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At-risk/problematic shopping and gambling in adolescence

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Abstract

Elevated levels of both pathological gambling (PG) and problem shopping (PS) have been reported among adolescents, and each is associated with a range of other negative health/functioning measures. However, relationships between PS and PG, particularly during adolescence, are not well understood. In this study, we explored the relationship between different levels of problem-gambling severity and health/functioning characteristics, gambling-related social experiences, gambling behaviors and motivations among adolescents with and without at-risk/problematic shopping (ARPS). Survey data from Connecticut high school students (n=2,100) were analyzed using bivariate analyses and logistic regression modeling. Although at-risk/problematic gambling (ARPG) was not increased among adolescents with ARPS, adolescents with ARPG (versus non-gamblers) were more likely to report having experienced a growing tension or anxiety that could only be relieved by shopping and missing other obligations due to shopping. In comparison to the non-ARPS group, a smaller proportion of respondents in the ARPS group reported paid part-time

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employment, whereas a greater proportion of respondents reported excessive gambling by peers and feeling concerned over the gambling of a close family member. In general, similar associations between problem-gambling severity and measures of health/functioning and gambling-related behaviors and motivations were observed across ARPS and non-ARPS adolescents. However, associations were weaker among ARPS adolescents for several variables: engagement in extracurricular activities, alcohol and caffeine use and gambling for financial reasons. These findings suggest a complex relationship between problem-gambling severity and ARPS. They highlight the importance of considering co-occurring risk behaviors such as ARPS when treating adolescents with at-risk/problem gambling.

Keywords

pathological gambling; problem shopping; adolescence; development; behavioral addictions; substance use

Introduction

Adolescence is an important developmental epoch characterized by elevated rates of impulsive and risk-seeking behaviors, making it a potentially vulnerable period for the development of addictions (Chambers et al. 2003; Potenza 2013). Compulsive or problem shopping (PS) and problem/pathological gambling share many key clinical features of addictions (Hollander et al. 2006; Potenza 2006; Grant et al. 2011; Potenza 2013), and elevated rates of both have been reported among adolescents (Grant et al. 2011; Villella et al. 2011; Yip et al. 2011). Adults with PS and pathological gambling (PG) frequently report an age-of-onset prior to 18 years of age (Volberg 1994; Roberts 1998; Lynch 2004), suggesting that problematic buying and gambling behaviors typically begin early and may have effects into adulthood.

Among adolescents, PG and PS symptoms are both associated with psychological distress (e.g., dysphoria/depression) and participation in other risky and antisocial behaviors (e.g., engagement in serious physical fights, alcohol use) (Grant et al. 2011; Yip et al. 2011). In adults, both PS and PG are also associated with other conditions, including other impulse-control disorders, substance-use disorders, obesity, and mood and anxiety disorders (Black 1998; Black 1998; Grant et al. 2003; Petry et al. 2005; Morasco et al. 2006; Müller et al. 2011; Schmidt et al. 2012). However, the relationship between PG and PS features among adolescents is unknown. In particular, no studies have studied how different levels of problem-gambling severity may interact with health/functioning characteristics among adolescents with PS. Given previous findings of increased antisocial behaviors among adolescents with PS (Grant et al. 2011), one hypothesis is that the relationship between antisocial behaviors and PG features would be weakened among adolescents with PS symptoms. Alternatively, it is additionally possible that an additive relationship might exist between PG and PS, such that stronger associations between PG features and antisocial behaviors might exist among adolescents with PS features. In this study, we explored the relationship between PG and PS features and other variables related to health/functioning and gambling behaviors in a sample of adolescents (n=2100).

Familial gambling

Cross-sectional data indicate increased rates of substance-use disorders among first-degree relatives of adults with PS (Christenson 1994; Black 1998), suggesting a possible link between PS and addictive disorders. However, no studies have yet examined the relationship between PS and parental/familial histories of PG. Thus, a secondary aim of this study was to determine whether adolescents reporting PS features were more likely to report having a family member with problematic gambling behaviors.

Problem gambling features

Among adults with PG, co-occurring PS is associated with greater intensities of gambling-related urges and thoughts (Grant et al. 2003). However, little is known about the relationship between PS and PG in adolescence – in particular how different levels of problem-gambling severity may relate to other gambling-related variables (e.g., motivations to gamble, gambling-related social experiences) among adolescents with and without PS features remains unknown.

