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Parental Gambling as a Moderator of the Child Delinquency–Gambling Relationship: Does Having a Role Model in the Home Make a Difference?

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Abstract

The relationship between delinquency and gambling has drawn significant attention from researchers in the behavioral and social sciences, yet there are aspects of this relationship that remain largely unexplored. The role of "third variables" in moderating the connection between child delinquency and gambling involvement is one such aspect. Accordingly, the current study set out to examine the impact of parent gambling involvement on the child delinquency–gambling relationship in a sample of 3089 adolescents (1576 males, 1513 females) from Cohort K of the Longitudinal Study of Australian Children (LSAC-K). Using cross-sectional data from Wave 7 of the LSAC, the current study tested the possibility that gambling involvement in parents may moderate the relationship between delinquency and gambling in their offspring. Results obtained from a regression analysis revealed that the link between delinquency, conceptualized as an early marker of general deviance, and gambling variety, as measured across ten different forms of wagering (e.g., Casino gambling, sports betting, horse and dog racing, scratch tickets), changed as a function of parental involvement in these same ten behaviors. In seeking clarity on this relationship, it was noted that the association between child delinquency and gambling involvement grew in proportion to the strength of parental involvement in gaming activities. Hence, having a gambling role model in the home may increase opportunities and incentive for gambling in children predisposed to antisocial behavior or general deviance.

Keywords Delinquency · Parent gambling involvement · Moderation

Introduction

The proposed relationship between gambling and delinquency and its implications for society have been long recognized, widely investigated, and well-documented (Temcheff et al. 2011; Vitaro et al. 2001). What remains to be determined, however, is the reason or reasons for this relationship. It could be that delinquents are drawn to gambling because of

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its psychological benefits and promises of power, excitement, and immediate gratification. Another possibility is that gamblers turn to delinquency and crime as a means of financing their growing gambling habit and as a way of covering their mounting financial loses. A third possibility is that gambling and crime are overlapping lifestyles and that involvement in one invariably leads to involvement in the other. Yet a fourth possibility and the one explored in the current investigation is that delinquency and gambling share certain features in common, either of an antisocial or low impulse control nature, and that elements of the environment help shape a general predisposition to antisocial or impulsive behavior to the point where gambling becomes an expression of this predisposition. In the current study, parental gambling involvement was evaluated as a possible environmental risk factor capable of converting or sculpting a tendency toward general deviance, as measured by current delinquent involvement, in their offspring into an interest in gambling.

Literature reviews by Magoon et al. (2005), Johansson et al. (2009), and Kryszajtys et al. (2018) posit a clear, consistent, and robust relationship between gambling and delinquency. In their review of the literature on gambling and delinquency up through the early 2000s, Magoon et al. (2005) speculated that gambling and delinquency may be part of a larger general deviance syndrome as proposed by Jessor and colleagues (Jessor and Jessor 1977; Jessor et al. 1991). Several years later in a review of the literature on risk factors for problem gambling, Johansson et al. (2009) determined that along with demographic variables (age, gender), cognitive distortions, schedules of reinforcement, and comorbid disorders (OCD, drug abuse), delinquency was a reliable risk factor for pathological gambling. Most recently, Kryszajtys et al. (2018) reported that gambling correlated with both violent and non-violent delinquency and like Magoon et al. (2005) before them, speculated on whether these behaviors were part of a larger general deviance syndrome. In one of the few longitudinal studies conducted on adolescent gamblers, Winters et al. (2002) identified commonalities in some of the developmental features of gambling, delinquency, and drug use consistent with the notion that problem gambling is part of a wider general deviance or low impulse control syndrome. In a second longitudinal study, Wanner et al. (2009) determined that peer delinquency moderated the gambling–delinquency relationship, such that gambling only predicted theft when peer delinquency was high.

Analyzing data from the National Longitudinal Study of Adolescent to Adult Health, Dennison et al. (2020) discovered that a relationship that had previously surfaced between crime and problem gambling disappeared once low self-control and prior substance abuse were controlled. This finding can be interpreted as further evidence of a general deviance syndrome in which gambling and delinquency, rather than being causally connected, are linked by their common association with elements of a general syndrome. Other studies have also uncovered support for the view that gambling and delinquency are part of a general deviance or low impulse control syndrome. In a sample of 101,167 14- to 16-year old Finnish boys and girls, Räsänen et al. (2015) observed that gambling frequency correlated meaningfully with truancy, bullying, substance abuse, and delinquency. Another study, this one conducted on a sample of 4734 high school students from Hong Kong, showed that gambling pathology correlated significantly with alcohol use, tobacco use, delinquency, and a self-report measure of low self-control. A series of earlier studies on North American samples also produced results consistent with the view that gambling functions as part of a larger general deviance syndrome (Barnes et al. 2005; Brunelle et al. 2012; Welte et al. 2004; Willoughby et al. 2004).

General deviance theory adopts a person × situation interactive framework to explain the genesis of deviant behavior. As originally outlined by Jessor et al. (1991), the person interacts with features of the physical and perceived environment to create conditions conducive to general deviance in the form of delinquency, drug use, sexual promiscuity, school failure, gambling, and a host of other impulse control disorder behaviors. These behaviors, while all part of the syndrome, do not necessarily surface at the same time. The average age of gambling onset, for instance, postdates the average age of delinquency onset by several years: 15.6 years (Auger et al. 2010) versus 12.7 years (Farrington et al. 2003). This does not necessarily mean that delinquency caused the gambling because general deviance theory holds that each form of deviance derives from a more general predilection for deviance, with some forms surfacing earlier than other forms (Jessor and Jessor 1977). As the general deviance syndrome evolves, it gains strength and substance from the person's interactions with the environment. Social learning processes, such as modeling, may play a particularly important role in this process (Donovan and Molina 2014). The current study tested the assumption that having the opportunity to observe a role model who gambles will increase the likelihood of gambling in someone with the incentive or predisposition to engage in deviant behavior, as measured by the presence of a behavior like delinquency that normally predates gambling.

