

A Developmental Perspective of Gambling Behavior in Children and Adolescents

Jeffrey L. Derevensky, Rina Gupta,
and Giuseppe Della Cioppa

Although it has been determined that gambling is a popular activity amongst the young, there seems to be a lack of studies examining developmental differences in children's gambling behavior. This study examines developmental differences in children's blackjack gambling behavior. One hundred and four students (51 males; 53 females) from grades 4, 6, and 8 completed a questionnaire examining their gambling behavior in general and individually played a computerized blackjack game with the following data being recorded: percentage of accuracy, amounts of money bet, gross winnings, percentage of wins, number of hands played, and end balance. Findings revealed few developmental differences in prevalence and frequency of gambling behavior and performance on a blackjack task. Males were found to wager greater amounts of money and have larger gross winnings than females on the blackjack task. Furthermore, males were more likely to view gambling as involving both large amounts of skill and luck, thus suggesting an illusion of control for gambling activities. The results are discussed from a cognitive developmental perspective.

McGill University

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Address correspondence to any of the authors at Department of Educational & Counseling Psychology, McGill University, 3700 McTavish Street, Montreal, Quebec, H3A 1Y2 Canada.

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Although gambling has been primarily thought of as an adult behavior, research has suggested that it remains a popular activity amongst both children and adolescents (Arcuri, Lester, & Smith, 1985; Ladouceur & Dubé, 1994; Ladouceur, Dubé, & Bujold, 1994; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Rosenstein & Reutter, 1980). Given that there frequently are few observable signs of gambling dependence among children, and the paucity of empirical research in the area, such problems in children and adolescents have gone relatively undetected compared to other forms of addiction (e.g., substance abuse) (Arcuri et al., 1985; Lesieur & Klein, 1987). Retrospective studies indicate that adult problem gamblers report the onset of their pathological behaviors to have begun quite early, often beginning between 10–19 years of age (Custer, 1982; Dell, Ruzicka, & Palisi, 1981; Livingston, 1974). Studies reveal that 20–25% of the children of adult gamblers engage in similar behavior themselves and/or show multiple addictions (Kusyszyn, 1972; Lesieur & Klein, 1987; Lorenz & Shuttlesworth, 1983). These findings suggest both a comorbidity between gambling and other forms of addiction as well as a strong social learning component involved in the acquisition of such behaviors.

To date, relatively few studies have empirically examined the gambling behaviors amongst elementary school children. Kass (1964) examined risk-taking behavior with a gambling-type scenario in children age 6, 8, and 10 years of age and failed to find any developmental differences while Slovic (1966) reported that boys at ages 11 and 14–16 took more risks than did girls, but the girls aged 6–8 took slightly more risks than boys. No differences were found in children aged 12 and 13. A replication of these findings was unsuccessful (Kopfstein, 1973). A survey conducted in Atlantic City (Arcuri et al., 1985) revealed that 64% of adolescents gambled in casinos, with 9% gambling weekly, despite the legal gambling age being 21. Lesieur and Klein (1987) examining the prevalence of pathological gambling at New Jersey high school students found that of 892 students, 32% were gambling at least once a week, with card playing and casino gambling being the two most popular types of gambling, followed by sporting events and lotteries. Using the diagnostic criteria of the American Psychiatric Association (1980) for pathological gambling, they established that 5.7% of students showed evident signs of pathological gambling. Their findings revealed that most gamblers were males with low grades, with one or both parents having a gambling problem, and gambling occurring whenever opportunities presented themselves.

A study examining gambling trends in Francophone Canadian adolescents from nine high schools in the Quebec City region (Ladouceur & Mireault, 1988) revealed that the three most popular forms of gambling were the lottery, sports betting, and card games. Twenty four percent of adolescents were found to purchase lottery tickets weekly, 45% partici-

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pated in sports related gambling, and 5.6% admitted to being unable to stop gambling despite their desire to do so. Finally, a small number of students, 1.7% classified themselves as being pathological gamblers with most of them reporting to be addicted to card playing. Additionally, 90% of these adolescents indicated that their parents knew they gambled and that only 6% were opposed to such activities. In a more recent prevalence study, Ladouceur and Dubé (1994), using 1,320 children from grades 4, 5, and 6, reported that 86% of children gambled in some form while 40% reported gambling a minimum of once a week. Lotteries were found to be the most popular form of gambling, followed by bingo, card playing, sports betting, wagering on specific events, video poker and slot machines, and other games of skill. The percent of children reporting gambling progressively increased, 81% at grade 4, 84% at grade 5, and 92% at grade 6.

