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Common and unique parenting predictors of adolescent tobacco and alcohol use

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Abstract

The current study sought to identify unique and common demographic and parental predictors of adolescent tobacco and alcohol initiation behaviors.

Methods—A total of 1,023 middle school students (Grades 6–8) and their parents from six Rhode Island schools were enrolled in a larger study on substance use initiation and progression, with the current sample representing those dyads with data at baseline and at a 12-month follow-up ($n = 814$ dyads). There was a relatively even split with regard to adolescent sex ($n_{\text{females}} = 444$; 55%). Comparisons were made between covariate/predictor associations with corresponding substance use behaviors (e.g., ever puffed a cigarette vs. ever sipped an alcoholic drink; ever smoked a whole cigarette vs. ever drank a full alcoholic drink).

Results—At the bivariate level, a host of demographic and parent-related variables were associated with each adolescent substance use behavior. Adolescent reports of parental monitoring variables were consistently more related to use than parent reports. In multivariate logistic regression analyses, adolescent reports of parental monitoring variables were more frequently associated with tobacco use behaviors than alcohol use behaviors. Tobacco use behaviors were more strongly predicted by perceived availability of tobacco than alcohol use behaviors were predicted by perceived availability of alcohol.

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Contributors

Drs. Jackson, Colby, and Barnett designed the study and wrote the protocol. Dr. Abar conducted literature searches and provided summaries of previous research studies. Dr. Abar conducted the statistical analysis. Dr. Abar wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

Conclusions—The distinctive predictors observed for cigarette versus alcohol use make it problematic for new and existing programs to assume that efforts targeting specific individual or parental characteristics will impact both substances with equivalent efficacy.

Keywords

parents; adolescent; alcohol; tobacco

1. Introduction

The initiation and progression of tobacco and alcohol use tend to be positively associated during adolescence (e.g., Hoffman et al., 2001; Jackson et al., 2002; Johnson et al., 2000; Weitzman and Chen, 2005). This association does not, however, imply that these initial substance use behaviors are necessarily predicted by the same antecedents. For example, while demographic and parent variables comprise key domains for youth alcohol and tobacco use, the specific characteristics associated with the onset of use of each substance may meaningfully differ. Greater parental monitoring (Hill et al., 2005; Mahabee-Gittens et al., 2012), parent education and income (Gilman et al., 2003), parental tobacco use (Gilman et al., 2009) and a closer parent-child relationship have been associated with a decreased likelihood of smoking initiation, whereas lower levels of parental alcohol modeling (Ellickson and Hays, 1991; Fisher et al., 2007) and greater parental monitoring (Barnes et al., 2000) have been linked with earlier alcohol use. To date, comparisons of the magnitudes of predictive effects have not commonly been made across substances within a given sample of adolescents.

Moreover, very little research has explicitly examined differential associations between predictors and very early initiation milestones (e.g., puffing a cigarette; sipping alcohol). Earlier onset of these preliminary substance use behaviors has the potential to cascade into earlier progression to more advanced substance use. Early onset of alcohol use is predictive of adult alcohol dependence (e.g., Guttmanova et al., 2011; Hingson et al., 2006), and early onset of tobacco use is predictive of multiple health risks later in adolescence (DuRant et al., 1999; USDHHS, 2012). Unanswered questions regarding differential prediction of early substance use behaviors are important for the design of prevention programs targeting the unique risk for each substance.

1.1. Study Purpose

The current investigation sought to examine similarities and differences in demographic and parental predictors of adolescent cigarette and alcohol initiation behaviors. Specifically, we prospectively compared associations between demographic characteristics, perceived availability of tobacco and alcohol, parental substance use modeling, parental monitoring constructs, and parent-teen relationship quality and the likelihood of (a) ever puffing a cigarette and ever sipping alcohol and (b) ever smoking a whole cigarette and ever consuming a full alcoholic drink.