Part-time employment

Increased rates of engagement in extracurricular activities - a category including paid part-time employment as well as participation in unpaid activities such as sports and community service – has been reported among adolescents with at-risk/problem gambling (ARPG) (Yip et al. 2011), but not among adolescents with PS (Grant et al. 2011). Part-time employment among adolescents is common, yet it remains controversial as to its health correlates, with some research suggesting positive associations between teenage employment and increased rates of substance use and other behavioral problems (Valois et al. 1999; Ramchand et al. 2007; Mortimer 2010; Leeman et al. 2013). A positive association between part-time employment and alcohol and marijuana use – but no associations between employment and gambling behaviors – has been reported among high school adolescents (Leeman et al. 2013). To our knowledge, no studies have yet explored how PS may influences the relationship between teenage employment and risk behaviors - including gambling - and health measures.

Study approach and hypotheses

In this study we explored the health/functioning characteristics, gambling-related social experiences (e.g., familial and peer gambling), gambling behaviors and motivations of adolescents with and without at-risk/problematic shopping (ARPS) stratified by level of problem-gambling severity: non-gambling (NG), low-risk gambling (LRG), and ARPG. We hypothesized that: (i) in comparison to their non-ARPS counterparts, individuals with ARPS would more likely report ARPG; (ii) adolescents with ARPS would be more likely to report having a family member with problematic gambling behaviors; (iii) there would be a differential relationship between problem-gambling severity and negative health/functioning measures (e.g., alcohol use, antisocial behavior) among adolescents with ARPS in comparison to those without ARPS; (iv) adolescents with and without ARPS would report different gambling-related motivations; and (v) adolescents with ARPS would be more

likely to report paid part-time employment and that the relationship between problem gambling severity and part-time employment would be stronger among ARPS versus non-ARPS respondents;

Methods

Recruitment and survey characteristics

These data were gathered as part of a cross-sectional study of health/functioning characteristics and risk behaviors among high-school students in Connecticut. Full recruitment, sample characteristics and consent procedures have been described previously (Schepis et al. 2008). Invitations to participate were given to all public 4-year and non-vocational or special education high schools in the state. In order to ensure adequate representation of all geographic regions of Connecticut, further targeted recruitment was conducted.

The survey consisted of 154 questions assessing a broad range of demographic characteristics, health/functioning measures, substance use and other risk behaviors. Along with questions related to demographic and health/functioning measures, questions related to shopping behaviors and gambling behaviors were included in these analyses (described below).

At-risk/problematic shopping (ARPS)

All survey respondents were asked how much time they spent shopping. For those respondents reporting any shopping, the following survey items were used to assess ARPS, as reported previously (Grant et al. 2011): (1) ‘Have you ever tried to cut back on buying things?’; (2) ‘Has a family member ever expressed concern about the amount of time you spend shopping?’; (3) ‘Have you ever missed school, work or other important social activities because you were shopping?’; (4) ‘Do you think you have a problem with excessive shopping?’; (5) ‘Have you ever experienced an irresistible urge or uncontrollable need to buy things?’; and (6) ‘Have you ever experienced a growing tension or anxiety that can only be relieved by shopping?’. ARPS was defined as a ‘yes’ response to one or more questions. Non-shoppers and shoppers endorsing no PS items were classified as non-ARPS respondents. Questions 1, 5 and 6 are based on the Minnesota Impulsive Disorders Interview, the reliability and validity of which in screening for adolescent problem shopping has been demonstrated previously (Grant 2008)(Grant et al. 2011).

At-risk/problematic gambling (ARPG)

Gambling groups were defined using items from the Massachusetts Gambling Screen (MAGS) (Shaffer et al. 1994), a validated assessment tool based on the Diagnostic and Statistical Manual of Mental Disorders’ (DSM-IV) criteria for PG (American Psychiatric Association Committee on Nomenclature and Statistics 2000). Consistent with previous studies, participants who reported past-year gambling but did not endorse any of the DSM-IV diagnostic criteria for PG were classified as having LRG, whereas participants endorsing one or more DSM-IV diagnostic criteria for PG were classified as having ARPG (Potenza et

al. 2011; Rahman et al. 2012; Slavin et al. 2013). Participants who reported no past-year gambling were classified as NG.