Problematic gambling amongst youths is not restricted to North America. Concern over the use of slot machines by teenagers in the U.K. has increased since the introduction of fruit machines. In one study of 50 adolescent slot-machine users, 23% of the 39 male participants were classified as pathological gamblers as measured by the DSM III (APA, 1987) diagnostic criteria (Griffiths, 1990). A larger study done in the U.K. with 1,332 teens aged from 12 to 15 revealed 40% played slot-machines in arcades at least once a week, and 16% played 4 times a week or more (Huxley & Carrol, 1992). Fisher (1992) reported similar results with 54% of adolescents classified as social gamblers and 5% exhibiting pathological gambling in the U.K.

Teenage gamblers present a distinct problem in today's society. Results of several prevalence studies generally suggest that 5-6% of adolescents are compulsive gamblers (Fisher, 1992; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987), while 24-40% engage in some gambling behavior weekly (Huxley & Carrol, 1992; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987). Alarming, the percentage of youthful gambling appears to be on the increase (Jacobs, 1989). Problematic gambling often results in increased delinquency and crime, the disruption of relationships, and negatively affects school performance or work activities. Ten percent of high school students admitted to having performed illegal activities to support their gambling behavior. The most frequent illegal means used to gain money for gambling are selling drugs, working for a bookmaker, selling sports cards, and shoplifting (Ladouceur & Mireault, 1988; Lesieur & Klein, 1987).

Despite some conflicting findings, there appears to be an overall consensus that gambling is more popular amongst males than females (Fisher, 1993; Ide-Smith & Lea, 1988; Ladouceur et al., 1994; Rosenstein & Reuter, 1980), with pathological gambling being at least twice as common among males (Lesieur & Klein, 1987; Volberg & Steadman, 1988; 1989a). Gambling amongst males appears to be encouraged by parents, since

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more males than females are reported to gamble with them (Ladouceur et al., 1994). Other studies have shown no gender differences in adolescents' slot-machine playing, although males are reported to play at a higher frequency than females (Huxley & Carrol, 1992).

Gender differences among primary school children with respect to frequency of reported gambling are not as apparent as during adolescence. In Ladouceur and Dubé's (1994) study, the frequency of gambling activities related to bingo, card games, specific events, and skill testing games were similar for both males and females. Those gambling events in which boys engaged more often were lotteries, sports betting, and video game wagering.

As children mature their cognitive ability, in general, tends to become more sophisticated and differentiated. Given Piaget's (1950; 1953) description of children's mathematical deductive reasoning strategies, one would assume that young children's limited cognitive understanding may predispose them to a greater number of errors as well as the belief that games of chance may in fact be skill driven and subsequently controllable to some degree. However, as children develop cognitively, they become more aware that games of chance involve less skill and more luck. Nonetheless, the inclusion of intermittent reinforcement schedules found in specific gambling activities and the level of excitement generated in playing may lead them to ignore their own cognitive understanding of the laws of probability. As a result, for both young children and adolescents, there may remain an illusion of skill associated with many games of chance. Still further, the ability to hold in one's mind simultaneously all potential outcomes, an understanding concerning the decisions to bet, engage in some other gambling behavior (e.g., hit or stand in blackjack, card exchanging in poker), and an understanding of the probabilities for each possible outcome measure certainly require individuals to be at Piaget's level of formal operational thought (Stein, 1989). This relatively sophisticated level of cognitive thinking strategy is generally acquired between the ages of 11 to 15. Thus, one would expect significant changes in performance during the latter elementary school years.

Although it has been determined that gambling is a popular activity amongst the young, there seems to be a lack of studies examining developmental differences in children and adolescent gambling behavior. While many studies examine gambling behavior during adolescence few studies have researched this issue during childhood. Still further, most research involving gambling behavior in children and adolescents have generally been limited to survey, self-report, and prevalence studies. This research examines developmental differences in children's gambling behavior. More specifically, it incorporates self-report data while focusing upon developmental differences on blackjack playing behavior.