General deviance is not the only non-causal explanation for the well-documented relationship between delinquency and gambling. A second possibility is that a common set of experiences rather than a general deviance syndrome explains delinquency–gambling concordance. Adverse childhood experiences (ACEs), in the form of physical and sexual abuse, child neglect, parental divorce or incarceration, and domestic violence, serve as examples of common experiences that may link delinquency to gambling. There is evidence, for instance, that ACEs are commonly found in the backgrounds of individuals who later develop problems with gambling (Loo et al. 2019) and delinquency (Connolly 2020). Although ACEs were not specifically assessed in the study supplying data for the current investigation, certain correlates and consequences of ACEs were, and these need to be included in the analysis. Emotion dysregulation, for instance, have been found to link ACEs to problem gambling (Poole et al. 2017) and so concomitants of emotional dysregulation like negative affect (depression) and impulsivity should be controlled. Drug use is also likely to connect ACE to problem gambling (Sharma and Sacco 2015). ACEs likewise may be linked to delinquency via impulsivity and deviant peer associations (Perez et al. 2018). Parental control and support, on the other hand, have been found to correlate negatively with gambling and delinquency in children who have been exposed to ACE (Brown and Shillington 2017).

The purpose of the current investigation was to evaluate the possibility that a significant person × situation interaction exists between child delinquency and parent gambling involvement in relationship to child gambling involvement. Phrased as a research question, the purpose of this study was to determine whether the child delinquency (person) × parent gambling involvement (situation) interaction would correlate positively with gambling involvement in the child. Given that an experimental design was not possible and longitudinal data were unavailable, it was deemed important to include relevant control variables of a general deviance, risk, and protective nature. Drug use and impulsivity, two core elements of the general deviance model capable of suppressing the delinquency–gambling relationship (Dennison et al. 2020), risk factors for delinquency (peer delinquency: Walters 2019) and gambling (depression: Rogier et al. 2019), and protective factors for both gambling and delinquency (parental knowledge and closeness: Canale et al. 2016; Staff et al. 2015) were accordingly controlled in this study. The hypothesis tested in the current investigation predicted that parent gambling involvement would moderate the relationship between child delinquency and the child's concurrent involvement in a range of gambling activities. In other words, the interaction between child delinquency and parent gambling should correlate positively with gambling involvement in the child.

Method

Participants

Participants for this study came from Cohort K of the Longitudinal Study of Australian Children (LSAC: Australian Institute of Family Studies 2018). All 3089 members of the LSAC-K cohort (1576 boys and 1513 girls) who participated in the Wave 7 interview in 2016 were included in the present study. The LSAC is composed of two large representative samples, cohorts B and K. The B (baby) cohort began assessing participants in infancy, with follow-up interviews conducted every 2 years, ending with the most recent follow-up at age 12–13. The K (kindergarten) cohort began assessing participants when they were in kindergarten and has evaluated them in two-year intervals up through age 16–17. Wave 7 of the K cohort was selected for the current study because it was the only wave in which detailed information on gambling was collected on both parents and children. Children in the current sample were 15–18 years of age ($M = 16.46$, $SD = 0.50$) and 97.7% were not indigenous to Australia (Aboriginal or Torres Strait Islander). Although no further information was provided on the non-indigenous portion of the sample, over 75% of Australians are White.

The sampling frame for the LSAC was constructed from the Australian Medicare enrollment database and participants were selected for the LSAC using a two-stage cluster probability sampling procedure. During the first stage of this procedure, postcodes were randomly selected and children within each selected postcode identified. During the second stage, children were randomly selected from each postcode to serve as participants in the LSAC. Sampling weights that adjusted for non-response and took into account the child's probability of being selected into the study were calculated. In the current study, the sampling weights were used to compute correlations and perform regression analyses, but they were not used to calculate means, standard deviations, or percentages. Face-to-face interviews and computer-assisted self-interviewing technology were utilized extensively in the LSAC, although telephone interviews were also employed with hard-to-reach participants. This secondary data analysis was approved by the Institutional Review Board at Kutztown University.

Measures

Delinquency

A 19-item delinquency scale served as the independent variable in this study. Each item ("got into a physical fight in public," "skipped school," "stole from a shop," "drew graffiti in public places," "carried a weapon like a knife or gun," "took a motor vehicle for a ride," "stole money or other things from another person," "ran away from home and stayed out overnight," "purposely damaged or destroyed other people's property," "damaged a parked car," "went around with a group of three or more kids damaging property," "suspended or expelled from school," "broke into a house/flat/vehicle," "stole something out of a parked car," "started a fire in a place where you should not burn anything," "used force or threat of force to get money or things from someone," "caught by police for something done wrong," "sold illegal drugs," and "attacked someone with the idea of harming them") was rated by the child on a six-point scale (0 = *not at all*, 1 = *once*, 2 = *twice*, 3 = *three times*, 4 = *four times*, 5 = *five or more times*). The time frame for these ratings was the past year. Scores were then averaged to produce a mean score per item. The internal consistency of this 19-item scale was good to excellent in the current sample of participants ($\alpha = .89$).