Demographic variables

Demographic findings for the overall survey have been published previously (Schepis et al. 2008). Demographic variables analyzed here with respect to ARPS status include gender, race/ethnicity, grade and family structure.

Gambling-related social experiences

In order to explore the hypothesis that individuals with ARPS might be more likely to have parents or other relatives who gamble, and to explore other gambling-related social experiences, the following variables were included for all participants (including non-gamblers), as follows: concerns over a family members gambling (yes/no), excess gambling by peers (no peers with excessive gambling, one or more peers with excessive gambling) and feeling pressured to gamble by peers (yes/no).

Health/functioning variables

Data from this survey relating to the health/functioning characteristics of adolescents with and without PS not stratifying by problem-gambling severity has been published previously (Grant et al. 2011). Here, variables relating to academic and extracurricular activities included in our comparisons subdivided by problem-gambling severity and ARPS status included grade average, involvement in extracurricular activities not including part-time jobs (i.e., community service/volunteer work, school clubs, church activities or team sports) and having a paid part-time job. A previous publication on problem shopping using data from this sample defined ‘extracurricular activities’ as including having a paid part-time job (Grant et al. 2011). However, in order to explore the relationship between part-time employment, ARPS and ARPG, we here included the variables ‘extracurricular activities’ and ‘paid part-time job’ separately in bivariate and multivariate analyses (models described below), as has done previously in studies of adolescent substance use and gambling (Schepis et al. 2011; Leeman et al. 2013).

Variables related to mood and aggression included past-year dysphoria/ depression (yes/no) and any aggressive behavior (yes/no to carrying a weapon to school in the past 30 days or to engaging in a serious fight resulting in serious medical attention).

Variables related to substance-use behaviors included lifetime cigarette smoking (never, occasional, regular), lifetime marijuana use (yes/no), lifetime other drug use (yes/no), lifetime alcohol use (yes/no), current alcohol-use severity (never regular (1-5 days/month), light (6-9 days/month), moderate (10-19 days/month), heavy (20-30 days/month)) and current caffeine use (none, 1-2 drinks/day, 3 or more drinks/day).

Gambling behaviors, urges and motivations

Respondents who reported any gambling within the past year (i.e., LRG and ARPG groups) were asked about their gambling behaviors, and responses were coded into the following variables (for details see (Yip et al. 2011)): on-line gambling (yes/no), gambling urges/

triggers (pressure, anxiety), gambling motivations (excitement, escape, financial, social reasons), gambling partners (family, friends, alone) and time spent gambling (less than one hour/week, more than two hours/week).

Data handling and statistical analyses

Data entry, verification and cleaning procedures have been reported previously (Yip et al. 2011). Data relating to demographic factors, part-time employment, engagement in extracurricular activities and gambling-related social experiences were explored using bivariate analyses with the between-subjects factor of group (ARPS vs. non-ARPS). Logistic regression and multinomial logistic regression models adjusting for demographic factors were used to assess associations between problem-gambling severity and health/functioning and gambling behavior variables among adolescents stratified by ARPS status. In order to test whether the magnitudes of these associations differed between ARPS and non-ARPS groups, further regression models were conducted using the interaction term (problem-gambling-severity-by-ARPS-status). For these models, stratum-specific odds ratios (ORs) and 95% confidence intervals (CIs) are presented. CIs excluding 1.0 are considered significant at $p<.05$.

Results

ARPS and sociodemographic characteristics

Among the 2,100 adolescents included in the final sample, 28.67% met criteria for ARPS. Among those participants meeting criteria for ARPS, 40.5% endorsed one PS item and 59.5% endorsed two or more items (Table 1). In comparison to the non-ARPS group, the ARPS group had a higher frequency of female respondents (χ^2= 246.31, p<.0001), a lower frequency of Caucasian respondents (χ^2=9.55, p=.002), and higher frequencies of African American (χ^2=3.93, p=.048), Hispanic (χ^2=17.64, p<.0001) and Other race/ethnicity respondents (χ^2=10.33, p=.001). ARPS and non-ARPS respondents did not differ in family structure or current grade in high school (p's>.1).