2. Materials and Methods

2.1. Participants

The sample comes from a prospective study of substance use initiation and progression during adolescence (Jackson et al., 2013). A total of 1,023 middle school students and their parents from six Rhode Island schools were enrolled in the larger study. Consent rates ranged from 16 – 30% across schools, with consenting students largely representative of their school populations with regard to sex, slightly over-representative of racial and ethnic minority students, and slightly under-representative of students with lower socioeconomic status. The current sample represents a subset for which (a) data were collected from one (self-selected) parent and (b) youth were retained at a 12-month follow-up. This resulted in 814 parent-child dyads (80% of the sample). Adolescents were in 6th ($n = 267$), 7th ($n = 261$), or 8th grade ($n = 286$) at baseline. There was a relatively even split with regard to adolescent sex ($n_{\text{females}} = 444$; 55%), and the majority of participants were Non-Hispanic White ($n = 602$; 74%).

2.2. Procedure

Adolescents completed a baseline computer-based survey. Parents separately completed a baseline paper-and-pencil survey. Twelve months later, adolescents completed a follow-up computer-based survey.

2.3. Measures

2.3.1. Current Parental Substance Use—Current parental alcohol use was indexed by any parent-reported alcohol use in the past 30 days ($n = 545$; 67%). Current parental cigarette use was indexed by parent-reported daily or occasional smoking ($n = 152$; 19%).

2.3.2. Parent-Child Relationship Quality—Adolescents completed the Network of Relationships Inventory (Furman and Buhrmester, 1985; 2009), which consists of 15 items (1 = “Little or None”, 5 = “The Most”) representing social support (6 items; Mother $\alpha = 0.85$; Father $\alpha = 0.85$) and negative interchanges (9 items; Mother $\alpha = 0.91$; Father $\alpha = 0.91$). Scales from mothers and fathers were averaged to represent overall support ($M = 2.86$; S.D. = 0.86) and negative interchanges ($M = 1.63$; S.D. = 0.61), with higher scores indicating greater support and negative interchanges.

2.3.3. Parental Monitoring Variables—Adolescents and parents responded, on a five-point scale, about four constructs related to parental monitoring from Stattin and Kerr (2000): parental knowledge (e.g., how much parents know about adolescent’s activities; 9 items; $\alpha_{\text{adolescents}} = 0.87$, $\alpha_{\text{parents}} = 0.80$), parental solicitation (e.g., how much parents ask about adolescent’s activities; 5 items; $\alpha_{\text{adolescents}} = 0.82$, $\alpha_{\text{parents}} = 0.76$), child disclosure (e.g., how much the adolescent tells parents of his/her activities; 4 items; $\alpha_{\text{adolescents}} = 0.71$, $\alpha_{\text{parents}} = 0.63$), and parental control (e.g., how much parents control adolescent’s activities; 3 items; $\alpha_{\text{adolescents}} = 0.69$, $\alpha_{\text{parents}} = 0.57$).

2.3.4. Adolescent Substance Use Initiation Behaviors—Adolescents were surveyed on their lifetime substance involvement at the 12-month follow-up. Four behaviors were

assessed: (a) “Have you ever tried or experimented with cigarette smoking, even a few puffs/drags?” (termed “ever puffed” herein), (b) “Have you ever had a sip of alcohol?” (termed ever sipped), (c) “Have you ever smoked a whole cigarette?”, and (d) “Have you ever had a full drink of alcohol?” (See Table 1).

2.3.5. Covariates—In addition to adolescent sex, grade, and race/ethnicity, we included *adolescent perceived availability* of alcohol and cigarettes as covariates. These variables were indexed using the following items: “If you wanted some beer, wine, or hard liquor, could you get some?” ($N_{\text{Yes}} = 216$; 27%), “If you wanted to get some cigarettes, could you get some?” ($N_{\text{Yes}} = 147$; 18%).

