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Impulsivity, Sensation-Seeking, and Part-Time Job Status in Relation to Substance Use and Gambling in Adolescents

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 A B S T R A C T

Purpose: Although impulsivity, sensation-seeking, and part-time employment have each been linked to risky behaviors in adolescents, their inter-relationships are less well-understood. We examined data from adolescents to assess the following predictions: (1) sensation-seeking would relate closely to substance use and gambling; (2) impulsivity would relate closely to alcohol, drug, and gambling problems; and (3) these relationships would be particularly strong among those holding part-time jobs.

Method: High-school students (N = 3,106) were surveyed to provide data on impulsivity, sensation-seeking, and part-time job status. Bivariate and logistic regression analyses were conducted to examine relationships with gambling, substance use (i.e., alcohol, cigarettes, and marijuana) and related problems.

Results: Both impulsivity and sensation-seeking related significantly to substance use and impulsivity to gambling. Impulsivity had stronger associations with drug and gambling problems than sensation-seeking did. Students with paid part-time jobs were more likely to drink alcohol, binge drink, and use marijuana. Sensation-seeking had a particularly strong relationship to heavy cigarette smoking among students with part-time jobs. Conversely, there was little relationship between part-time job status and smoking among low sensation-seekers.

Conclusions: These findings further support the relevance of sensation-seeking, impulsivity, and part-time job status to risky behaviors among adolescents. Sensation-seeking and impulsivity had unique relationships to risky behaviors, in accordance with theory and prior evidence. Impulsive adolescents may be in particular need for interventions to reduce drug use and gambling. Although part-time jobs can be beneficial, parents and caregivers should be mindful of potential negative ramifications of paid work outside the home.

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 IMPLICATIONS AND
 CONTRIBUTION

It is important to identify and intervene with sensation-seeking and/or impulsive adolescents. Impulsive adolescents may have particular need for interventions to reduce drug use and gambling. Although part-time jobs can be beneficial, parents and caregivers should be mindful of potential negative ramifications of paid work outside the home.

Early alcohol, cigarette, and marijuana use, all of which are prevalent, may lead to subsequent use of harder drugs and substance use disorders [1]. Among late adolescents in the

United States, 78% reported lifetime alcohol use, 47% reported at least 12 drinks per year, 42% reported lifetime illicit drug use and 16% reported lifetime illicit drug abuse according to DSM-IV criteria [2]. Over 70% of adolescents report recent/past-year gambling with gambling typically defined as wagering something of value in activities such as card games and lotteries [3,4].

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Adolescents appear two-to-four times more likely than adults to experience gambling problems [3]. Given their prevalence and negative ramifications, substance use and gambling among adolescents are public health concerns. Thus, there is a need to identify correlates of substance use, gambling, and problems with these behaviors among adolescents, which may facilitate identification of those at greatest risk and shape interventions.

Difficulties with self-control may be important correlates of risky behaviors such as substance use in adolescence [5]. Neural circuitry supporting higher-order self-regulation is not fully developed in adolescence, which likely contributes to impulsivity and sensation-seeking [6]. Impulsivity reflects “a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or others” [7,8]. Sensation-seeking is the pursuit of “varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experiences” [9] (p. 27, emphasis in original). Impulsivity and sensation-seeking are related, yet distinct constructs [10]. Differing neurodevelopmental features may contribute to impulsivity and sensation-seeking and their divergent developmental trajectories [11]. Distinctions between these constructs parallel an empirically supported dual-pathway theory (e.g., [12]), stating that risky behaviors result from poor response inhibition and excessive reward-seeking. Poor inhibition of behavior may make impulsive individuals vulnerable to negative consequences or problems with substance use and gambling while the reward drive of sensation-seekers may predispose to frequent engagement in gambling and substance use, with basic- [13] and human-research findings [14] supporting this idea.

Related to self-control difficulties [6], adolescent impulsivity and sensation-seeking are associated with substance use cross-sectionally [15,16] and predict substance-related problems longitudinally [16,17]. Impulsivity may increase the likelihood of gambling onset [18] and predict subsequent problem gambling [19]. Adolescent sensation-seeking is associated with gambling severity cross-sectionally [20]. Relationships between substance use/gambling and difficulties with self-control may be reciprocal. Evidence suggests impulsivity and sensation-seeking measured in late adolescence predict undergraduate heavy drinking and at the same time, heavy drinking predicts subsequent increases in impulsivity and sensation-seeking among undergraduates [21].