ARPS status and gambling-related social experiences

In comparison to the non-ARPS group, a larger proportion of respondents in the ARPS group reported having previously been concerned about the gambling behaviors of a close family member (χ^2=16.27, p<.0001) and having one or more peers who gambled excessively (χ^2=8.34, p=.004). There were no differences between ARPS and non-ARPS respondents in reports of feeling peer pressure to gamble (p>.28).

Problem-gambling severity among ARPS and non-ARPS respondents

No difference in the prevalence estimates of problem-gambling features (i.e., NG, LRG and ARPG) was observed between shopping groups (χ^2=1.15, p=.56). Within the ARPS group, 16.45% of respondents were classified as NG, 56.64% were classified as LRG and 26.91% were classified as ARPG. Within the non-ARPS group, 18.16% of respondents were classified as NG, 54.41% were classified as LRG and 27.44% were classified as ARPG.

Findings from logistic regression analyses examining the relationships between problem-gambling severity and health/functioning measures and individual problem shopping items endorsed among past-year shoppers (APRS and non-ARPS) are shown in Table 2 (bivariate results shown in Supplementary Table 1). In comparison to NG adolescents, adolescents with ARPG were more likely to report having experienced a growing tension or anxiety that could only be relieved by shopping (OR=1.80, CI=1.05-3.09) and having missed school, work or social obligations due to shopping (OR=2.42, CI=1.46-4.03).

Health/functioning measures

Findings from logistic regression analyses examining the relationships between problem-gambling severity and health/functioning measures – including engagement in extracurricular activities and paid part-time employment - among respondents with and without ARPS are presented in Table 3 (bivariate results shown in Supplementary Table 2). Among adolescents in both the ARPS and non-ARPS groups, both LRG and ARPG were also associated with increased likelihoods of a range of negative health/functioning measures (see Table 3 for details), as has been reported previously in studies of adolescent gambling not stratifying by ARPS status (Yip et al. 2011; Rahman et al. 2012).

Interaction analyses revealed a significantly weaker association between problem-gambling severity (ARPG vs. NG) and moderate alcohol use (Interaction OR=0.45, CI=0.22-0.93; APRS: OR=1.04, CI=0.54-2.02; non-APRS: OR=2.56, CI=1.72-3.81) among adolescents in the ARPS group, in comparison to those in the non-ARPS group. Significantly weaker associations were also observed between caffeine consumption (i.e., one to two caffeinated drinks/day; three or more caffeinated drinks/day) and problem-gambling severity (LRG vs. NG) within the ARPS group, in comparison to the non-ARPS group (1-2 drinks: Interaction OR=.47, CI=0.22-0.96; ARPS: OR=0.84, CI=0.43-1.63; non-ARPS: OR=1.92, CI=1.35-2.73; 3 or more drinks: Interaction OR=0.39, CI=0.17-0.930; ARPS: OR=1.24, CI=0.59-2.62; non-ARPS: OR=3.49, CI=2.17-5.62).

Gambling behaviors, urges and motivations

Findings from logistic regression analyses examining the relationships between problem-gambling severity and gambling behaviors, urges and motivations across respondents with and without ARPS are shown in Table 4 (see Supplemental Table 3 for findings from bivariate analyses). Interaction analyses revealed a significantly weaker association between problem-gambling severity and endorsement of financial motivations for gambling among adolescents with ARPS, in comparison to non-ARPS adolescents (Interaction OR=0.51, CI=0.30, 0.85; ARPS: OR=2.02, CI=1.28, 3.18; non-ARPS: OR=4.00, CI=2.97-5.37).

