Parental monitoring trajectories and gambling among a longitudinal cohort of urban youth

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Abstract

Aim—To test the strength of the association between parental monitoring trajectories throughout early adolescence (ages 11–14) and gambling behaviors by young adulthood (age 22).

Design—Longitudinal cohort design.

Setting—Baltimore, Maryland.

Participants—The sample of 514 participants with gambling data between ages 16–22 and parental monitoring data between ages 11–14, were predominantly African American and received subsidized lunches at age 6.

Measurements—The South Oaks Gambling Screen and South Oaks Gambling Screen-Revised for Adolescents collected self-reports on annual gambling and gambling problems between ages 16–22. The Parental Monitoring Subscale of the Structured Interview of Parent Management Skills and Practices-Youth Version collected self-reports on annual parental monitoring between ages 11–14.

Findings—General growth mixture modeling identified two parental monitoring trajectories: 1) "Stable" class (84.9%) began with a high level of parental monitoring at age 11 that remained steady through age 14; 2) "Declining" class (15.1%) began with a significantly lower level of parental monitoring at age 11 and experienced a significant decline through age 14. The Declining class had significantly increased unadjusted (OR=1.91; 95% CI=1.59,2.23; p=<.001) and adjusted (aOR=1.57; 95% CI=1.24,1.99; p=.01) odds of problem gambling as compared with nongambling.

Conclusion—Low and/or declining parental monitoring of children between the ages of 11 and 14 is significantly associated with problem gambling when those children reach young adulthood.

Keywords

Parental monitoring; Problem gambling; General growth mixture model

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Introduction

Gambling among youth is a public health issue of increasing concern worldwide. A review of youth gambling studies conducted in North America, Europe, and Australia found that upwards of 80% of youth have engaged in gambling activities in their lifetime, and 2–13% meet diagnostic criteria for problem gambling, a behavioral addiction marked by irrational thinking and erroneous cognitions, preoccupation with gambling and with obtaining money to gamble, continuation with gambling despite adverse consequences, and inability to stop gambling despite a desire to do so [1,2]. In the U.S., 70–90% of adolescents and young adults have ever gambled, with 18–40% of the gamblers at further risk for developing problem gambling [3–6]. Not only is problem gambling highly correlated with other delinquent behaviors [7–10], problem gamblers could also experience adverse financial, interpersonal, criminal, and psychiatric outcomes secondary to their gambling disorder [11–14]. It is imperative to examine potential antecedents to gambling behaviors. While studies have found gender, race, socioeconomic status, impulsivity, aggression, and deviant peer affiliation to be important risk factors for gambling, these are difficult to intervene on to lower the risk of youth gambling [15–20]. Thus, it is of particular importance to examine factors conducive to change so as to effectively reduce the risk of problem gambling development among youth.

One potential avenue for such interventions is parental monitoring as several programs have shown to effectively improve parental monitoring over time [21,22]. Defined as the active surveillance of children and open communication as children share their whereabouts, company, and activities [23=25], parental monitoring serves to limit deviant behavior by bolstering the parents' ability to manage their children's behavior [23]. By restricting certain activities and behaviors, parents also encourage conventional behavior [26].

As children mature and gain independence during adolescence, parents adjust their supervisory practices to allow for more freedom and independent decision-making [23]. Studies show parental monitoring to decrease throughout adolescence [27,28]. For instance, Luyckx and colleagues [28] found parental monitoring to be stable during ages 7–11 before declining during ages 12–18. Barnes and colleagues [27] found an 8% annual decline in parental monitoring from ages 14–20. While adolescence may be a time of increasing autonomy, it is also a vulnerable period marked by a biologically-driven imbalance between the mature reward processing system and the immature inhibitory control [29]. The imbalance may lead to increased vulnerability to risk-taking behaviors, such as gambling [30]. Therefore, while it may be normative for parents to relinquish some control over their adolescent children, relinquishing too much control could be problematic given the biological processes simultaneously occurring.

While several longitudinal studies have found an association between parental monitoring during adolescence and later substance use [31,32], much less is known about the relationship between parental monitoring and gambling. Some cross-sectional studies have found low parental monitoring to increase the odds of gambling among youth [10,33], but one longitudinal study found no such association [34]. Such mixed findings could be because parental monitoring was generally assessed at only one time point, and usually the

same time point gambling was assessed, therefore its change over the course of adolescence was not accounted for. Thus, the current study aims to explore the association between parental monitoring trajectories throughout early adolescence and youth gambling using a longitudinal sample of urban youth. We hypothesize that those with low and/or rapidly declining levels of parental monitoring from ages 11–14 will be more likely to problem gamble by age 22.