Impulsivity and related tendencies (e.g., conduct disorder) share genetic features with substance-use disorders [22]. Genetically mediated tendencies such as impulsivity and substance dependence are often viewed as interacting with key features in the environment to produce elevated risk. Analogous to these gene-by-environment interactions, we considered interactions of impulsivity and sensation-seeking with a key feature of the adolescent environment: part-time employment. Paid employment may be beneficial for some adolescents, though positive effects are not found consistently [23]. Jobs have been linked to alcohol and drug use and gambling in adolescents, with the risk appearing to increase with increasing work hours [23,24]. However, effects were small in a national survey [25], suggesting individual differences. There are multiple proposed explanations for relationships between work outside the home and risky behaviors, which are non-mutually-exclusive. Jobs provide income that could financially support risky behaviors such as substance use and gambling [26]. Work outside the home can increase deviant activity due to exposure to deviant peers, increased adolescent autonomy,

reduced parental monitoring [23,26] and decreased opportunities for structured extracurricular activities [25,27], which have been associated with less alcohol [28], drug [28,29], and cigarette use [29]. Having a part-time job has been linked to general risk-taking proclivities among adolescents [30]; thus, adolescents having both a part-time job and difficulties with self-control may be particularly likely to engage in substance use or gambling.

We assessed relationships between difficulties with self-control (i.e., impulsivity and sensation-seeking) and risky behaviors (i.e., gambling, substance use) and problems with these behaviors among adolescents. We predicted sensation-seeking would relate more closely to substance use and gambling while impulsivity would relate more closely to problems with these behaviors [31]. We also predicted interactions, such that relationships between difficulties with self-control and risky behaviors would be strongest among those with part-time jobs. A variable capturing participation in extracurricular activities was included to account for the possibility that risk associated with having a job was due largely to nonparticipation in these activities.

The present study is unique in multiple ways. Relationships involving impulsivity and sensation-seeking have been addressed individually in prior studies involving adolescents; however, impulsivity and sensation-seeking are addressed less commonly in the same study. Testing statistical models for multiple risky behaviors in the same study is rare, and examination of correlates of substance use and gambling in the same study is even less common. There are few studies exploring moderating relationships between risky behaviors and impulsivity/sensation-seeking by part-time job status.

Method

Participants

Recruitment has been described previously (e.g., [32,33]). Briefly, all Connecticut public high schools were invited to participate. The final survey sample ($N = 4,523$) included schools from all Connecticut regions and district reference groups (DRGs), based on the socioeconomic status of households in those districts (see [supplementary materials](#) for details). The present study sample ($n = 3,106$) (Table 1) was comprised of participants providing complete data for all variables in the statistical models (i.e., demographics, sensation-seeking, impulsivity, and part-time job status) and at least one substance or gambling-related variable.

Procedure

Passive parental consent procedures were approved by participating schools and Yale’s institutional review board and the study was in compliance with the Health Insurance Portability and Accountability Act (HIPAA). Students were informed participation was voluntary and that responses were confidential and anonymous. A pen was offered to each student for participation. The refusal rate was less than 1%.

Measures

Demographics included gender, age, and race/ethnicity. As in previous reports from this survey (e.g., [32–35]), categorical variables pertaining to substance use and gambling were created and analyzed due to limited variability of responses to these items. Use of similar categorical groupings also allowed for

Table 1
Sample characteristics (N = 3,106)