Extracurricular activities and part-time employment

As described previously (Grant et al. 2011), bivariate analysis indicated no between-group difference in the proportion of respondents reporting engagement in extracurricular activities in the ARPS versus non-ARPS groups (χ^2=.06, p.80). However, in comparison to the non-ARPS group, a smaller proportion of adolescents in the ARPS reported part-time paid employment (χ^2=7.30, p=.01). Among non-ARPS adolescents, gamblers (i.e., LRG and ARPG) were more likely than non-gamblers to report engagement in extracurricular

activities (OR=1.81, CI=1.31-2.51; OR=2.56, CI=1.72-3.81), but were less likely to report paid part-time employment (OR=0.65, CI=0.47-0.92; OR=0.59, CI=0.40-0.86). No differences in employment status (OR=1.22, CI=0.70-2.11; OR=1.04, CI=0.54-2.02) or engagement in extracurricular activities (OR=0.70, CI=0.41-1.20; OR=0.66, CI=0.35-1.26) were observed among ARPS adolescents as a function of gambling group. Interaction analyses indicated a weaker association between problem-gambling severity (ARPG vs. NG) and engagement in extracurricular activities (Interaction OR=0.45, CI = 0.22-0.93; APRS OR=1.04, CI=0.54-2.02; non-APRS OR=2.56, CI=1.72-3.81) among respondents in the ARPS group.

Discussion

In this study we explored the relationship between health/functioning characteristics, gambling-related social experiences and gambling behaviors amongst adolescents with and without ARPS across different levels of problem-gambling severity. Both ARPS and ARPG are relatively common among adolescents and are both associated with multiple negative functioning measures (Grant et al. 2011; Villella et al. 2011; Yip et al. 2011). However, to our knowledge this is the first study to explore the associations between ARPS and ARPG in a sample of adolescents.

Problem-gambling severity among adolescents with and without ARPS

In adults, problem shopping is associated with elevated rates of a range of psychiatric comorbidities - including PG and other impulse-control disorders (Christenson 1994; McElroy 1994; Mueller et al. 2010). However, contrary to our first hypothesis, adolescents with ARPS were not more likely to report ARPG. Therefore, it is possible that associations between PS and PG behaviors may develop later in life, or as a function of disease course.

In comparison to non-gambling adolescents, ARPG adolescents were more likely to report (i) experiencing a growing tension or anxiety that can only be relieved by shopping and; (ii) neglecting other responsibilities to pursue shopping (missing social, work or school obligations). This provides preliminary evidence that subtle differences in PS-related symptomatology may exist between adolescents with and without ARPG. Further research into the natural history of PS and PG is needed to explore the longitudinal relationship between these behaviors.

ARPS status and gambling-related social experiences

Consistent with our second hypothesis, a greater proportion of individuals with ARPS reported having previously been concerned about the gambling behaviors of a family member. Frequent alcohol and substance-use disorders have been reported amongst the first-degree relatives of adults with PS (Christenson 1994; Black 1998); however, to our knowledge, this is the first study to explore associations between PS and familial gambling behaviors among youth. Preliminary data suggest neurochemical similarities across alcohol, shopping and gambling disorders (i.e., both naltrexone and memantine have been found to reduce symptoms across these disorders) (Kim 1998; Kim 2000; Grant 2003; Krupitsky et al. 2007; Grant et al. 2008; Grant et al. 2010; Grant et al. 2012). Thus, it is possible that

genetically influenced alterations in opioidergic and/or glutamatergic symptoms may partially account for the elevated co-occurrence rates of these disorders among individuals with PS and their first-degree relatives. However, further research is needed to explore this hypothesis, as well as to more formally assess the prevalence of PG among first-degree relatives of individuals with ARPS.

In comparison to those without ARPS, a greater proportion of adolescents with ARPS reported having peers who gambled excessively. This suggests that individuals with ARPS may be more likely to associate with individuals who engage in gambling behaviors than their non-ARPS adolescents, and - together with the finding that ARPS adolescents were more likely to report having family members with gambling problems – suggests that social learning may play a role in the development of these and behaviors. It is also possible that adolescents with ARPS may be more aware of gambling-related stimuli in their environment (and therefore more likely to recall others' gambling), in comparison to adolescents without ARPS, and this may also relate to increased rates of familial gambling problems. However, the extent to which these or other possibilities are underlying the association warrants additional study.

Health/function measures

Generally speaking, across all individuals, increased problem-gambling severity was associated with increased rates of a range of negative health/functioning measures (e.g., aggressive behavior, substance use), as has been reported previously (Ellenbogen et al. 2007; Yip et al. 2011; Rahman et al. 2012; Slavin et al. 2013). However, consistent with our third hypothesis, different associations between problem-gambling severity and several health/functioning variables were observed between adolescents with and without ARPS.