Parent Gambling Involvement

During Wave 7 of the LSAC-K, parents and primary caregivers were asked to indicate which of the following 10 gambling activities they had spent money on in the past year ("scratch tickets," "bingo," "lotto," "keno," "private betting," "poker," "Casino table games," "poker machines," "horse and dog racing," and "professional sports"). Spending money on an activity at least once in the past year earned the individual one point toward the total scale score on this measure (range = 0–10). This scale can be considered a measure of gambling variety or versatility. Research indicates that variety scores possess psychometric properties that make them superior to frequency and dichotomous measures (Sweeten 2012). The procedure for the LSAC called for two parental estimates. Parent 1 (93% of whom were the mother) completed the parent gambling involvement scale 96.6% of the time and Parent 2 (92% of whom were the father) completed the parent gambling involvement scale 57.4% of the time. When both Parent 1 and 2 provided ratings, the ratings were averaged. Additional analyses were performed on mothers ($n = 2878$) and fathers ($n = 1863$) separately. The internal consistency of the parent gambling involvement scale was adequate in the present sample of participants ($\alpha = .69$).

Child Gambling Involvement

The ten items from the parent gambling involvement scale (spent money on "scratch tickets," "bingo," "lotto," "keno," "private betting," "poker," "Casino table games," "poker machines," "horse and dog racing," or "professional sports" in the past year) were also administered to child participants. Just 15.8% of all adolescents in the LSAC indicated that they spent money on one or more of these activities in the past year. The child version of the gambling involvement scale nonetheless achieved good internal consistency ($\alpha = .86$). Items describing gambling-related problems (e.g., bet more money than could afford, chasing loses, felt like had a gambling problem) were also administered to participants during Wave 7 of the LSAC-K. Unfortunately, most participants were not asked this question and less than 2% of the sample ($n = 58$) acknowledged experiencing one or more gambling-related problems during the past year. Moreover, the gambling problem scores produced by these 58 individuals did not correlate significantly with scores on the child gambling involvement scale ($r = .18$, $p = .18$).

Control Variables

Nine control variables were included in the current investigation. Single-item control variables were available for age (in years), sex (1 = *male*, 2 = *female*), indigenous status (1 = *non-indigenous*, 2 = *indigenous*), and depression (child experiences ongoing depression as rated by one or both parents: *yes* = 1, *no* = 0). Multiple-item control measures designed to assess parental knowledge, parental closeness, impulsivity, drug use, and peer delinquency were also included in this study as control variables.

Perceived parental knowledge was assessed with four items ("parents know child's friends;" "parents know how child spends their money;" "parents know what child does in free time;" "parents know where child is most afternoons") rated by the child on a three-point scale (1 = *parents don't know*, 2 = *parents know a little*, 3 = *parents know a lot*). Item scores were then averaged to produce a mean score per item. This scale achieved adequate to good internal consistency in the current sample of participants (α = .78).

Children who participated in this study also indicated how close they felt to their parents on a four-point scale (1 = *not close at all*, 2 = *not very close*, 3 = *quite close*, 4 = *very close*). Scores were then averaged between the two parents. If only a single parent rated the child that score alone was used to assess the "closeness to parents" construct.

Impulsivity was another parent-rated control variable included in this study. Parents rated the child on two items, "stops to think before acting" and "has a good attention span," using a three-point rating scale (1 = *certainly true*, 2 = *somewhat true*, 3 = *not true*). Scores on the two items were first averaged between items (r = .48–.50) and then averaged between parents to create a final score that could range from 1 to 3.

Drug use was assessed with a variety score. Child participants were asked to indicate if they had ever used any of the following eight substances: alcohol (more than just a few sips), marijuana, cocaine, inhalants, ecstasy, hallucinogens, amphetamines, and crystal methamphetamine. Respondents received one point for each substance they reported using, which when summed, produced a total score that could range from 0 to 8. This measure displayed poor internal consistency in the current sample of participants (α = .38).

The final control variable used in this study was a measure of peer delinquency. Eight items ("Kids I know…" "get into trouble;" "get into trouble at school;" "cheat on tests;" "get into fights;" "smoke cigarettes;" "drink alcohol;" "have broken the law;" "try drugs"), each rated on a five-point scale (1 = *none of them*, 2 = *one or two of them*, 3 = *some of them*, 4 = *most of them*, 5 = *all of them*) were used to assess peer delinquency. A mean score was then calculated for a scale that achieved good internal consistency in the current sample of participants (α = .84).

Research Design and Statistical Analyses

A cross-sectional research design was employed in this study in which all relationships were between concurrently measured variables using data from Wave 7 of the LSAC-K. The independent and moderator variables for this study were child delinquency and parent gambling involvement, respectively. A simple moderation design was then tested to determine whether parent gambling involvement moderated the relationship between child delinquency and child gambling involvement. The interaction term for this model was constructed by multiplying centered scores from the delinquency and child gambling involvement measures. This model was then used to test whether child delinquency, parent gambling involvement, or their interaction correlated significantly with child gambling involvement, net the effect of 9 control variables (age, sex, indigenous status, depression, peer delinquency, parental knowledge, parental closeness, impulsivity, and drug use).