Variable	Percent/mean (SD)
Percent female	54.6%
Mean age (SD)	15.86 years (1.23)
Race	76.6% White
	5.7% African-American
	3.3% Asian
	4.3% Multiple races
	10.1% Other
Ethnicity	88% Non-Hispanic/Latino(a)
	12% Hispanic/Latino(a)
Holding a part-time job	40.4%
Regular participation in at least one extracurricular activity	48.6%
Lifetime alcohol users (at least one drink)	68.6%
Having at least 1 binge-drinking day in past 30 days	30.7%
Alcohol consumption frequency in past 30 days	52.5% None
	30.4% One to five days (infrequent)
	17.1% Six days or more (frequent)
Reporting a lifetime problem with alcohol	3.9%
Lifetime cigarette smokers	37.4%
Cigarette-use frequency in past 30 days	80.3% None
	12.7% Up to seven per day (infrequent)
	7% Eight or more per day (frequent)
Lifetime marijuana users	38.2%
Smoking marijuana at least once in past 30 days	22.8%
Reporting a lifetime problem with drug use	4.7%
Engaging in any gambling in past 12 months	90.9%
Hours spent gambling in an average week	88.3% An hour or less (infrequent)
	11.7% Two hours or more (frequent)
Endorsing one or more criteria for pathological gambling in past 12 months	13.7%
Mean impulsivity sum score out of a possible 8 (SD)	3.44 (2.18)
Mean sensation-seeking sum score out of 11 (SD)	6.59 (2.91)

continuity across the present investigation and other papers published from the survey data.

Alcohol. Two variables were created. Participants first indicated whether or not they ever had a drink of alcohol other than a few sips. Lifetime drinkers reported past-30-day frequency of consumption, responses to which were collapsed into a three-level variable: none, infrequent (1–5 days), and frequent use (≥ 6 days). Participants also reported past-30-day frequency of binge-drinking (≥ 5 drinks in a row for males, ≥ 4 for females). A binary variable (yes/no) of any past-30-day binge-drinking was created.

Cigarettes and marijuana. Participants indicated whether or not they had ever smoked cigarettes. Those who had smoked reported their average cigarettes per day in the prior 30 days. These items were collapsed into a single variable with participants grouped as non-, light (≤ 7 cigarettes per day), and heavy smokers (≥ 8 per day). Similarly, those who reported having ever smoked marijuana then reported frequency of past 30-day use. These items were combined into a binary past-30-day use/nonuse variable.

Gambling. Gambling was defined as “any game you bet on for money OR anything else of value.” Participants who indicated gambling ≤ 1 hour or no past 12-month involvement in any type of gambling were considered infrequent gamblers, while those who reported gambling ≥ 2 hours per week were deemed frequent gamblers.

Alcohol, drug, and gambling problems. Participants reported on their history of alcohol or drug problems in separate, single items: “Do you now have, or have you ever had, an alcohol problem?” “Do you now have, or have you ever had, any kind of a drug problem?” Questions regarding current *DSM-IV-TR* criteria for pathological gambling were assessed using items from the Massachusetts Gambling Screen [36]. As in prior reports from this survey (e.g., [33,37]), a binary problem-gambling severity variable was created based on responses to this measure. Low-risk gambling was defined as past-year gambling without acknowledging any *DSM-IV* criteria and at-risk/problem gambling was defined as meeting one or more criteria.

Impulsivity and sensation-seeking. Impulsivity and sensation-seeking were assessed with the Zuckerman-Kuhlman Personality Questionnaire [38], which consists of true/false questions, eight of which pertain to impulsivity (primarily lack of premeditation [38]) ($\alpha = .70$) and 11 of which pertain to sensation-seeking ($\alpha = .78$). Sum scores were created for each construct.

Part-time job status. Participants reported their part-time job status with the following single item: “Do you currently have a paid part-time job?” Participants indicated yes or no.

Extracurricular activities. Based on the following single item, students were classified as participating or not participating in activities: “Do you currently do any of the following on a regular basis (at least 1–2 times per month). Check all that apply.” A binary variable was created based on whether or not participants reported being involved in “community service/volunteer work,” “school clubs,” or “church activities.” Team sports were omitted given evidence of relationships to greater alcohol consumption [39]. This variable was included in statistical models to address the possibility that having a part-time job is problematic at least in part because it decreases students’ opportunities to participate in structured, pro-social extracurricular activities [25,27].

Data analysis

Analyses were conducted using IBM SPSS, version 19 (Armonk, NY). Preliminary analyses included examination of item distributions; bivariate correlations to assess relationships among variables; *t*-tests and *Chi*-square analyses to compare variables between survey participants included in the present study and those not included due to missing data.