Substance use

The associations between problem-gambling severity and moderate alcohol use and caffeine consumption were significantly weaker among individuals in the ARPS group (in comparison to the non-ARPS group). Adults with PS report experiencing mood-elevating effects during shopping that are arguably similar to those associated with both caffeine and alcohol use – e.g., 'a buzz' or 'a high' (McElroy 1994)(Lejoyeux et al. 2010). Thus, the decreased association between problem-gambling severity and moderate caffeine and alcohol among ARPS adolescents might relate to a greater likelihood of engaging in shopping behaviors rather than caffeine or alcohol consumption for moderate mood elevation. As these associations were observed with low/moderate level use of substances, it also raises the possibility that these behaviors may relate to less severe patterns, perhaps reflecting initiation or better-controlled use. However, further research into the phenomenology of PS (e.g., through longitudinal studies) is required to substantiate these and other hypotheses.

Gambling behaviors and motivations

Similar associations between problem-gambling severity and engagement in on-line gambling, gambling-related urges and gambling durations were observed across shopping groups. Similarly, across both shopping groups, ARPG was associated with gambling for

escape, excitement, social and financial motivations. However, partially consistent with our fourth hypothesis, the association between problem-gambling severity and gambling for financial reasons was weaker among individuals in the ARPS group. In that gambling and shopping each involve use of money, it is possible that motivations for the use of money are more directed towards shopping – and less towards gambling - in ARPS individuals. Further research investigating drives and behaviors regarding use of money would be helpful in investigating further.

Extracurricular activities and part-time employment

Contrary to our final hypothesis, a smaller proportion of ARPS individuals reported paid-part employment. In addition, the association between engagement in extracurricular activities and problem-gambling severity was weaker among ARPS individuals. These data suggest a complex relationship between job status and engagement in both ARPS and ARPG behaviors during adolescence. Paid part-time employment among adolescents is both common and controversial (Mortimer 2010): Whereas employment during adolescence is associated with some positive developmental factors such as learning time management, responsibility and potentially marketable skills (Mortimer 2010; Greene et al. 2012), research also suggests negative associations, including increased rates of behavioral problems and substance use (e.g., alcohol, tobacco, illicit drugs) (Valois et al. 1999; Ramchand et al. 2007; Mortimer 2010). The relationships between engagement in extracurricular activities and adolescent risk factors appear equally complex; e.g., increased rates of violent behavior and sexual activity (Barnes et al. 2007; Jiang et al. 2012; Leeman et al. 2013) and improved self-esteem and decreased substance use (Darling 2005; Dotterer et al. 2007; Schepis et al. 2011; Leeman et al. 2013) have been reported.

To our knowledge, this is the first report of decreased rates of part-time employment among adolescents with either ARPG or with ARPS. While preliminary, these findings have implications at both familial and public-policy levels – parents and school administrators should educate students about the relationship between different risk variables and part-time employment. Our findings are arguably contrary to previous reports of increased rates of other risky behaviors (e.g., substance use) among employed adolescents (Valois et al. 1999; Ramchand et al. 2007; Mortimer 2010). Thus, further studies are required to determine the precise relationship between part-time job status, gambling, shopping and other possible risk behaviors during adolescence.

Strengths and limitations

This study has several strengths, including its careful characterization of a large sample of adolescents across shopping, gambling and health/functioning variables. This is also one of only a few studies to systematically explore the relationship between PS and other behavioral addictions (Villella et al. 2011), and the first to do so in a large sample of adolescents.

This study also has several limitations, including those inherent to self-report (e.g., the possibility of responder bias) and cross-sectional (e.g., longitudinal relationships could not be explored) methodologies. Further limitations of this study include the absence of

clinician-validated diagnoses of ARPS and ARPG and the absence of a more formal measure of familial problem-gambling history.