Data were analyzed with SPSS Version 26 (IBM 2019) and MPlus 8.3 (Muthén and Muthén 1998–2017). SPSS was used to calculate the descriptive statistics and inter-correlations, whereas MPlus was used to conduct the regression analyses. The main regression analysis was performed with a maximum likelihood (ML) estimator, although 95%

bias-corrected confidence intervals were also constructed in an effort to address non-normality in the dependent variable (child gambling involvement). A 95% confidence interval is considered significant if it does not include zero. Conditional effects were then evaluated at three levels of the moderator variable (i.e., parent gambling involvement): low (one standard deviation below the mean on the moderator), medium (the mean of the moderator), and high (one standard deviation above the mean on the moderator). One final analysis was performed using a maximum likelihood with robust parameters and standard errors (MLR) estimator, in which the standard errors are computed using the Huber-White sandwich estimator.

Missing Data

The vast majority of Cohort K participants had complete data on all 12 independent, dependent, moderator, and control variables employed in this study ($n = 2748$; 89.0%). Another 2.5% of participants were missing data on one variable, 1.7% were missing data on two variables, 5.5% were missing data on three to six variables, and 1.3% were missing data on seven to nine variables. Six out of the 12 variables had more than 5% missing data: parental knowledge (6.9%), parental closeness (6.4%), drug use (5.7%), peer delinquency (5.4%), child delinquency (5.3%), and child gambling involvement (5.2%). Missing data were handled with full information maximum likelihood (FIML), a procedure that uses all non-missing information to estimate standard errors and population parameters for the entire sample. Research indicates that FIML generates more accurate and less biased results than traditional missing value procedures like listwise deletion or simple imputation (Allison 2002).

Results

Descriptive statistics and intercorrelations for the 12 variables included in this study are listed in Table 1. Because the dependent variable, child gambling involvement, was both skewed (5.69) and leptokurtic (37.23), bias-corrected bootstrapped confidence intervals were calculated with the ML estimator and a robust estimation procedure (MLR) was employed in a secondary analysis of the data. There were no signs of multicollinearity between predictor variables in the results of a collinearity diagnostic analysis (tolerance = .660–.992; variance inflation factor = 1.008–1.515).

Constructing interaction terms from centered variables, the child gender × delinquency and child gender × parent gambling involvement interactions were included in a preliminary analysis to determine whether child gender moderated the relationships between delinquency and child gambling involvement or between parent gambling involvement and child gambling involvement. Neither interaction was significant and so analyses were conducted on male and female participants collectively rather than separately.

The results of a linear regression analysis using an ML estimator and 95% bias-corrected bootstrapped confidence intervals revealed that while the two main effects (i.e., delinquency and child gambling involvement) were nonsignificant, the interaction between the two variables was significant (see Table 2). Robustness testing using an MLR estimator also revealed the presence of a significant interactive effect ($Z = 2.55$, $p < .05$). The significant interaction achieved with the ML estimator is depicted in Fig. 1. The differences in slope between the two lines indicate that while delinquency

Table 1 Descriptive statistics and correlations for the 12 variables included in the present study

Variable	*n*	*M*	*SD*	Range	2	3	4	5	6	7	8	9	10	11	12
1. Age	3089	16.46	0.50	15–18	.00	.00	.02	.09*	−.07*	−.03	−.01	.08*	.02	−.01	.02
2. Sex	3089	1.49	–	1–2		.01	.06*	−.09*	.09*	−.07*	−.17*	−.02	−.13*	−.04	−.07*
3. Indigenous	3089	1.02	–	1–2			−.00	.05	−.05	.00	.06*	.04	.08*	.03	.05
4. Depression	3028	0.07	–	0–1				.06	−.08*	−.06	.14*	.06	.09*	.01	.01
5. Peer Delinquency	2933	1.65	0.61	1–5					−.30*	−.10*	.21*	.42*	.50*	.07*	.20*
6. Parental Knowledge	2892	2.69	0.40	1–3						.34*	−.20*	−.23*	−.30*	.02	−.12*
7. Parental Closeness	2909	3.37	0.66	1–4							−.12*	−.12*	−.09*	.08*	.01
8. Impulsivity	3011	1.70	0.50	1–3								.13*	.26*	.04	.05
9. Drug Use	2914	0.42	0.68	0–5									.29*	.04	.07*
10. Delinquency	2936	0.12	0.33	0–4.84										.02	.19*
11. Parent Gambling Involvement	3004	1.34	1.35	0–10											.05
12. Child Gambling Involvement	2936	0.35	1.20	0–10											

Variable = variable name, Age = chronological age in years, Sex = male (1) versus female (2), Indigenous = non-indigenous (1) versus indigenous (2), Depression = parental rating of child depression, Peer Delinquency = perceived peer delinquency as rated by the child, Parental Knowledge = perceived parental knowledge as rated by the child. Parental Closeness = child rating of how close they feel to their parents, Impulsivity = parental rating of child's impulsivity, Drug Use = self-reported drug use variety score; Delinquency = self-reported child delinquency over the past year, Parent Gambling Involvement = parental participation in 10 different gambling activities, Child Gambling Involvement = child participation in 10 different gambling activities, *M* = mean, *SD* = standard deviation, Range = range of scores in current sample

*$p < .00076$ (Bonferroni-corrected alpha: .05/66 correlations)