2.4. Analytic Plan

Spearman correlations between predictors and analogous substance use behaviors (i.e., ever puffed/sipped; ever full cigarette /full drink) were compared using Fisher’s Z-transformations. We then performed hierarchical logistic regressions examining each substance use behavior. Step 1 of these models included demographics, perceived substance availability, parental substance use, and relationship quality variables. Step 2 included the parental monitoring variables. To avoid unnecessary multicollinearity, adolescent and parent reports were examined in separate models (adolescent reports [AR] in Step 2a; parent reports [PR] in Step 2b).

3. Results

3.1. Substance Use Outcomes

Results indicated that, consistent with national data (Johnston et al., 2013), each alcohol use behavior was more common than the corresponding cigarette use behavior (see Table 1).

3.2. Bivariate Associations

3.2.1. Comparing Ever Puffed and Ever Sipped—The first two columns in Table 1 present associations between covariates/predictors and ever puffed and ever sipped. Parental education, income, and parent reports of child disclosure were negatively associated with ever puffed only, current cigarette use was only positively associated with ever puffed, and current parental alcohol use was positively associated only with ever sipped. The relationships between perceived cigarette availability (positive) and parent reports of knowledge (negative) were also significantly stronger for ever puffed.

3.2.2. Comparing Full Cigarette and Full Drink—The third and fourth columns of Table 1 present associations between covariates/predictors and ever smoked a full cigarette and ever had a full drink of alcohol. There was a significantly stronger positive association between grade in school and having a full alcoholic drink than smoking a full cigarette.

3.3. Hierarchical Logistic Regressions

3.3.1. Comparing Ever Puffed and Ever Sipped—In Table 1, the first two columns of the multivariate logistic regression section present the results of predicting ever puffed and ever sipped. Variables included in Step 1 provided much better prediction of ever puffed

than ever sipped (Nagelkerke $R^2 = 0.30$ vs. 0.16). Perceived cigarette availability, high negative interchanges with parents, and ever having sipped an alcoholic beverage were associated with ever puffed. Less parental education, perceived alcohol availability, current parental alcohol use, and having puffed a cigarette were significantly associated with having sipped at follow-up, though the magnitude of the association with availability was weaker than seen for ever puffed.

The adolescent reports of parental monitoring included in Step 2a provided slightly better prediction of ever puffed than ever sipped (Nagelkerke $R^2 = 0.06$ vs. 0.01). Greater child disclosure and parental control were associated with decreased odds of ever puffed. None of the monitoring variables were predictive of ever sipped, and none of the parent reports of parental monitoring were predictive of either puffing or sipping.

3.3.2. Comparing Full Cigarette and Full Drink—The last two columns of Table 1 present the results of multivariate logistic regressions predicting ever smoking a whole cigarette and ever drinking a full drink of alcohol. Variables in Step 1 provided slightly better prediction of full drink than whole cigarette (Nagelkerke $R^2 = 0.34$ vs. 0.30). Lower parental education was uniquely predictive of having smoked a whole cigarette, and higher grade in school, and current parental cigarette use were uniquely predictive of having had a full drink. The prediction of cigarette availability on smoking a whole cigarette was stronger than the prediction of alcohol availability on consuming a full drink, whereas ever puffing was more related to full drink than ever sipping was related to whole cigarette.

The adolescent reports of parental monitoring included in Step 2a provided slightly better prediction of ever smoking a full cigarette than ever drinking a full drink of alcohol (Nagelkerke $R^2 = 0.07$ vs. 0.03). Greater child disclosure and parental control were associated with decreased odds of ever smoking a cigarette, while greater parental knowledge was associated with decreased odds of drinking. Once again, none of the parent reports of parental monitoring were predictive of either behavior.

4. Discussion

The current study sought to demonstrate common and unique predictors of adolescent initial cigarette and alcohol use. Considerable similarities were seen across analogous substance use behaviors, such as positive associations with substance availability, conflict with parents (i.e., negative interchanges), and other substance use. However, important distinctions with potential implications for prevention programs were also observed.