The primary analytic approaches were logistic regression models for binary variables and multinomial logistic regression models for three-level categorical variables. As with prior reports from this survey [32–35], all participants with complete data were included in models for gambling/substance use (i.e., frequency of binge-drinking, frequency of alcohol drinking overall, cigarette, and marijuana use). Abstainers (past-year for gambling and lifetime for substances) were omitted from models for alcohol, drug, and gambling problems. Model entry of variables occurred in two steps with individual variables in an initial step, followed by

interaction terms in the second step. Two-way interactions of part-time-job status with impulsivity and sensation-seeking were tested in the primary models. Impulsivity and sensation-seeking scores were mean-centered to reduce possible collinearity with interaction terms [40]. Interactions with nonsignificant *p* values were dropped and models were retested without them. Thus, final models for substance use/gambling included demographics, impulsivity, sensation-seeking, part-time job status, and remaining interactions. The same approach was used for related drug, alcohol, and gambling problems except that a variable capturing substance use/gambling was also included. Model goodness of fit was assessed using *chi*-square comparisons of $-2 \log$ likelihood between the final and constant-only models, along with the Hosmer and Lemishow test for logistic regressions and Pearson and deviance statistics for multinomial logistic regressions. Significant interactions were interpreted by plotting results of simple regression equations at values of the individual variables 1 SD above and below 0 (or at both values for binary variables) [40]. Given testing of multiple models and use of multiple comparisons, an alpha level of $p \leq .01$ was adopted for all analyses.

Along with the primary models, we tested alternate logistic regressions including two-way interactions of gender with part-time job status, impulsivity, and sensation-seeking and interactions between participation/nonparticipation in activities and part-time-job status. The latter interactions were tested to address the possibility that a job was particularly problematic for those who did not participate in structured activities. None of these interactions was statistically significant in any model; thus, results of these alternate models are not reported. We also retested the final, primary models using a mixed-model approach to account for the nested structure of the data within schools. School was a random variable and other variables were fixed effects in these models. The mixed models did not yield substantially different results; thus, we reported findings from the more parsimonious logistic regressions.

Results

Preliminary analyses

Using all available data, we compared those included in the studied sample with those not included due to missing data. Excluded individuals were more likely to be male, non-white, and Hispanic/Latino(a); report frequent cigarette smoking,

gambling, and marijuana use; have lifetime histories of alcohol and drug problems; and scored higher for impulsivity. The highest correlation between variables included in the same models was between impulsivity and sensation-seeking ($r = .58$, $p < .001$). Thus, no correlations were high enough to raise concern about collinearity. Tests indicated good fit to the data for all regression models.

Regression models for substance use and gambling

Alcohol. According to logistic regression (Table 2) and multinomial logistic regression (Table 3) results, impulsivity, sensation-seeking and having a part-time job were significantly and positively associated with binge-drinking and more frequent alcohol consumption overall. Nonparticipation in extracurricular activities was also associated with binge-drinking and more frequent alcohol use overall; however, these significant effects did not appear to detract substantially from the effect of part-time job status on alcohol use. The impulsivity effect for overall frequency pertained only to the comparison between frequent consumption and no use. Older, white, and Hispanic/Latino(a) students were more likely to have endorsed binge-drinking at least once in the past 30 days and endorsed more frequent consumption overall. There were no significant gender differences for either alcohol variable.

Cigarettes. In a multinomial regression, there were significant effects of impulsivity and sensation-seeking but not of part-time job status (Table 3). Sensation-seeking had a significant association with light smoking versus nonsmoking but not with heavy smoking versus nonsmoking. Associations involving sensation-seeking and part-time job status should be interpreted in light of a significant interaction. The relationship between sensation-seeking and heavier smoking pertained to those with a part-time job to a greater extent than those without a part-time job. Among low sensation-seekers, a part-time job bore little relationship to heavy smoking (Figure 1). The significant interaction did not pertain to light smoking; thus, for heavier smoking, effects of sensation-seeking were moderated by part-time-job status, whereas for lighter smoking, the relationship between sensation-seeking and smoking was more direct. Nonparticipation in activities was associated with both heavy and light smoking compared with no smoking. Age, female gender, and Hispanic/Latino(a) ethnicity also related significantly to cigarette