METHOD

Subjects

One hundred and four children (51 males; 53 females) from grades 4 (N = 37), 6 (N = 33), and 8 (N = 34), ranging in age from 9 to 14, participated in the study. The children were selected from middle class, public, English elementary and secondary schools in Montreal.

These children and adolescents were part of a larger research project and were initially classified on the basis of frequency and duration of video-game playing behavior. The results with respect to the relationship between video game playing and gambling behavior are reported elsewhere (Gupta, Derevensky & Della Cioppa, 1994).

Measures

A 14 item questionnaire was completed by all individuals pertaining to their gambling activities. Items pertaining to past gambling behavior and perceptions toward gambling were analyzed.

A computerized blackjack game measuring risk-taking behavior on a gambling task was included. Blackjack was selected due to the relatively simplistic nature of the rules of the game, it incorporates both elements of randomness and skill, and is familiar to many children. A color Lap Top IBM compatible computer was used in order to render the task 'life-like' and stimulating. The MS DOS computer software, *BlackJack! Version 2.20D*. (Granger, 1991) graphically stimulates a casino blackjack game. It was deemed appropriate for young children due to its graphic accuracy as well as adding the cards for each hand, thereby avoiding potential faulty arithmetic errors. It provides specific statistics for each player, including gross winnings and wagers, number of hands played, percentage of winnings, percentage of accuracy, and final balance.

Procedure

A research assistant administered the gambling questionnaire in the children's classrooms, explained that all information obtained was confidential, and was present to assist individuals requiring assistance. The children required between 10 to 20 minutes to complete this task depending upon their age.

During the blackjack task the children did not play with actual money (due to ethical constraints), but were provided with a bankroll of \$100 and given the incentive of winning movie gift certificates, proportionate to their winnings. More specifically, for every 5 dollars that they won above

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the initial \$100 at the conclusion of the game, they were given a ticket to be entered in a draw for \$20 worth of movie certificates. Therefore, the greater the number of tickets a child won and entered into the draw, the greater the chance of winning the movie certificates. Each child played the game for a 10 minute period, or until their bankroll was depleted. No children were omitted on the basis of not being familiar with the required task. Children were provided with the following standardized instructions while being shown on the computer screen certain aspects of the game:

You will be playing a game called blackjack against the computer. The whole idea is to have your cards add up to 21 or as close to 21 as possible without going over. The one who's total is closest to 21 without going over wins the hand. Don't worry about being able to add up your cards because the computer does that for you. The dealer will first allow you to decide whether or not you want another card, and only after you have decided to stop will he play his hand. If you want another card, you press the green button (hit) and if you want to stop (stand), you press the red button. You should know that it is considered a risk to ask for another card if your cards add up to 17 or more, and that it is also considered a risk to stand if your cards add up to 16 or less. But really, it is up to you to decide what to do. You can change your bet on every hand. The minimum you can bet on each hand is \$5 and the maximum amount you can bet is whatever you have remaining in your account. Don't forget that your goal is to end up with an amount greater than the initial \$100 dollars we lent you in order to get as many tickets as possible for the draw. (The research assistant then demonstrated several hands to show how to operate the computer, and the child was then permitted to practice 5 trials to ensure they understood the task). Good luck and have fun. You have 10 minutes to play, or until you have run out of money.

RESULTS

The data were taken from both the questionnaire and performance on the blackjack task. Measures obtained from the questionnaire include: past gambling behavior, frequency of gambling behavior, amount of perceived skill and luck involved in gambling, perceptions of their gambling skill, their desired level of proficiency, the largest amount of money bet at any one time, whether gambling makes them feel important, fear of being caught while gambling, and whether children perceive their gambling behavior as excessive. Measures from the blackjack task include gross wagers (total amount of money wagered throughout the game), gross winnings

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(cumulative amount of money won), end balance, percentage of accuracy, and percentage of wins (gross winnings/gross wagers).

Prevalence of Gambling

Of the total sample, 70% (N = 73) of children and adolescents reported having gambled, and of those 53% (N = 39) engaged in this behavior once a week or more. No statistically significant development differences were found, with 57% of grade 4 children (N = 21), 85% of grade 6 children (N = 23), and 68% of grade 8 adolescents (N = 23) reporting having gambled at one point. The percentages of those who engage in gambling activities a minimum of once a week are 48% for both 4th (N = 18) and 8th (N = 16) graders, and 61% for grade 6 students (N = 21). Sixty percent of all females (N = 32) reported having gambled versus 78% of males (N = 51). Forty-seven percent of those females (N = 15) and 58% of males (N = 30) do so on a weekly basis.