Table 2 Multiple regression analysis of child gambling involvement

Variables	b (95% BCBCI)	β	Z	*p*
Outcome = Child Gambling Involvement				
Age	0.006 (−0.086, 0.112)	0.002	0.12	.906
Sex	−0.102 (−0.208, 0.011)	−0.040	−1.81	.070
Indigenous	0.259 (−0.279, 1.231)	0.034	0.67	.503
Depression	−0.032 (−0.217, 0.260)	−0.006	−0.27	.789
Peer Delinquency	0.267 (0.148, 0.406)	0.133	4.01	< .001
Parental Knowledge	−0.204 (−0.496, 0.004)	−0.067	−1.61	.107
Parental Closeness	0.076 (−0.025, 0.196)	0.040	1.35	.177
Impulsivity	−0.038 (−0.157, 0.068)	−0.015	−0.67	.504
Drug Use	−0.042 (−0.175, 0.069)	−0.022	−0.67	.500
Delinquency	0.271 (−0.017, 0.605)	0.077	1.74	.082
Parent Gambling Involvement	0.032 (0.001, 0.066)	0.034	1.89	.058
Delinquency × PGI	0.113 (0.003, 0.249)	0.120	2.00	.046
R^2	0.074		1.93	.054

Outcome = outcome measure (child gambling involvement), Age = chronological age in years, Sex = male (1) versus female (2), Indigenous = non-indigenous (1) versus indigenous (2), Depression = parental rating of child depression, Peer Delinquency = perceived peer delinquency as rated by the child, Parental Knowledge = perceived parental knowledge as rated by the child. Parental Closeness = child rating of how close they feel to their parents, Impulsivity = parental rating of child's impulsivity, Drug Use = self-reported drug use variety score, Delinquency = self-reported child delinquency over the past year, Parent Gambling Involvement = parental involvement in 10 different gambling activities, Delinquency × PGI = interaction between delinquency and parent gambling involvement, b(95% BCBCI) = unstandardized coefficient and 95% biased-corrected bootstrapped confidence interval (in parentheses), β = standardized coefficient, Z = Wald Z test statistic, *p* = significance level of the Wald Z test statistic, R^2 = R-square for entire equation, *N* = 3089

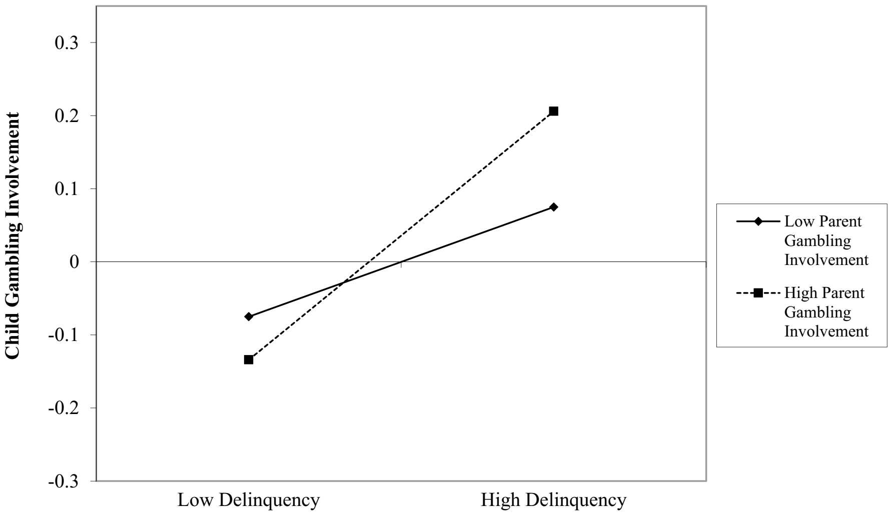

Fig. 1 Moderating effect of parental gambling involvement on the relationship between child delinquency and child gambling involvement

was associated with higher levels of child gambling involvement irrespective of parent gambling involvement, the effect was strongest when parent gambling was high.

Regression analyses were also performed on mothers ($n = 2878$) and fathers ($n = 1863$) separately. For mothers, the interactive effect was nonsignificant based on both the ML estimator ($Z = 1.73$, $p = .08$) and 95% bootstrapped confidence interval (Estimate = 0.099, 95% BCBCI = − 0.016, 0.231). Using an MLR estimator, however, a significant delinquency × parent gambling involvement interaction surfaced ($Z = 2.30$, $p < .05$). For fathers, the bootstrapped confidence interval produced with an ML estimator fell short of significance (Estimate = 0.137, 95% BCBCI = − 0.013, 0.221), but the parametric results from the ML estimated analysis ($Z = 2.33$, $p < .05$) and an MLR estimated analysis ($Z = 4.20$, $p < .001$) both proved significant.

The conditional effects of the moderator variable employed in the present study (parent gambling involvement) on the strength of the child delinquency–child gambling relationship were calculated at low, medium, and high levels of parent gambling involvement. The results, as outlined in Table 3, showed that the association between child delinquency and child gambling involvement was stronger at higher levels of parent gambling involvement. Thus, while the child delinquency–child gambling relationship was non-significant when parental gambling was low, it was significant when parental gambling was medium, and stronger still when parental gambling was high. Similar patterns were observed when mother and father data were analyzed separately. This would seem to suggest that as parent gambling involvement increased, so too did the association between delinquency and the child's own involvement in the ten previously mentioned gambling activities.