Table 2
Logistic regression models for binge-drinking of alcohol, marijuana use, and gambling

Variable	Binge-drinking of alcohol			Marijuana use			Gambling		
	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>
Age	1.38	1.28–1.49	<.001	1.31	1.20–1.43	<.001	1.19	1.04–1.36	.009
Gender	.98	.82–1.17	.979	1.03	.85–1.25	.748	5.04	3.35–7.56	<.001
Race	2.06	1.59–2.68	<.001	1.35	1.03–1.77	.031	.90	.59–1.37	.631
Ethnicity	2.15	1.57–2.94	<.001	1.42	1.03–1.98	.035	1.95	1.21–3.17	.007
Regular participation in at least one activity	.68	.57–.80	<.001	.57	.47–.68	<.001	1.04	.76–1.43	.801
Impulsivity	1.11	1.06–1.17	<.001	1.11	1.05–1.17	<.001	1.14	1.04–1.25	.004
Sensation-seeking	1.19	1.15–1.24	<.001	1.19	1.14–1.24	<.001	1.08	1.01–1.15	.034
Have a part-time job	1.57	1.30–1.89	<.001	1.35	1.10–1.66	.004	1.19	.83–1.67	.303

Gender: male coded 1, female coded 0; race: white coded 1, non-white coded 0; ethnicity: Hispanic/Latino(a) coded 1, non-Hispanic/Latino(a) coded 0; activity participation: at least one activity coded 1, no activities coded 0; part-time job coded 1, no job coded 0.

Statistically significant results at $p \leq .01$ indicated in bold. Two-way interactions of part-time job status with impulsivity and with sensation seeking were tested initially; however, these interactions were not statistically significant in any of the models reported in this table. Therefore, the interactions were dropped and models were retested without them. Thus, the models reported here included no interactions.

OR = odds ratio; CI = 95% confidence interval.

Table 3
Multinomial logistic regression models for overall frequency of alcohol use and heaviness of cigarette use

Variable	Frequent vs. no alcohol consumption			Infrequent vs. no alcohol consumption			Heavy cigarette use vs. no cigarette use			Light cigarette use vs. no cigarette use		
	OR	95% CI for OR	p	OR	95% CI for OR	p	OR	95% CI for OR	p	OR	95% CI for OR	p
Age	1.53	1.38–1.70	<.001	1.24	1.14–1.34	<.001	1.55	1.36–1.78	<.001	1.29	1.16–1.44	<.001
Gender	.86	.68–1.07	.170	.80	.67–.96	.014	.87	.64–1.18	.376	.55	.43–.70	<.001
Race	1.94	1.40–2.68	<.001	1.83	1.43–2.36	<.001	1.25	.81–1.92	.314	1.38	.98–1.94	.069
Ethnicity	1.94	1.31–2.88	.001	1.72	1.25–2.36	.001	1.99	1.24–3.19	.004	1.07	.70–1.64	.755
Regular participation in activities	.54	.43–.67	<.001	.71	.60–.85	<.001	.45	.33–.61	<.001	.67	.54–.85	.001
Impulsivity	1.15	1.08–1.22	<.001	1.03	.98–1.08	.207	1.22	1.12–1.33	<.001	1.11	1.04–1.18	.001
Sensation-seeking	1.25	1.19–1.32	<.001	1.20	1.15–1.25	<.001	1.05	.97–1.15	.227	1.21	1.12–1.30	<.001
Have a part-time job	2.00	1.57–2.54	<.001	1.50	1.24–1.82	<.001	.82	.57–1.20	.313	1.38	1.04–1.81	.024
Sensation-seeking-by-part-time-job interaction			ns				1.25	1.11–1.42	<.001	1.03	.94–1.13	.537

Gender: male coded 1, female coded 0; race: white coded 1, non-white coded 0; ethnicity: Hispanic/Latino(a) coded 1, non-Hispanic/Latino(a) coded 0; activity participation: at least one activity coded 1, no activities coded 0; part-time job coded 1, no job coded 0.