Cognitive Perceptions

Children's cognitive perceptions of the nature of gambling were appraised by asking them to indicate whether gambling involves either a lot, a little, or no skill. The same question was asked with respect to the role that luck plays in gambling. Because of the children's age no differentiation was made between the concept of luck and chance. The results indicate, in general, that gambling was perceived as involving both a substantial amount of skill and luck. Fifty-six percent of children indicated that a lot of skill is necessary to gamble, and similarly 70% indicated that a lot of luck is involved. Thirty-one percent view gambling as necessitating a little skill, and 23% perceive it as involving a little luck. Finally, 13% stated that no skill is involved and 7% do not think that gambling involves any luck. The findings are consistent across grades such that the majority of students perceive gambling activities to involve both a lot of skill and luck. In grades 4, 6, and 8, a greater percentage of males consistently perceive successful gambling to incorporate a lot of skill and luck, whereas females are equally divided among the "a little" and "a lot" categories for both skill and luck.

Perceived and Desired Ability

Individuals were asked to indicate on a 10 point Likert scale, 0 being not good at all and 9 being excellent, how good they perceive themselves to be at gambling. In general, they rated themselves as being slightly above average" (M = 5.35). No developmental differences were noted for per-

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ceived ability, with means being 5.81 (grade 4), 4.93 (grade 6), and 5.30 (grade 8). Across grades, males consistently rated themselves as being slightly above average, while females showed a decreasing trend, with grade 4 children rating themselves as being slightly above average, and grade 6 and 8 females rating their gambling abilities as slightly below average. Overall, males perceived themselves as having greater gambling ability than females ($t = 2.12, p < .04$).

To assess their desired gambling ability, the students indicated, on a similar Likert scale (0 to 9), their desired level of gambling. Surprisingly, the total score ($M = 7.47$) revealed that in general, they desire to be above average, but not excellent or superior at gambling. With respect to developmental differences, grade 4 students indicated a higher optimal ability level ($M = 8.14$) than either grade 6 ($M = 6.93$) or 8 ($M = 7.35$) students, although not meeting statistical significance. It might be that older children are more realistic. Across grades, males consistently indicated higher desired abilities than females, although this finding was not statistically significant.

Relevant Gambling Information

The largest amount of money (mean amount) ever wagered at one time was \$9.80 for the entire sample. An increasing developmental trend was noted, with grade 4's having bet \$8.20, grade 6's having bet \$8.10, and grade 8's having bet \$13.00. Males showed a similar increasing trend, with mean amounts being \$9.00, \$10.50, and \$14.50 in grades 4, 6, and 8 respectively. Females were consistent across grades, showing no increases in their betting behavior with age. Not unexpectedly, males reported betting significantly larger amounts of money ($M = \$11.33$) than females ($M = \5.53) ($t = 3.13, df = 69, p < .003$).

Overall, 17% of those who gamble report that gambling makes them feel more important. However, this finding tends to decrease with age such that 24% of grade 4's, 19% of grade 6's, and 9% of grade 8's reported this perception. In grade 4, males were more likely to indicate this effect whereas an equal amount of males and females did so for both grades 6 and 8.

Twenty-eight percent of those who gamble indicated a fear of being caught when doing so. A decreasing trend was noted with age such that as children get older their fear of being caught participating in some gambling activity decreases. At the grade 4 level, males appear to be more fearful, but at grades 6 and 8, reports for both males and females are similar.

Of those who gamble, 27% indicated that they engaged in gambling activities more than they desire, and 13% feel they gamble too much. Sur-

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prisingly, children in grade 4 have the greatest proportion of students who fall into those two categories, with 43% stating that they gamble more than they want, and 29% reporting that they gamble in excess. Looking across grades, 84% of individuals reporting gambling more than they want were males, and 100% of those who revealed that they gamble too much were males as well.