Methods

Design and sample

The longitudinal data came from the Johns Hopkins Prevention Intervention Research Center's (JHU PIRC) Second Generation Intervention Trial [35], a study initiated as a randomized prevention trial of interventions targeting academic achievement and aggression. Cohort recruitment occurred in Fall 1993 at nine urban primary schools in Baltimore, MD, when the participants were starting first grade (n=678; mean age=6.2 years; 53% male; 86% African American). Within each school, three first grade classrooms were randomly assigned to control or one of two interventions. Briefly, the classroom-centered intervention aimed to create opportunities for more positive attention from teachers and peers, the family-school partnership intervention aimed to enhance parent-school communication, and the control received the customary curriculum [35]. While the intervention only lasted one year, the cohort has been interviewed annually since first grade and includes those who dropped out of school or were incarcerated. During the assessments, data on behaviors, achievement, and mental health were collected via multiple sources (e.g., school records, teacher-, parent-, self-reports). Study protocols were approved by the Johns Hopkins Bloomberg School of Public Health institutional review board.

This study focuses on the 514 participants (76% of original cohort) with any data on gambling behaviors between ages 16–22 and parental monitoring between ages 11–14. Chi-square tests showed no differences by sex, race, subsidized lunch status, household structures, or intervention condition between the current sample and the original cohort (p-values>.05).

Measures

Gambling Behavior—Two gambling instruments assessed gambling involvement and gambling problems (e.g., hiding evidence of gambling). The South Oaks Gambling Screen (SOGS; [36]) was used at ages 20–22 while the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; [37]) was used at ages 16,18, and 19. Within each assessment, items inquiring about the frequency of involvement in various gambling activities (e.g., lottery, casino) distinguished nongamblers from gamblers. Gambling problems was next assessed using twelve dichotomous (i.e., yes/no) items in both the SOGS and SOGS-RA. The number of gambling problems reported by each participant was summed (range 0–12). Based upon Lesieur & Blume [36] and Winters et al.'s [37] proposed criteria, gambling status categories were created: 1) nongamblers reported neither gambling nor any gambling problems; 2) social gamblers were gamblers with up to 1 problem; 3) at-risk problem gamblers were gamblers with 2–3 problems; and 4) problem gamblers were gamblers with at

least 4 problems. As past studies have found at-risk and problem gamblers to exhibit similar characteristics (e.g., impulsivity, depression; [38,39]), the two groups are collectively referred to as problem gamblers from this point on. To increase statistical power and maximize the use of the multi-assessment (i.e., ages 16, 18–22) gambling data, cumulative measures of each gambling variable (i.e., total gambling problems, gambling status) were created across the six assessments by using participants' highest involvement at any year. This approach was similarly taken by previous studies [17,18]. Within the current sample, the SOGS had Cronbach's alphas ranging from 0.60–0.70 between ages 20–22, and the Cronbach's alphas for the SOGS-RA ranged from 0.61–0.72 during ages 16, 18, and 19.

Early Adolescent and Childhood Parental Monitoring—The Parental Monitoring Subscale of the Structured Interview of Parent Management Skills and Practices-Youth (SIPMSP-Youth; [31]), first administered at age 11, assessed parental monitoring via seven self-reported items (e.g., "When you get home from school, how often is your parent there within one hour?") Each item was rated on a 5-point Likert scale (1= never; 5= all of the time). Each participant's average score indicates his/her overall monitoring level, with lower scores indicating lower monitoring. The current study used the SIPMSP-Youth data reflecting parental monitoring at ages 11–14 (i.e., early adolescent). Within the current sample, the Cronbach's alpha ranged from 0.62–0.67 across ages 11–14.

The Parental Monitoring Subscale of the SIPMSP-Parent [40], administered at age 6, assessed parental monitoring via four parent-reported items (e.g., "How often can the child get in touch with you?"). Each item was rated on a 5-point Likert scale, and participants' average scores indicated their overall monitoring level, with lower scores indicating lower monitoring. The current study used the SIPMSP-Parent data reflecting parental monitoring at age 6 (i.e., childhood). Within the current sample, the Cronbach's alpha was 0.51.