Table 3 Conditional effects of the focal predictor (delinquency) at different levels of the moderator (parent gambling involvement)

Variables	b (95% BCBCI)	Z	*p*
Moderator = Parent Gambling Involvement			
Low Parent Gambling	0.271 (− 0.017, 0.605)	1.74	.082
Medium Parent Gambling	0.425 (0.083, 0.881)	2.14	.032
High Parent Gambling	0.579 (0.121, 1.207)	2.24	.025
Moderator = Mother Gambling Involvement			
Low Mother Gambling	0.286 (0.001, 0.669)	1.69	.091
Medium Mother Gambling	0.407 (0.031, 0.883)	1.90	.058
High Mother Gambling	0.556 (0.035, 1.196)	1.96	.050
Moderator = Father Gambling Involvement			
Low Father Gambling	0.393 (0.062, 0.790)	2.15	.031
Medium Father Gambling	0.620 (0.120, 1.049)	2.70	.007
High Father Gambling	0.855 (0.096, 1.355)	2.80	.005

Moderator = conditional variable (gambling involvement averaged across parents and primary caregivers, gambling involvement of mothers, and gambling involvement of fathers), Low Parent Gambling = one standard deviation below the mean for parent gambling involvement, Medium Parent Gambling = mean of parent gambling involvement, High Parent Gambling = one standard deviation above the mean for parent gambling involvement, b(95% BCBCI) = unstandardized coefficient and 95% biased-corrected bootstrapped confidence interval (in parentheses), Z = Wald Z test statistic, *p* = significance level of the Wald Z test statistic, $N = 3089$ (total sample), 2878 (mothers), 1863 (fathers)

Discussion

The purpose of the current investigation was to examine the relationship between a person × situation interaction and a child's degree of involvement in gambling activities within the context of Jessor and Jessor's (1977) general deviance theory. The person × situation interaction of interest in this study crossed a child's level of delinquency with his or her parents' involvement in ten different gambling behaviors. It was reasoned that if environmental events play a leading role in shaping how behavioral deviance in children at risk for general deviance syndrome is expressed, then children already exhibiting signs of behavioral deviance should be at heightened risk for modeling the gambling behavior they observe in the home. Results consistent with this hypothesis were obtained when the product of the child delinquency × parent gambling interaction was correlated with child gambling involvement, especially when parent gambling was averaged across parents or caregivers. Because delinquency has an average age of onset that predates gambling by several years, it was reasoned that the onset of child delinquency normally preceded the onset of child gambling in the LSAC-K, although there is no way to know for sure if this is what happened because child gambling was only assessed at one point in time. The use of cross-sectional data precludes causal inferences and conclusions, although delinquency and parent gambling involvement did interact in the current study and the product of this interaction did correlate with child gambling involvement. This occurred regardless of whether an ML estimator, an MLR estimator, or bootstrapped confidence intervals were used to evaluate the results.

Contributions to Theory

The results of the present study contribute to the literature on general deviance theory in several ways. Most importantly, they illustrate how a person × situation interaction could potentially explain how a general tendency toward deviance can be shaped by certain environmental experiences, in this case gambling on the part of the parents. Consistent with social learning theory, it could be surmised that some form of social learning took place, whereby a child already at risk for deviance as indicated by their involvement in delinquency, engaged in significantly more gambling activity if parental gambling was high rather than low (see Fig. 1). There are alternative explanations for these findings, however, given the fact that cross-sectional data were used to test the hypothesis. Not only is it impossible to determine the causal order of events using cross-sectional data, but there is no way to know for sure how aware the children participating in this study were of their parent's gambling activities. Before a behavior can be modeled, it must first be observed. In the LSAC, it was the parents, not the child, who reported on the parents' gambling behavior. It is therefore uncertain how cognizant the children were of their parents' gambling habits for this behavior to even serve as a model. More work, using longitudinal data, is required to more thoroughly evaluate this hypothesis and rule out viable alternate explanations.

Contributions to Research

The results of this study also have implications for future research on the delinquency–gambling relationship. Research studies employing mediation and moderation methodologies would appear to have a great deal to offer the social sciences, yet their presence in the literature is sparse. Causal mediation analysis requires longitudinal data and conditions designed to establish the causal direction of one's variables (Cole and Maxwell 2003). Moderation analysis, on the other hand, can be conducted on cross-sectional data, although one must be cautious in drawing conclusions and avoid offering causal explanations for one's findings. Even with this caveat, moderation studies can be helpful in establishing certain variable relationships, particularly when it comes to understanding interactions such as the person × situation interactions that lie at the heart of general deviance theory. In the current study, for instance, moderation analysis helped shed light on the interaction between a specific environmental experience (parent gambling) and a person-based disposition toward deviance (child delinquency) and the correlation between this interaction and a behavioral outcome central to general deviance theory (child gambling). Understanding the value of moderation analysis and interactive effects also means understanding their limits. One such limitation is that interaction effects normally have less power to reject the null hypothesis than the main effects upon which the interaction is based (Aguinis et al. 2005; McClelland and Judd 1993). Moreover, moderation analysis, like mediation analysis, should be treated as a confirmatory, theory-driven approach rather than as an exploratory, data-mining approach.

Contributions to Practice

From a practical standpoint, the current results suggest that children with a history of delinquency are at increased risk for gambling involvement, particularly if their parents also gamble. Whether this represents a social learning effect, a genetic effect, or something else entirely (e.g., the result of a parental trait or behavior correlating with parental gambling), it needs to be addressed. Whatever the reason, having a history of delinquency and parents who gamble augments a person's risk of future gambling involvement and potential for gambling-related problems. While it is true that the current study did not examine problem gambling specifically, given its extremely low prevalence in Wave 7 of the LSAC-K, it did examine gambling involvement at a relatively early age (16–17), a pattern that has been found to be associated with heightened risk for future gambling-related problems (Sharman et al. 2019). If, in fact, a social learning effect was responsible for the significant correlation obtained between the child delinquency × parent gambling interaction and child gambling in the current study, then cognitive behavioral therapy may be an effective means of addressing the incentive to engage in deviance. On the other hand, family therapy may be of assistance in reducing opportunities to observe gambling behavior in the home. Research indicates that cognitive-behavior therapy is effective in treating problem gambling and that family therapy, while promising, requires further study (Smith et al. 2013; Wynn et al. 2014).