On the blackjack task, significant developmental differences were found with respect to the total number of hands played, with children playing a mean of 35.60 hands in grade 4, 38.64 in grade 6, and 54.32 in grade 8 ($F = 10.75$, $df = 2$, $p < .001$). This increasing trend was accounted for by the fact that children were able to process information more quickly as they mature, and thus played at a faster rate. Furthermore, the older children were more likely to play the entire 10 minutes since fewer of them depleted their bankrolls before the time limit was reached. There were no statistical differences for gender found for the number of hands played.

No significant developmental differences were noted for the following variables: gross wagers, gross winnings, final balance, percentage of accuracy, and percentage of winnings (see Table 1), suggesting that children's playing behaviors are developed and maintained from a relatively young age. However, although not significant, grade 4 students finished with lower end balances in their bankroll than did grades 6 and 8 children, indicating a somewhat overall poorer performance on the task. The percent of accuracy score obtained did not reflect their actual playing ability due to the fact that the program software factors in "double-downs" when calculating the accuracy, a notion judged as being too complex for the young subjects to grasp. It is thus possible that no developmental differences in percentages of accuracy were found for this reason.

In addition, no significant findings were found when looking at gender differences within grades, although some trends are worth noting with respect to female players. Females show an increasing trend with age in

TABLE 1
Means and Standard Deviations for Gambling Behaviors by Grade

	Grade 4 (N = 37)		Grade 6 (N = 33)		Grade 8 (N = 34)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
No. of hands	35.60	15.63	38.64	19.07	54.32	19.45
Gross wagers	433.16	290.80	395.64	238.81	474.38	251.35
Gross winning	200.80	160.08	186.23	149.84	226.19	144.50
End balance	-60.53	48.82	-38.79	85.82	-39.84	50.25
% accuracy	75.73	8.10	78.12	6.41	77.82	4.45
% of wins	40.24	11.41	44.10	13.04	44.42	12.08

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the amount of total wagers they made, gross winnings they yield, and total percentage of money won (Table 2).

With respect to gender differences across grades, males in general were found to make higher gross wagers ($t = 2.72$, $df = 102$, $p < .008$) and have greater gross winnings than females ($t = 2.77$, $df = 102$, $p < .007$), suggesting that they are exhibiting greater risk-taking behaviors (Table 3).

DISCUSSION

The present findings pertaining to gambling prevalence rates of children and adolescents are similar to those found in other studies (Ladouceur & Dubé, 1994; Ladouceur et al., 1994; Ladouceur & Mireault, 1988) with 70% of these youths having engaged in some type of gambling activity, and of those, 53% gamble a minimum of once per week. The fact that prevalence rates do not differ significantly with respect to age suggests that these behavior patterns may be established fairly early on in life.

Within the present study, males and females did not differ with respect to prevalence rates and frequency of engaging in gambling activities. This finding is consistent with results from Ladouceur and Dubé's (1994) study which reported that children at the elementary level revealed no gender differences for gambling activities related to bingo, card games, specific events, and games of skill. These findings are nonetheless contrary to most of the literature which portrays males to be greater gamblers than females (Fisher, 1993; Ide-Smith & Lea, 1988; Ladouceur & Dubé, 1994; Rosenstein & Reutter, 1980). Since most of these other studies surveyed adolescents older than the present sample, it is plausible that these gender differences become more apparent during later adolescence. No analyses in the present research were conducted with respect to types of gambling activities in which the children engaged, therefore not permitting direct comparisons. In another study by Gupta et al. (1994), the findings indicated that high frequency male video game players engaged in gambling activities more than females, but that high frequency video game playing females gambled more than low frequency video game playing males. No appreciable developmental differences for high and low frequency video game players were noted. Nevertheless, these findings highlight the possibility that there are hidden factors influencing the reported prevalence rates of male and female gambling behavior, and that predisposing factors exist which are important determinants of their behavior. Other such factors may include physiological levels of arousal, social influences, personality traits, and emotional states.