Childhood Impulsivity and Aggression—The Teacher Observation of Classroom Adaption-Revised (TOCA-R; [41]) assessed childhood behaviors. Trained assessors guided the teachers through a structured interview of 36 items pertaining to the child's adaptation to classroom tasks over the preceding three-week period. The impulsivity subscale consisted of three items (e.g., "Waits for turn"). The aggression subscale consisted of ten items (e.g., "Harms others and property"). Items were rated on a 6-point Likert scale (1 = almost never; 6 = almost always). The current study used the average impulsivity and aggression scores from age 6, with higher scores indicating higher levels of behavior. Within the current sample, the Cronbach's alpha for the impulsivity and aggression subscales were 0.79 and 0.90, respectively.

Adolescent Deviant Peer Affiliation—Deviant peer affiliation was assessed using six self-reported items developed by Capaldi and Patterson [42]. Participants indicated how many of their peers engaged in delinquent behaviors. Items were rated on a 5-point Likert scale (1=none; 5=all), with higher scores indicating higher deviant peer affiliation. The current study used the average deviant peer affiliation score from age 16. Within the current sample, the Cronbach's alpha was 0.79.

Childhood Socio-Demographic Characteristics—Data on participants' gender, race, subsidized lunch, household structure, and intervention status at age 6 came from school records.

Statistical Analysis

Chi-square tests and Pearson correlations uncovered distributions of various characteristics within the sample of 514 participants with data on both gambling and parental monitoring. Sixteen percent (n=84) were missing at least one of the four waves of parental monitoring from ages 11–14. Ten percent (n=53) had missing data for one wave, 4% (n=19) for two waves, and 2% (n=12) for three waves. Missing data on parental monitoring over time were accounted for by using full information maximum likelihood estimation [43].

General growth mixture modeling (GGMM) identified trajectories of parental monitoring from ages 11–14. Multiple models were run, with varying numbers of classes and functional forms (i.e., linear slope, quadratic slope). The model with an optimal balance between fit and parsimony, via Akaike's Information Criterion (AIC; [44]) and Bayesian Information Criterion (BIC; [45]), and with substantive meaning and interpretation was selected as the best model.

Once the best GGMM model was chosen, the covariates (i.e., gender, sex, subsidized lunch, household structure, intervention, age 6 parental monitoring, age 6 impulsivity, age 6 aggression, age 16 deviant peer affiliation) were added to the model to refine membership classification [46]. Ordered logistic regression models next examined the unadjusted and covariate-adjusted associations between parental monitoring class and gambling (i.e., total gambling problems, gambling status). All analyses were conducted using Mplus version 6.12 [47], and the clustering of students within classrooms was accounted for by computing robust standard errors using a sandwich estimator [48]. The analytic model is shown in Figure 1.

Results

Parental Monitoring Trajectory Classes from Ages 11–14

The mean parental monitoring scores from ages 11–14 ranged from 4.92–5.02, and were moderately correlated over time with correlation coefficients ranging from 0.36–0.55.

GGMM was performed with 1–3 latent classes and with either a linear slope or by allowing for a quadratic slope. Fit indices for the latent classes are presented in Table 1. While the 3-class linear model had the lowest BIC (BIC=4022.6), the 3.4% of the sample belonging to the third class was a small subset of the largest class from the 2-class model. Thus, the 2-class linear model appeared to be the best fitting model.

Table 2 and Figure 2 depict the estimated mean growth trajectories from ages 11–14 for parental monitoring by trajectory class. The "Stable" class (84.9%) began with high parental monitoring that remained steady through age 14 (intercept=5.01, p<.001; slope=−0.01, p>.05). The "Declining" class (15.1%) exhibited significantly lower parental monitoring at each

age (as compared to the Stable class) and also experienced a significant decline from age 11 to 14 (intercept=3.98, p<.001; slope=−0.27, p<.05).

Covariates by Parental Monitoring Trajectory Class

Compared to the Stable class, the Declining class was more likely to report subsidized lunches at age 6 (76.7% vs. 69.1%; p=.02) and higher mean deviant peer affiliation at age 16 (1.80 vs. 1.48; p=.04; Table 3).

Associations between Parental Monitoring Trajectory Class and Gambling

The prevalence of annual gambling decreased between ages 16–22, from 49.7% to 12.3% (Table 4). Similarly, the mean number of gambling problems and the prevalence of problem gambling declined between ages 16–22, from 0.34 to 0.05 and 9.1% to 0.1%, respectively. Cumulatively between ages 16–22, 62.5% had gambled, 13.5% met diagnostic criteria for problem gambling, and experienced a mean of 0.69 gambling problems.