Perhaps the most interesting distinction observed was with regard to perceived substance availability. The relationships between use and availability were substantially larger for cigarette initiation behaviors than alcohol initiation behaviors. These discrepancies imply environmental and/or parental interventions to limit adolescent substance availability might prove more effective at preventing the onset of cigarette use than alcohol use.

Patterns of findings also suggest that encouraging greater child disclosure and parental control efforts might prove more effective at preventing tobacco use than alcohol use during this developmental period, as these parenting constructs consistently predicted lower rates of

both tobacco use behaviors. Previous research has also linked lack of parental concern and control regarding smoking to progression to established smoking in adolescence (e.g., Distefan et al., 1998).

4.1. Strengths and Limitations

The sample for the current investigation was relatively large with high retention over 12 months, included diverse school settings, explored adolescent and parent reports, and incorporated web-based surveys. However, the sample was also relatively well educated, somewhat racially homogeneous, came from a single U.S. state, and parent reports of modeling were only with regard to the reporting parent. Future work should seek to use a more diverse sample, in addition to reports from both parents, to further improve generalizability. The current work explored predictors of initial substance experimentation (i.e., puffing/sipping) and more complete experimentation (i.e., whole cigarette/drink), but the rates of heavier use behaviors like daily cigarette use or heavy episodic drinking were too low in this age range to explore. Future work might benefit from following this cohort through later adolescence to better capture these behaviors. The current study also focused on prediction of substance experimentation by 12 months post-baseline, but we did not distinguish between participants who had already experimented pre-baseline. Future replication with a larger sample might strengthen interpretations by focusing on individuals who transition from abstinent to experimentation during the study.

4.2. Conclusions

While common predictors underscore the frequent co-development of cigarette and alcohol use, the differential prediction observed highlights the necessity for thoughtful design and implementation of prevention efforts. As such, it may prove problematic for new and existing programs to assume that efforts targeting specific individual or parental characteristics will impact both adolescent tobacco and alcohol use.

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- Differential prediction of initial tobacco and alcohol use behaviors was observed.
- Availability was more closely related to tobacco use than to alcohol use.
- Child disclosure and parental control were only predictive of initial *tobacco* use.

Table 1

Bivariate Spearman correlations and multivariate logistic regression odds ratios and 95% confidence intervals for prediction of early substance use behaviors from demographics and parent-related constructs.