Statistically significant results at $p \leq .01$ indicated in bold. Two-way interactions of part-time job status with impulsivity and with sensation seeking were tested initially in each model; however, these interactions were dropped when not statistically significant. Thus, the results presented here include only statistically significant interaction terms.

OR = odds ratio; CI = 95% confidence interval.

use (Table 3). The gender effect pertained only to light as compared with no smoking, whereas the ethnicity effect pertained only to heavy versus no smoking.

Marijuana. In a logistic regression, there were significant effects of impulsivity, sensation-seeking, and part-time-job status (Table 2). Nonparticipation in activities was also associated with marijuana use; however, this significant effect did not appear to detract substantially from the effect of part-time-job status on marijuana. Age was the only demographic variable that related significantly to marijuana use. There were no significant interactions.

Gambling. In a logistic regression, impulsivity related significantly to more frequent gambling but sensation-seeking did not. Neither part-time-job status nor participation in activities related significantly to gambling, and there were no significant interactions (Table 2). There were also significant effects of age, male gender, and Hispanic/Latino(a) ethnicity.

Regression models for drug, alcohol, and gambling problems

There were no significant interactions in any of these models. The only significant variable in a model for lifetime alcohol

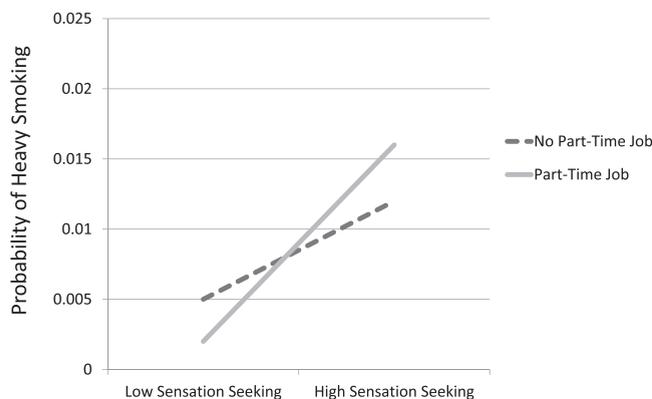


Figure 1. Interaction between sensation seeking and part-time job status in relation to cigarette smoking.

problems was frequency of alcohol use (Table 4). In a model of lifetime drug problems, past-30-day marijuana use and impulsivity were significant; however, sensation-seeking was not. Neither part-time-job status nor participation in activities nor any demographic variables was related to drug-problem history (Table 4). In a model of at-risk/problem gambling, frequent gambling and impulsivity were significant; however, sensation-seeking was not. Neither part-time-job status nor participation in activities was significant. Male students were more likely to have at-risk/problem gambling; however, no other demographic variables were significant (Table 4).

Discussion

Our findings support the relevance of impulsivity and sensation-seeking to risky behaviors in adolescents [15,18,20]. Our contention—based on theory (e.g., [12]) and empirical findings [10,11]—that impulsivity and sensation-seeking are distinct constructs with unique relationships to risky behaviors was empirically supported. Our specific predictions that sensation-seeking would relate more closely to substance use and gambling, and that impulsivity would relate more closely to problems with these behaviors [31], were partly supported. Sensation-seeking and impulsivity had significant relationships to all substance-use and gambling variables with the exception of a nonsignificant relationship between sensation-seeking and gambling. However, only sensation-seeking had a significant interaction with part-time-job status in relation to substance use (cigarettes). Further, as predicted, only impulsivity had significant associations with related problems (drugs and gambling).

Findings from this study support the position that paid part-time work may be a risk factor for adolescent substance use, but not gambling. Relationships involving part-time job status pertained only to substance use and not to related problems as reported by the students in this study. We hypothesized interactions between part-time job status and difficulties with self-control in relation to risky behaviors, analogous to gene-by-environment interactions. Tendencies such as impulsivity appear to be genetically mediated and share genetic features with substance-use disorders [22]. We found one such significant interaction: with sensation-seeking in relation to heavier