The number of gambling problems experienced between ages 16–22 did not differ by parental monitoring class (Table 5). However, compared to the Stable class, the Declining class had approximately twice the unadjusted odds of problem gambling as compared to nongambling (OR=1.91; 95% CI=1.59,2.23; p<.001). Upon adjustment for covariates, the association remained between the Declining class and problem gambling (aOR=1.57; 95% CI=1.24,1.00; p=.01).

Associations between Parental Monitoring at age 14 and Gambling

Ad hoc analyses (results available upon request) examining the relationship between parental monitoring at age 14 and gambling behaviors (i.e., gambling problems, gambling status) by young adulthood found no significant associations.

Discussion

This study investigated the relationship between parental monitoring throughout early adolescence and youth gambling among an urban cohort of youth. Fifteen percent experienced significant decline in parental monitoring between ages 11–14. Not only were they more likely to receive subsidized lunches and to have higher deviant peer affiliation during adolescence, they were also significantly more likely than their peers with steadily high levels of monitoring to be problem gamblers by young adulthood. The lack of associations found between parental monitoring at a single time point (i.e., age 14) and gambling further justifies the current study's approach of examining longitudinal trajectories of parental monitoring.

Parental monitoring is the way parents supervise and discipline their children and stay informed of their children's whereabouts and associations. This can be done through household rules, exerting influence on decision-making via communication, and spending quality time together [23–25,49]. If parents consistently and effectively monitor their children, the Social Development Model suggests that a strong parent-child bond will form [50]. As children enter adolescence and begin to spend more time outside of their homes and

with peers, parents begin to play a smaller role in their children's lives. Furthermore, as children mature and become more independent, it is normative for parents to give their children more freedom by easing their monitoring practices [27,28].

This study found that the level of parental monitoring for both classes declined from ages 11–14, though the decline in the Stable class was not significant. The consistently lower level of parental monitoring in the Declining class could be due to its significantly higher prevalence of subsidized lunch status as studies have found children from low SES households report low parental monitoring [51]. The low parental monitoring could be due to the parents' lack of time as they juggle multiple jobs to support their families [52]. It could also be due to their lack of parenting skills as they could be very young themselves or that they might not have had good parenting models to learn from [53]. The Declining class's lower level of parental monitoring coupled with its larger decrease throughout early adolescence could have also explained its high level of deviant peer affiliation during adolescence. According to Patterson's model of antisocial behavior, poor parental monitoring can create child conduct problems, leading to rejection by normal peers, then commitment to deviant peer group, and finally to problem behaviors [54].

Another important point of consideration is that the mean parental monitoring scores between the two classes identified by the current study show that while the Stable class reported significantly higher levels of monitoring at each time point, such differences were modest as the levels of monitoring in both classes were very high, with the Stable class monitored approximately all of the time and the Declining class monitored approximately most of the time. The finding that such a small difference in parental monitoring is associated with a significantly increased risk for problem gambling could be due to the current sample of predominantly African American youth from urban, low SES environments. Due to the high levels of stressful life events (e.g., violence, theft) present in such environments [4], parents from more disadvantaged backgrounds tend to be more aware of the potential detrimental impact their environment has on their children [55,56]. Such increased parental awareness could explain the high levels of monitoring found in the current sample. Among such vulnerable youth living in high-stress environments, any decline in parental monitoring, particularly during adolescence when peer and environmental influences increase in importance, could also lead to adverse consequences, such as the increased risk of problem gambling.

The current study found a strong decline in the annual prevalence of gambling and problem gambling between ages 16–22, consistent with the trend found by Goudriaan and colleagues [57]. One potential explanation could be that as adolescents mature into young adults, priorities begin to shift. Thus, the time they had previously spent on risky activities, such as gambling, was now devoted to establishing life anchors, such as careers and intimate relationships. Another explanation could be that due to the normalization and pervasiveness of gambling, its novelty may be lost on youth. Furthermore, with the advent of online social networking sites, adolescents and young adults could be spending their free time on their smartphones, computers, and other electronic devices instead of gambling. Conversely, in Maryland, where the current sample is from, video lottery terminals were legalized in 2008 and table games in 2012. The recent expansion of gambling outlets within the state coupled

with the growth of online gambling outlets could increase the gambling and problem gambling rates among youth in the upcoming future. Therefore, it is important to better understand those who could be more vulnerable to develop problem gambling so that effective prevention programs can be created. While studies have pinpointed various risk factors for problem gambling (e.g, impulsivity, depression, hyperactivity, aggression, anxiety; [16,19,20]), such characteristics are often difficult to ameliorate as many components (e.g., one's biology, social environment) work together to create such characteristics. Alternatively, the current study found declining levels of parental monitoring to increase the risks of problem gambling. Not only is this the first study to examine the relationship between the developmental trajectory of parental monitoring during early adolescence and gambling behaviors by young adulthood, it also identifies a characteristic that future gambling prevention and intervention programs can target as past programs have been able to improve parental monitoring over time [21,22].