Conclusions

To our knowledge, this is the first study to investigate the health/functioning characteristics, gambling-related social experiences and gambling behaviors and motivations of adolescents with and without ARPS. Overall, our findings suggest a relatively subtle yet complex relationship between ARPG and ARPS: ARPG adolescents were more likely than non-gambling adolescents to endorse PS features that may be more closely linked to the pathology of addictions – e.g., a tension or anxiety that can only be relieved by shopping, neglecting other responsibilities. However, ARPG frequency was similar in adolescents with and without ARPS. Interestingly, a larger proportion of adolescents with ARPS reported excessive gambling by peers and feeling concerned over the gambling of a close family member. While the associations between problem-gambling severity and measures of health/functioning and gambling behaviors were largely similar among ARPS and non-ARPS adolescents, differential associations were observed for several variables: engagement in extracurricular activities, gambling for financial reasons, alcohol and caffeine use.

Previous research suggests a similarly complex relationship between problem-gambling severity and other risk factors; e.g., a stronger association between cigarette smoking and problem-gambling severity has been reported among adolescents who engage in serious fights (Slavin et al. 2013). In contrast, in this study we observed significantly weaker associations between problem-gambling severity and other health/functioning variables among adolescents with ARPS. Taken together, the differential relationship between different possible risk factors and problem-gambling severity highlights the importance of considering co-occurring conditions in understanding the health characteristics of adolescents with and without ARPG. Further research investigating the etiologies of these associations is needed to better inform prevention and other interventions efforts (Potenza 2013; Slavin et al. 2013).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Summary of the number of problem shopping items endorsed by adolescents with at-risk/problem shopping (ARPS)

Total Items Endorsed	n	%
1 item	244	40.5
2 items	155	25.8
3 items	94	15.6
4 items	54	9.0
5 items	27	4.5
6 items	28	4.7

Table 2

Problem-gambling severity and individual problem-shopping items among past-year shoppers (APRS and non-ARPS)

	LRG v NG		ARPG v NG	
Shopping Item	**OR**	**95 %CI**	**OR**	**95% CI**
1- Have you ever tried to cut back on buying things?	0.94	.62-1.42	1.14	.70-1.87
2- Has a family member ever expressed concern about the amount of time you spend shopping?	0.87	0.60-1.27	1.40	.90-2.18
3- Have you ever missed school, work or other important social activities because you were shopping?	1.19	.77-1.83	**2.42**	**1.46-4.03**
4- Do you think you have a problem with excessive shopping?	0.86	.47-1.58	1.67	.84-3.29
5- Have you ever experienced an irresistible urge or uncontrollable need to buy things?	0.96	.65-1.42	1.55	.97-2.49
6- Have you ever experienced a growing tension or anxiety that can only be relieved by shopping?	0.97	.61-1.54	**1.80**	**1.05-3.09**

ARPS = at-risk/problem shopping; NG = non-gambling; LRG = low-risk gambling; ARPG = at-risk/problem gambling

Table 3

Problem-gambling severity and health functioning measures among adolescents with and without ARPS