According to Piaget's (1950) theory of cognitive development, children from ages 7 to 11 are in the concrete operational stage and are limited to concrete problem solving abilities. At approximately 11 years of age, the

TABLE 2
Means and Standard Deviations for Females by Grade

	Grade 4 (N = 18)		Grade 6 (N = 19)		Grade 8 (N = 16)		Total (N = 53)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	No. of hands	33.94	16.72	37.00	15.41	58.00	18.40	42.30
Gross wagers	320.67	147.41	340.58	144.85	454.81	248.79	368.30	188.66
Gross winning	133.08	90.4	155.63	106.48	213.37	132.02	165.41	112.82
End balance	-60.53	48.82	-38.79	85.82	-39.84	50.25	-46.49	64.50
% of accuracy	76.50	7.75	79.05	5.11	77.87	5.49	77.83	6.21
% of wins	36.99	13.70	42.21	13.43	45.15	8.86	41.32	12.56

TABLE 3
Means and Standard Deviations for Males by Grade

	Grade 4 (N = 19)		Grade 6 (N = 14)		Grade 8 (N = 18)		Total (N = 51)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	No. of hands	37.16	14.79	40.86	23.59	51.06	20.30	43.08
Gross wagers	539.74	352.08	470.36	317.63	491.78	259.51	503.76	307.59
Gross winning	264.95	186.02	227.75	190.64	237.58	157.68	254.08	174.96
End balance	-56.95	63.91	-11.46	96.45	-27.92	75.82	-34.22	78.73
% of accuracy	75.00	8.57	76.86	7.86	77.78	3.44	76.49	6.93
% of wins	43.32	7.91	46.66	12.53	43.77	14.60	44.39	11.74

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enter the formal operational period and possess the ability to think abstractly, formulate hypotheses, and use deductive reasoning. Changes with age result in new, more sophisticated levels of organization which differ in their degree of complexity of the rules of transformation (Elkind, 1981). Children from grades 6 and 8 reflect this higher level of cognitive ability in their playing behaviors, such that performance for children at these two grade levels resembled each other, with the greatest differences found between grades 4 and 6, the age span in which the shift from concrete to formal operations takes place.

When taking into account the ratio of gross wagers over the total number of hands played, older children appear to be betting more conservatively on the blackjack task. Furthermore, even though the grade 8 individuals were found to be betting less per hand, and have the same amount of gross winnings as grades 4 and 6, they have the highest end balances, revealing that they are "playing smarter" and exerting greater judgment, and are likely using more sophisticated cognitive strategies and an understanding of the laws of probability.

Developmentally, the general cognitive understanding of the nature of gambling increases with age. As children's cognitive abilities increase, they reflect a decrease in their desired level of gambling ability, likely due to the fact that they realize gambling is primarily a game of chance without much room for "ability" to play a role. Nonetheless, the majority of grade 8 adolescents still perceive skill to be a major determinant leading to their success in gambling activities, thus endorsing an illusion of control even at the level of formal operations. It is interesting to note that these children's responses reflect an "illusion of control" on the questionnaire, whereas adults do not endorse the controllability of outcomes of independent events in interviews or surveys, but claim to be able to predict outcomes when engaged during a gambling task (Dickerson, 1993). Children, adolescents, and adults appear to get so caught up in the excitement, enjoyment and risks involved in the gambling activity that all the realistic cognitions they normally possess are abandoned, being subsequently replaced with false beliefs governed by the intermittent schedules of reinforcement. This was particularly true for regular gamblers of fruit machines who produced a greater total number of irrational verbalizations than non-regular gamblers (Griffiths, 1994). Griffiths has hypothesized that it is likely that regular gamblers, on fruit machines, believe their activity to be far more skillful than it actually is in reality. Yet it is important to note that this behavior may be specific to fruit machine playing behavior. It appears that children's cognitions are driven by their actual gambling experience. The players are expecting reinforcement of wins to occur at any time, and when the win finally takes place, they believe it has something to do with their ability to control events (or predict outcomes), despite the number of times

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reinforcement failed to occur. Wagenaar (1988) has further suggested that it may not be the individuals behavioral repertoire of available heuristics but rather that they may select inappropriate heuristics during their gambling episodes.

This research is a preliminary empirical examination of children's gambling behaviors using an actual gambling task. It has been suggested that laboratory confined studies of gambling have several limitations, mainly that bringing real life situations into a controlled, unrealistic setting changes the nature of the task. Furthermore, it has been stipulated that "hidden interactions" between the gambling activity and an individual's motivations which occur in real life experiences are excluded in the laboratory (Anderson & Brown, 1984). However, considering that no attempt was made to construct an unrealistic "social scenario," or to measure levels of arousal, the nature of the task was not compromised. Furthermore, information obtained from our survey lends support to our findings. The fact that the children in this study did not use their personal money for gambling purposes represents a limitation, although the incentives provided appear to have been sufficiently motivating. Ethically, it remains difficult to have children engage in gambling activities using their own money.

