in the list with which you were not familiar?  

Are there any gambling activities which you engage in which were not mentioned in the list? 

Which of the gambling activities on the list have you participated in?
Section C - Preference Judgments

In this section we would like you to indicate your preference for each gambling activity when it is compared to another gambling activity. The gambling activities will be presented in pairs. Examine each pair carefully and indicate the ONE gambling activity in the pair that you like better by placing an X in the blank beside it. BE SURE THAT YOU HAVE ONLY ONE X FOR EVERY PAIR IN THIS SECTION. PLEASE BE SURE TO ANSWER EVERY ITEM. Feel free to refer back to the description of the gambling activities to refresh your memory.

1. Poker  
   Bingo
2. Slots  
   Blackjack

3. Racetrack  
   Roulette
4. Lottery  
   Dice

5. Racetrack  
   Slots
6. Poker  
   Dice

7. Bingo  
   Lottery
8. Racetrack  
   Sports

9. Roulette  
   Poker
10. Slots  
    Bingo

11. Sports  
    Dice
12. Roulette  
    Slots

13. Bingo  
    Racetrack
14. Roulette  
    Sports

15. Blackjack  
    Racetrack
16. Slots  
    Sports

17. Dice  
    Racetrack
18. Lottery  
    Slots

19. Sports  
    Blackjack
20. Dice  
    Bingo

21. Blackjack  
    Lottery
22. Bingo  
    Roulette

23. Blackjack  
    Poker
24. Racetrack  
    Lottery

25. Sports  
    Bingo
26. Roulette  
    Blackjack
### Section C - continued

<p>| | | | |</p>
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<th></th>
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<tbody>
<tr>
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<td>32. Dice Roulette</td>
<td>33. Blackjack Dice</td>
<td>34. Sports Lottery</td>
</tr>
<tr>
<td>39. Roulette Racetrack</td>
<td>40. Dice Lottery</td>
<td></td>
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### Section D

In this section we would like you to indicate in a general way whether you like or dislike each of the gambling activities presented. Place an L for *like*, or a D for *dislike* beside each of the activities in the following list. Feel free to refer back to the description of the activity if you so desire.

1. Roulette   
2. Bingo    
3. Sports  
4. Dice     
5. Lottery  
6. Slots    
7. Blackjack 
8. Racetrack 
9. Poker    

Please make sure that you have responded to every item.
APPENDIX B

SUPPLEMENTARY TABLE
## Table 12

Contingency Tables for Preference Judgements on Repeated Measures

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<td>54 7 61</td>
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\[ \chi^2 = 135.31^{***} \]

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<tr>
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<td>3 10 61 71</td>
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<tr>
<td>61 134 195</td>
<td>128 67 195</td>
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\[ \chi^2 = 131.59^{***} \]

<table>
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<tr>
<td>32 7 39</td>
<td>41 6 47</td>
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</table>

\[ \chi^2 = 109.34^{***} \]

<table>
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<tbody>
<tr>
<td>3 9 147 156</td>
<td>3 14 134 148</td>
</tr>
<tr>
<td>41 154 195</td>
<td>55 140 195</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 106.56^{***} \]

**Note.** Subjects having missing data were omitted from these analyses, hence \( n = 195 \).

***p < .0001.***
VITA AUCTORIS

Mark R. Potashner was born October 13th, 1960 in Montreal, Quebec to Bert and Shirley Potashner. He graduated from West Hill High School in Montreal in 1977, and from A.Y. Jackson Secondary School in Toronto in 1978. In September, 1978 he enrolled at the University of Toronto. Mark graduated with the Bachelor of Science degree in May, 1982. In September, 1982 he enrolled in the Master's programme in Clinical Psychology at the University of Windsor. In recognition of high scholastic achievement, Mark was awarded the University of Windsor Postgraduate Scholarship in 1983.

Mark R. Potashner is married to the former Arlene F. Sherman.