Strengths and Weaknesses

There were several strengths to this study that should be mentioned. First, the sample size was large and consisted of mid- to late- adolescents. The advantage of studying a sample with a mean age of 16.5 is that it is close to the mean age of gambling onset (Auger et al. 2010), which makes it easier to infer that most of the children from Wave 7 of the LSAC-K who indicated that they had gambled for money in the past year (just 16% of the total sample) probably started gambling recently. Hence, the likelihood of having recently gained an interest in gambling from observing such behavior in a parent was greater than if a sample of adults had been studied. A second strength of this study is that both children and parents supplied information to the study in fairly equal amounts. The reason why this is so important is that multiple informants makes it less likely that the results can be attributed to mono-operational bias (Shadish et al. 2002). Third, three different methods of evaluation (ML estimation, MLR estimation, and bootstrapping) were employed in this study and these methods produced consistent results, at least when parental ratings of gambling involvement were averaged across parents.

This study also suffered from several major weaknesses. The external validity of the current results is one such weakness. Major cultural differences exist between the Australian and North American contexts. It is uncertain, therefore, how well these results generalize to other cultures and circumstances. There were also problems with several of the measures. Depression and parental closeness were measured with just one item and the drug use measure displayed poor internal consistency. The problem with using a single item to measure a construct is that if the individual misinterprets the item or leaves the item blank then there are no additional items to compensate for the misconstrued or unanswered item. Weak internal consistency in the drug use measure is a concern, although internal consistency may not be the best way to assess the reliability of a drug use variety measure, which represents a set of disparate behaviors rather than a unified construct (Huizinga and Elliott 1986). The third and perhaps most serious limitation of this study is that the data are cross-sectional rather than longitudinal in nature. This, as previously stated, limits a researcher's ability to draw causal inferences from the results. In the future, investigators should consider using prospective data to address issues involving delinquency and gambling.

Conclusion

In moderation analysis, the statistics do not distinguish between the independent and moderator variables. This is why it is important that investigators establish clear theory-based hypotheses at the outset of a study and use a confirmatory approach to test their hypotheses. Based on the current results, it could just as easily be argued that delinquency moderated the relationship between parent gambling involvement and child gambling involvement as it is to argue that parent gambling moderated the relationship between child delinquency and child gambling. What makes the process authentic, reliable, and trustworthy is the fact that hypotheses are created a priori, and a confirmatory, theory-driven approach is utilized. In the current study, the model, based in part on general deviance theory, held that parent gambling involvement moderated the child delinquency–child gambling relationship, not the other way around. The confirmatory approach that should be used with moderation analysis is what protects the integrity of the process and prevents misidentification of idiosyncratic results as meaningful or important, even after they defy replication. Following up and extending these results with longitudinal data and better measures of some of the key constructs would appear to be the next logical step in the process.

Compliance with Ethical Standards

Conflict of interest The author has no conflict of interest to report.

References

Aguinis, H., Beaty, J. C., Boik, R. J., & Pierce, C. A. (2005). Effect size and power in assessing moderating effects of categorical variables using multiple regression: A 30-year review. *Journal of Applied Psychology, 90,* 94–107.

Allison, P. D. (2002). *Missing data*. Thousand Oaks, CA: Sage.

Auger, N., Lo, E., Cantinotti, M., & O'Loughlin, J. (2010). Impulsivity and socio-economic status interact to increase the risk of gambling onset among youth. *Addiction, 105,* 2176–2183.

Australian Institute of Family Studies. (2018). *Longitudinal study of Australian children data user guide—December 2018*. Melbourne: Australian Institute of Family Studies.

Barnes, G. M., Welte, J. W., Hoffman, J. H., & Dintcheff, B. A. (2005). Shared predictors of youthful gambling, substance use, and delinquency. *Psychology of Addictive Behaviors, 19,* 165–174.

Brown, S. M., & Shillington, A. M. (2017). Childhood adversity and the risk of substance use and delinquency: The role of protective adult relationships. *Child Abuse and Neglect, 63,* 211–221.

Brunelle, N., Leclerc, D., Cousineau, M.-M., Dufour, M., Gendron, A., & Martin, I. (2012). Internet gambling, substance use, and delinquent behavior: An adolescent deviant behavior involvement pattern. *Psychology of Addictive Behaviors, 26,* 364–370.

Canale, N., Vieno, A., Bogt, T., Pastore, M., Siciliano, V., & Molinaro, S. (2016). Adolescent gambling-oriented attitudes mediate the relationship between perceived parental knowledge and adolescent gambling: Implications for prevention. *Prevention Science, 17,* 970–980.

Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112,* 558–577.

Connolly, E. J. (2020). Further evaluating the relationship between adverse childhood experiences, antisocial behavior, and violent victimization; A sibling-comparison analysis. *Youth Violence and Juvenile Justice, 18,* 3–23.

Dennison, C. R., Finkeldey, J. G., & Rouheleau, G. C. (2020). Confounding bias in the relationship between problem gambling and crime. *Journal of Gambling Studies*. https://doi.org/10.1007/s10899-020-09939-0.

Donovan, J. E., & Molina, S. G. (2014). Antecedent predictors of children's initiation of sipping/tasting alcohol. *Alcoholism, Clinical and Experimental Research, 38,* 2488–2495.