Although not very high, a proportion of children and adolescents reported that gambling activities make them feel important. It has been suggested that children who engage in risk-taking behaviors are positively regarded by their peers, since such activities are viewed as acts of bravery (Opie & Opie, 1969). This, coupled with the excitement of playing and false sense of control, may account for why these feelings of importance are generated. Grade 4 children appear to be most influenced by these feelings, followed by grade 6 and 8 students. It is plausible that as children mature, other more meaningful factors (e.g. relationships, appearance, accomplishments) influence their self-reflections and self-concept, thus leaving them less impressionable to the effects of gambling.

Younger children appear to be more fearful of getting caught in the act of gambling than older individuals such that there is a decreasing trend in the percentages of children reporting this fear with age. This may reflect a societal view that as children get older, their gambling becomes more and more acceptable as a legitimate pastime. By the time they reach adolescence, very few individuals may feel they are doing something wrong. Society has taken it upon itself to educate children and adolescents about the negative consequences of smoking, drug, and alcohol addictions. It is time that gambling be addressed as well. Furthermore, the facts that gambling is glamorized and highly publicized in today's society, and that sports lottery tickets appear to be targeted toward our youth, must be acknowledged as contributing to the acceptability of juvenile gambling.

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It is interesting to note that a number of children, especially at the grade 4 level, indicated that they gamble excessively, suggesting that they are unsuccessful at regulating their own gambling behavior. Furthermore, 29% of grade 4 children who gamble, 4% of grade 6 children, and 9% of adolescents at the grade 8 level indicated that they gamble in excess. While the sample size was limited, and caution in interpretation is warranted, all of the individuals who revealed that their habits were overly excessive were males. Children and adolescents are aware, at some level, that gambling is not a very healthy pastime since they realize that some limits need to be placed upon their participation in this activity. The fact that the children themselves are aware that gambling can be problematic highlights its potential severity.

The present research is consistent with recent findings which show a high prevalence rate for gambling amongst our youth. While we are not suggesting that these reports of early gambling behavior will directly lead to an increase in compulsive or pathological gambling disorders, it nevertheless remains a concern. There are clear indications that there exists a comorbidity with other psychiatric disorders (see review by Lesieur & Rosenthal, 1991). The fact that parents perceive gambling behavior in their children to be socially acceptable and that such gambling behavior may be linked to juvenile delinquency and poor academic performance are alarming. The intermittent reinforcement schedules associated with the game of blackjack, coupled with the excitement, enthusiasm, arousal, and possibility of winning money or prizes, significantly increases the likelihood that some individuals will continue to engage in such behaviors.

There remains a general lack of acceptance that children's gambling behaviors remain a significant problem. Our research indicates that the amount of money wagered and risk-taking strategies, especially for males, increases with age. The data also show that children as young as 9 years of age, in grade 4, are actively involved in some form of gambling activity and are very familiar with the game of blackjack. Little attention is being paid to therapeutic and intervention programs aimed at decreasing gambling behavior, or at the very least discussing the implications and consequences of this behavior. A greater understanding of the underlying processes and etiologies associated with excessive gambling behavior needs to be examined.

Society remains faced with a multitude of childhood problems. Children's gambling rates appear to be on the rise (Jacobs, 1989; Volberg & Steadman, 1989b) and have been associated with poor academic achievement, social problems, and criminal activities (Ladouceur & Mireault, 1988; Lesieur & Klein, 1987). Of particular concern is the proliferation of legalized gambling opportunities and the fact that pathological gamblers

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report the onset of their problem to have occurred at a very young age (Custer, 1982; Livingston, 1974). More attention needs to be paid to the potential ill effects of gambling behavior in our children.

The potential negative consequences remain obvious. Occasional gambling amongst today's youth should not necessarily be considered a problem, however, the probability of these children developing a gambling addiction is worrisome. This research is an initial attempt at aiding our understanding of cognitive developmental issues related to juvenile gambling behavior. Many important questions remain to be addressed.

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