Turning to the current study's limitations, its small sample size could have limited the study's statistical power. This may be related to the discrepancy between the non-significant association between parental monitoring and continuous gambling problem scores and the significant association between parental monitoring and categorical gambling status. The latter approach compared participants who met problem gambling diagnostic criteria to the rest of the sample, heightening our ability to find effects; the former approach could have attenuated the association between parental monitoring and gambling problems due to the small sample size and lack of a crisp comparison [58]. While the temporality of events was ensured between early adolescence parental monitoring and young adulthood gambling behaviors, a causal relationship between the two cannot be established using general growth mixture modeling. Due to the design of the original prevention trial, data on parental monitoring was first collected at age 6 and not collected again until age 11. Thus, the current study was limited to examine the developmental trajectory of parental monitoring during early adolescence only, and not extended to also include childhood. Conversely, because parental monitoring tends to be relatively stable during childhood [28], the current study design could be sufficient to examine its trajectories. Parental monitoring at age 6 was also included in the analysis in an effort to build a fuller and more accurate general growth mixture model. The majority of the data was also based on self reports, thus subject to recall and social desirability bias. The self-reported gambling data could be particularly vulnerable to social desirability bias, however the use of an anonymous instrument to collect the data should minimize the bias. According to Stattin & Kerr [25], parental monitoring information provided by the child is not synonymous to that provided by the parent. The child reports capture how the participants perceived their parents to be monitoring them, rather than how they were truly being monitored. Similarly, the younger the children, the more likely that they could be misperceiving the level of monitoring they received. However, Barry and colleagues' [59] suggestion that child-reported monitoring could be of clinical significance justifies the current study's primary focus on the self reports.

A major strength of the current study is its cohort of predominantly African Americans, selected from an epidemiologically defined population representative of students in urban schools. The sample provides an opportunity to examine an understudied behavior (i.e., gambling) in an understudied population. Another strength is the availability of longitudinal

data on parental monitoring, allowing the current study to examine changes in its level over time.

Conclusion

The longitudinal trajectory of parental monitoring during adolescence is significantly associated with problem gambling by young adulthood. Not only is the current study the first to examine such a relationship, it also identifies a characteristic that future gambling prevention and intervention programs can target as past programs have been able to change parental monitoring over time.

Acknowledgments

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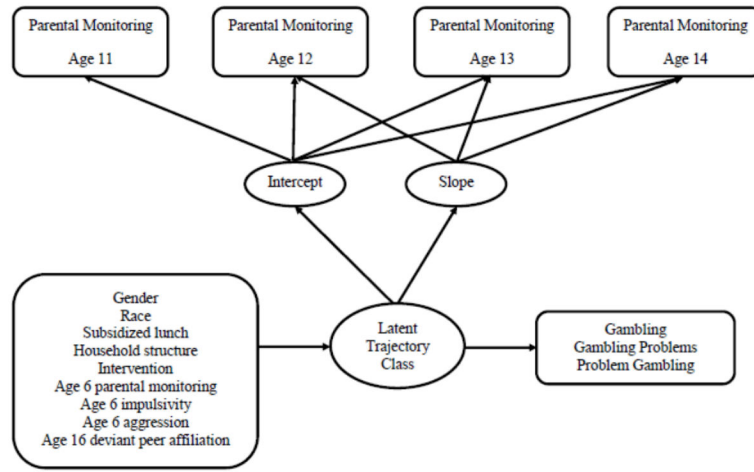**Figure 1.**
Analytical model for the general growth mixture model exploring the association between parental monitoring trajectories and gambling behaviors using the JHU PIRC data
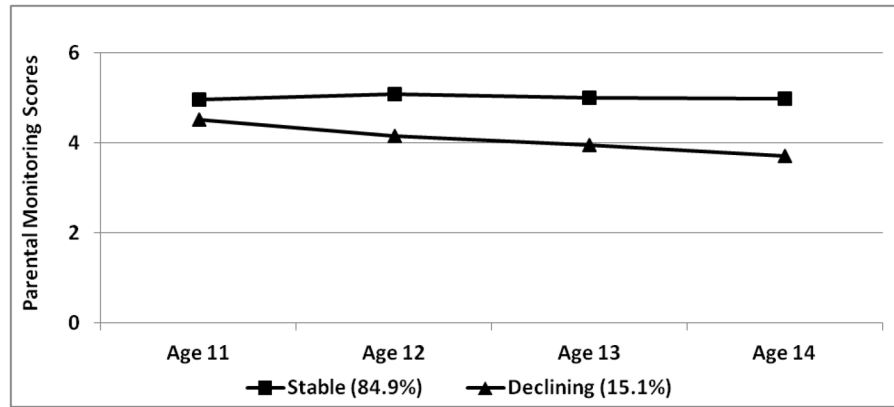
Figure 2.
Mean parental monitoring by class (N=514)