Table 4
Logistic regression models for alcohol, drug, and gambling problems

Variable	Alcohol			Drug use			Gambling		
	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>
Age	1.17	.98–1.39	.087	1.08	.88–1.31	.469	1.03	.92–1.16	.576
Gender	1.12	.76–1.65	.577	1.33	.87–2.03	.191	2.89	2.13–3.92	<.001
Race	1.34	.73–2.44	.347	.81	.45–1.47	.495	.96	.67–1.39	.839
Ethnicity	1.99	1.07–3.71	.030	1.47	.76–2.87	.254	1.40	.89–2.18	.144
Regular participation in activities	1.03	.70–1.53	.884	.74	.47–1.15	.174	1.00	.77–1.31	.985
Frequency of substance use/gambling									
Infrequent alcohol use ^a	1.02	.57–1.82	.947						
Frequent alcohol use ^a	3.72	2.17–6.38	<.001						
Marijuana use				3.90	2.24–6.79	<.001			
Gambling							4.81	3.35–6.90	<.001
Impulsivity	1.14	1.02–1.27	.020	1.18	1.05–1.33	.007	1.14	1.05–1.23	.001
Sensation-seeking	1.01	.93–1.11	.797	1.04	.94–1.14	.484	1.04	.99–1.11	.142
Have a part-time job	.98	.64–1.48	.905	1.49	.94–2.36	.091	.85	.63–1.13	.260

Gender: male coded 1, female coded 0; race: white coded 1, non-white coded 0; ethnicity: Hispanic/Latino(a) coded 1, non-Hispanic/Latino(a) coded 0; activity participation: at least one activity coded 1, no activities coded 0; part-time job coded 1, no job coded 0.

Statistically significant results at $p \leq .01$ indicated in bold. Two-way interactions of part-time job status with impulsivity and with sensation seeking were tested initially; however, these interactions were not statistically significant in any of the models reported in this table. Therefore, the interactions were dropped and models were retested without them. Thus, the models reported here included no interactions.

OR = odds ratio; CI = 95% confidence interval.

^a Three-level alcohol use variable dummy coded for analytic purposes with recent abstinence as the reference group.

cigarette smoking as high sensation-seekers with jobs were more likely than those without jobs to smoke cigarettes heavily. Conversely, a part-time job had little association with heavy cigarette use among low sensation-seekers. We also showed that risk associated with a part-time job appeared not to relate to nonparticipation in extracurricular activities. Items in this survey did not permit us to examine other possible explanations for risk associated with part-time job status such as association with deviant peers [23,26]. These possible mediating factors should be addressed in future studies.

This study has multiple strengths, including a large sample size. Inclusion of multiple outcome variables involving substance use and gambling is relatively unique. This allowed for assessment of consistency in relationships with predictor variables across risky behaviors. Inclusion of impulsivity and sensation-seeking in the same statistical models permitted observation of similarities and distinctness regarding associations with risky behaviors. Part-time-job status has not been addressed often in adolescent studies. Our findings suggest part-time work deserves attention in future studies.

The study also had limitations. The goal of the survey was breadth, and accordingly, myriad health behaviors and potential correlates were assessed. Several constructs were examined with single items, including alcohol and drug problems. Many of these items have not been fully evaluated for their psychometric properties. Although the single-item on part-time-job status had utility, prior findings suggest number of work hours had a stronger relationship to substance-related measures than merely whether or not an adolescent had a job [23]. That we identified significant relationships involving part-time-job status despite these limitations suggests the construct may be a robust correlate of substance use. There was considerable missing data and, in multiple respects, students with missing data were at higher risk (e.g., more frequent gambling, cigarette and marijuana use) than those with complete data. We nonetheless found several significant relationships between proposed risk factors and substance use/gambling. More complete data from these higher risk students may have further strengthened results of the present study.

The present findings highlight the importance of identifying and intervening with sensation-seeking and/or impulsive adolescents. Specifically, these findings supported theory and prior evidence of unique relationships of impulsivity and sensation-seeking to risky behaviors. Given stronger relationships with lifetime histories of drug and gambling problems, impulsive adolescents may have particular need for interventions to reduce drug use and gambling. Having a paid part-time job may increase risk of substance use among adolescents. Regarding cigarette smoking, risk associated with a part-time job pertained primarily to high sensation-seekers. Although part-time jobs can be beneficial, parents and caregivers should be mindful of potential negative ramifications of paid work outside the home.

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Supplementary Data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.jadohealth.2013.09.014>.

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