Variable	ARPS				Non-ARPS				Interaction OR			
	LRG vs NG		ARPG vs NG		LRG vs NG		ARPG vs NG		LRG vs NG		ARPG vs NG	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Academic/extracurricular												
Grade average												
Mainly A's &B's[1]	0.61	0.36-1.03	0.66	0.35-1.22	0.95	0.70-1.30	0.61	0.43-0.87	0.67	0.37-1.21	1.18	0.61-2.29
Paid part-time job	0.70	0.41-1.20	0.66	0.35-1.26	**0.65**	**0.47-0.92**	**0.59**	**0.40-0.86**	1.09	0.52-2.02	1.22	0.61-2.43
Other extracurricular	1.22	0.70-2.11	1.04	0.54-2.02	**1.81**	**1.31-2.51**	**2.56**	**1.72-3.81**	0.68	0.36-1.27	**0.45**	**0.22-0.93**
Mood												
Dysphoria/Depression	0.78	0.46-1.30	1.33	0.72-2.45	1.70	1.10-2.62	2.94	1.80-4.79	0.55	0.28-1.06	0.82	0.40-1.69
Any aggression	1.47	0.75-2.90	**3.47**	**1.65-7.27**	**2.62**	**1.64-4.17**	**4.72**	**2.90-7.69**	0.54	0.24-1.19	.80	0.35-1.85
Substance Use												
Smoking, Lifetime												
Occasionally[2]	1.27	0.74-2.19	**2.47**	**1.27-4.78**	2.29	1.50-3.50	3.42	2.15-5.44	0.58	0.29-1.14	0.80	0.37-1.73
Regularly[2]	1.53	0.71-3.31	**4.65**	**1.96-11.05**	2.20	1.32-3.65	3.22	1.83-5.67	0.69	0.28-1.72	1.92	0.72-5.08
Marijuana, lifetime	1.28	0.78-2.10	**1.83**	**1.01-3.33**	2.15	1.51-3.06	3.34	2.31-5.11	0.60	0.33-1.11	0.59	0.30-1.15
Alcohol, lifetime	**5.92**	**2.56-13.69**	**5.06**	**1.90-13.45**	4.00	2.69-5.96	5.33	3.23-8.80	1.21	0.51-2.86	0.68	0.27-1.72
Alcohol, current												
Light[3]	0.98	0.42-2.27	0.95	0.34-2.60	1.20	0.7-2.1	**2.00**	**1.06-3.75**	0.79	0.29-2.08	0.41	0.14-1.23
Moderate[3]	1.03	0.46-2.32	0.93	0.35-2.52	**2.57**	**1.3-5.0**	**5.46**	**2.63-11.35**	0.36	0.13-1.02	**0.12**	**0.04-0.38**
Heavy[3]	4.35	0.90-21.09	**6.73**	**1.23-36.84**	2.32	0.90-6.0	**8.05**	**2.9-22.06**	1.86	0.30-11.48	0.80	0.12-5.28
Other drug, lifetime	1.32	0.53-3.28	**2.66**	**1.02-6.95**	**2.08**	**1.05-4.1**	**4.70**	**2.28-9.66**	0.67	0.22-2.04	0.98	0.30-2.82
Caffeine use												
1-2 per day[4]	0.84	0.43-1.63	1.52	0.64-3.61	**1.92**	**1.35-2.73**	1.23	0.81-1.86	**0.47**	**0.22-0.96**	1.15	0.48-2.77
3+ per day[4]	1.24	0.59-2.62	2.41	0.96-6.06	**3.49**	**2.17-5.62**	**3.77**	**2.23-6.35**	**0.39**	**0.17-0.93**	0.77	0.29-2.05

[1]Reference = mainly C's or lower;

[2]Reference = never;

[3] Reference = never regular;

[4] Reference = none

ARPS = at-risk/problem shopping; NG = non-gambling; LRG = low-risk gambling; ARPG = at-risk/problem gambling

Table 4

Problem-gambling severity and gambling behaviors, urges and motivations among adolescents with and without ARPS

	ARPS		Non-ARPS		Interaction OR	
Variable	**ARPG v LRG**		**ARPG vs LRG**		**ARPG v LRG**	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Online Gambling	**2.62**	**1.5-4.56**	**2.92**	**2.13-3.99**	0.97	0.53-1.78
Gambling Urges						
Pressure	**4.85**	**2.11-11.16**	**3.93**	**2.51-6.16**	1.07	0.45-2.57
Anxiety	**14.74**	**2.91-74.62**	**20.72**	**7.80-55.03**	1.02	0.17-5.93
Gambling Motivations						
Excitement	**4.55**	**2.58-8.00**	**2.54**	**1.84-3.50**	1.60	0.86-2.95
Financial	**2.02**	**1.28-3.18**	**4.00**	**2.97-5.37**	**0.51**	**0.30-0.85**
Escape	**3.20**	**2.01-5.08**	**2.39**	**1.81-3.15**	1.39	0.84-2.29
Social reasons	**1.85**	**1.16-2.94**	**1.85**	**1.42-2.42**	0.83	0.51-1.37
Gambling Partners						
Family	1.29	0.83-2.01	**1.68**	**1.29-2.18**	0.72	0.45-1.16
Friends	1.52	0.93-2.50	**1.94**	**1.38-2.72**	0.70	0.40-1.24
Alone	**5.74**	**2.56-12.87**	**3.10**	**1.96-4.91**	1.53	0.64-3.66
Gambling Duration						
2+ hours/week[1]	**5.22**	**2.44-11.19**	**5.07**	**3.46-7.42**	1.03	0.46-2.33

[1]Reference = less than 1 hour/week; ARPS = at-risk/problem shopping; LRG = low-risk gambling; ARPG = at-risk/problem gambling; ref = reference