Table 1

Fit indices for general growth mixture models with 1–3 classes (N=514)

Number of Classes	Shape	Entropy	Log Likelihood	AIC	BIC
1	Linear	1	−1990.4	4006.7	4061.9
2	**Linear**	**0.75**	**−1964.6**	**3963.1**	**4030.2**
3	Linear	0.81	−1945.8	3933.5	4022.6
1	Quadratic	1	−1995.8	4009.7	4047.9
2	Quadratic	0.81	−1980.1	3984.3	4035.2
3	Quadratic	0.90	−1967.2	3964.4	4028.1

Table 2

Class size and mean parental monitoring (N=514)

	Stable	Declining	P value
Membership (%)	84.9	15.1	--
Parental Monitoring			
Age 11	4.96	4.52	.001
Age 12	5.07	4.15	<.001
Age 13	5.00	3.95	<.001
Age 14	4.97	3.70	<.001
Intercept	5.01***	3.98***	<.001
Slope	−0.01	−0.27*	<.001

*
p<.05,

**
p<.01,

***
p<.001

Table 3

Distribution of covariates across classes (N=514)

	Overall %	Stable %	Declining %	p
Female	47.1	48.5	38.8	.20
African American	87.2	87.6	85.1	.70
Subsidized Lunch	70.3	69.1	76.6	.02
Single-Caregiver Household	56.0	55.3	60.9	.48
Intervention	67.1	65.5	65.7	.54
Age 6 Parental Monitor	1.15[+]	1.15[+]	1.14[+]	.82
Age 6 Impulsivity	2.28[+]	1.99[+]	2.55[+]	.08
Age 6 Aggression	1.63[+]	1.60[+]	1.73[+]	.15
Age 16 Deviant Peer Affiliation	1.49[+]	1.48[+]	1.80[+]	.04

[+]Mean

Table 4

Annual gambling behaviors between ages 16–22 years

Age	Gambling prevalence n (%)	Number of gambling problems Mean (SD)	Problem gambling prevalence n (%)
16 (n=463)	230 (49.7)	0.34 (1.0)	42 (9.1)
18 (n=449)	112 (24.9)	0.22 (0.9)	23 (5.1)
19 (n=450)	117 (26.0)	0.13 (0.6)	14 (3.1)
20 (n=445)	85 (19.1)	0.14 (0.8)	12 (2.7)
21 (n=437)	93 (21.3)	0.10 (0.6)	6 (1.3)
22 (n=431)	53 (12.3)	0.05 (0.4)	3 (0.1)
Cumulative (N=514)	321 (62.5)	0.69 (1.4)	69 (13.5)

Table 5

Gambling outcomes by young adulthood (ages 16–22; N=514)

	Stable %	Declining %	Reference Group=Stable			Reference Group=Stable		
			OR	95% CI	p	aOR[&]	95% CI	p
Gambling Problems	0.65[+]	0.85[+]	1.31	0.96,1.52	.10	1.15	0.95,1.40	.15
Gambling Status								
Nongambler	38.3	33.0	1.00			1.00		
Social Gambler	49.5	46.1	0.93	0.57,1.75	.64	0.85	0.50,1.84	.73
Problem Gambler	12.2	20.9	1.91	1.59,2.23	<.001	1.57	1.24,1.99	.01

[+]Mean

[&]Adjusted for sex, race, lunch status, household structure, intervention, age 6 parental monitor, age 6 impulsivity, age 6 aggression, age 16 deviant peer affiliation