Farrington, D. P., Jolliffe, D., Hawkins, J. D., Catalano, R. F., Hill, K. G., & Kosterman, R. (2003). Comparing delinquency careers in court records and self-reports. *Criminology, 41,* 933–958.

Huizinga, D., & Elliott, D. S. (1986). Reassessing reliability and validity of self-report delinquency measures. *Journal of Quantitative Criminology, 2,* 293–327.

IBM. (2019). *IBM SPSS Statistics for Windows* (Version 26.0). IBM Corp.

Jessor, R., Donovan, J. E., & Costa, F. M. (1991). *Beyond adolescence: Problem behavior and young adult development*. New York, NY: Cambridge University Press.

Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York, NY: Academic Press.

Johansson, A., Grant, J. E., Kim, S. W., Odlaug, B. L., & Götestam, K. G. (2009). Risk factors for problematic gambling: A critical literature review. *Journal of Gambling Studies, 25,* 67–92.

Kryszajtys, D. T., Hahmann, T. E., Schuler, A., Hamilton-Wright, S., Ziegler, C. R., & Matheson, F. I. (2018). Problem gambling and delinquent behaviours among adolescents: A scoping review. *Journal of Gambling Studies, 34*, 893–914.

Loo, J. M. Y., Kraus, S. W., & Potenza, M. N. (2019). A systematic review of gambling-related findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Behavioral Addictions, 8,* 625–648.

Magoon, M. E., Gupta, R., & Derevensky, J. (2005). Juvenile delinquency and adolescent gambling: Implications for the juvenile justice system. *Criminal Justice and Behavior, 32,* 690–713.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties in detecting interactions and moderator effects. *Psychological Bulletin, 114,* 376–390.

Muthén, B., & Muthén, L. (1998-2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Muthén and Muthén.

Perez, N. M., Jennings, W. G., & Baglivio, M. T. (2018). A path to serious, violent, chronic delinquency: The harmful aftermath of adverse childhood experiences. *Crime and Delinquency, 64,* 3–25.

Poole, J. C., Kim, H. S., Dobson, K. S., & Hodgins, D. C. (2017). Adverse childhood experiences and disordered gambling: Assessing the mediating role of emotion dysregulation. *Journal of Gambling Studies, 33,* 1187–1200.

Räsänen, T., Lintonen, T., & Konu, A. (2015). Gambling and problem behavior among 14- to 16-year-old boys and girls in Finland. *Journal of Gambling Issues, 31,* 1–22.

Rogier, G., Picci, G., & Velotti, P. (2019). Struggling with happiness: A pathway leading depression to gambling disorder. *Journal of Gambling Studies, 35,* 293–305.
Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Mifflin.
Sharma, A., & Sacco, P. (2015). Adverse childhood experiences and gambling: Results from a national survey. *Journal of Social Work Practice in the Addictions, 15,* 25–43.
Sharman, S., Murphy, R., Turner, J., & Roberts, A. (2019). Psychosocial correlates in treatment seeking gamblers: Differences in early age onset gamblers vs later age onset gamblers. *Addictive Behaviors, 97,* 20–26.
Smith, D. P., Dunn, K. I., Harvey, P. W., Battersby, M. W., & Pols, R. G. (2013). Assessing randomized clinical trials of cognitive and exposure therapies for gambling disorders: A systematic review. *Behaviour Change, 30,* 139–158.
Staff, J., Whichard, C., Siennick, S. E., & Maggs, J. (2015). Early life risks, antisocial tendencies, and preteen delinquency. *Criminology, 53,* 677–701.
Sweeten, G. (2012). Scaling criminal offending. *Journal of Quantitative Criminology, 28,* 533–557.
Temcheff, R., St. Pierre, R. A., & Deverensky, J. (2011). Youth gambling and delinquency: Legislative and social policy implications. *Gaming Law Review and Economics, 15,* 539–552.
Vitaro, F., Brendgen, M., Ladouceur, R., & Tremblay, R. E. (2001). Gambling, delinquency, and drug use during adolescence: Mutual influences and common risk factors. *Journal of Gambling Studies, 17,* 171–190.
Walters, G. D. (2019). Peer influence or projection bias? Predicting respondent delinquency with perceptual measures of peer delinquency in 22 samples. *Journal of Adolescence, 70,* 1–12.
Wanner, B., Vitaro, F., Carbonneau, R., & Tremblay, R. E. (2009). Cross-lagged links among gambling, substance use, and delinquency from midadolescence to young adulthood: Additive and moderating effects of common risk factors. *Psychology of Addictive Behaviors, 23,* 91–104.
Welte, J. W., Barnes, G. M., & Hoffman, J. H. (2004). Gambling, substance use, and other problem behaviors among youth: A test of general deviance models. *Journal of Criminal Justice, 32,* 297–306.
Willoughby, T., Chalmers, H., & Busseri, M. A. (2004). Where is the syndrome? Examining co-occurrence among multiple problem behaviors in adolescence. *Journal of Consulting and Clinical Psychology, 72,* 1022–1037.
Winters, K. C., Stinchfield, R. D., Botzet, A., & Anderson, N. (2002). A prospective study of youth gambling behaviors. *Psychology of Addictive Behaviors, 16,* 3–9.
Wynn, J., Hudyma, A., Hauptman, E., Houston, T. N., & Faragher, J. M. (2014). Treatment of problem gambling: Development, status, and future. *Drugs and Alcohol Today, 14,* 42–50.

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