	Bivariate Spearman Correlations					Multivariate Logistic Regression Odds Ratios				
	Puffed a Cigarette?	Sipped an Alcoholic Drink?	Smoked a Whole Cigarette?	Drank a Full Alcoholic Drink?	Step 1 – Nagelkerke R ²	Puffed a Cigarette?	Sipped an Alcoholic Drink?	Smoked a Whole Cigarette?	Drank a Full Alcoholic Drink?	
Frequency (%)	68 (8.4%)	296 (36.4%)	41 (5.0%)	52 (6.4%)		0.30	0.16	0.30	0.34	
Sex (0 = F; 1 = M)	−0.02	−0.05	−0.01	−0.05		1.39 (0.77–2.53)	0.86 (0.63–1.19)	1.34 (0.64–2.80)	0.80 (0.42–1.57)	
Grade	0.12**	0.15***	0.11** <i>a</i>	0.21*** <i>a</i>		1.12 (0.76–1.67)	1.17 (0.96–1.43)	1.24 (0.75–2.05)	2.91*** (1.67–5.06)	
White/Non-White (0 = Non-W; 1 = W)	−0.08*	−0.03	−0.04	−0.03		0.83 (0.44–1.58)	0.81 (0.55–1.18)	0.84 (0.38–1.86)	1.16 (0.54–2.48)	
Parental Education	−0.15*** <i>a</i>	−0.05 <i>a</i>	−0.13***	−0.07		0.81 (0.59–1.10)	0.84* (0.72–1.00)	0.59* (0.40–0.89)	1.02 (0.71–1.45)	
Parental Income	−0.18*** <i>a</i>	0.00 <i>a</i>	−0.11**	−0.09*		0.85 (0.70–1.02)	1.08 (0.97–1.20)	1.08 (0.85–1.38)	0.94 (0.76–1.17)	
Perceived Alcohol Availability	0.20***	0.27***	0.17***	0.24***		1.40 (0.67–2.93)	2.32*** (1.53–3.50)	0.91 (0.38–2.21)	3.42** (1.55–7.53)	
Perceived Cigarette Availability	0.31*** <i>a</i>	0.21*** <i>a</i>	0.30***	0.21***		4.13** (2.00–8.53)	1.36 (0.84–2.19)	6.56*** (2.64–16.29)	0.80 (0.35–1.82)	
Current Parental Alcohol Use	−0.04 <i>a</i>	0.07* <i>a</i>	−0.02	0.03		1.03 (0.53–2.00)	1.50* (1.04–2.18)	1.11 (0.49–2.52)	1.53 (0.69–3.41)	
Current Parental Cigarette Use	0.16*** <i>a</i>	0.02 <i>a</i>	0.12***	0.11**		1.94 (1.00–3.79)	0.89 (0.57–1.38)	1.82 (0.80–4.11)	2.38* (1.05–5.39)	
Social Support (AR)	−0.10**	−0.12***	−0.11**	−0.13***		0.95 (0.66–1.37)	0.84 (0.69–1.03)	0.74 (0.47–1.18)	0.80 (0.52–1.23)	
Negative Interchanges (AR)	0.20***	0.15***	0.17***	0.19***		1.60* (1.06–2.42)	1.14 (0.87–1.50)	1.74* (1.08–2.82)	2.00** (1.26–3.18)	
Ever Puffed a Cigarette?	N/A	0.22***	N/A	0.31***		N/A	3.20*** (1.72–5.95)	N/A	4.50*** (2.04–9.94)	
Ever Sipped an Alcoholic Drink?	0.22** *	N/A	0.16***	N/A		3.27*** (1.75–6.12)	N/A	2.39* (1.11–5.16)	N/A	

	Bivariate Spearman Correlations					Multivariate Logistic Regression Odds Ratios				
	Puffed a Cigarette?	Sipped an Alcoholic Drink?	Smoked a Whole Cigarette?	Drank a Full Alcoholic Drink?		Puffed a Cigarette?	Sipped an Alcoholic Drink?	Smoked a Whole Cigarette?	Drank a Full Alcoholic Drink?	
					Step 2a – Nagelke R ²	0.06	0.01	0.07	0.03	
Parental Knowledge (AR)	–0.26***	–0.18***	–0.22***	–0.24***		0.90 (0.56–1.42)	0.95 (0.71–1.26)	1.27 (0.71–2.29)	0.51* (0.29–0.90)	
Parental Solicitation (AR)	–0.12**	–0.08*	–0.12***	–0.09**		1.44 (0.98–2.12)	1.09 (0.89–1.33)	1.37 (0.85–2.19)	1.38 (0.88–2.16)	
Child Disclosure (AR)	–0.27***	–0.19***	–0.26***	–0.20***		0.52** (0.34–0.82)	0.84 (0.64–1.09)	0.45** (0.26–0.77)	1.21 (0.71–2.08)	
Parental Control (AR)	–0.22***	–0.13***	–0.22***	–0.17***		0.65* (0.46–0.92)	0.92 (0.75–1.14)	0.54** (0.35–0.84)	0.76 (0.51–1.14)	
					Step 2b – Nagelke R ²	0.04	0.00	0.03	0.00	
Parental Knowledge (PR)	–0.17*** ^a	–0.07** ^a	–0.13***	–0.09**		0.49 (0.23–1.03)	0.83 (0.51–1.35)	0.70 (0.29–1.70)	0.79 (0.32–1.94)	
Parental Solicitation (PR)	–0.04	–0.01	–0.04	0.00		1.14 (0.73–1.78)	1.00 (0.79–1.27)	0.90 (0.51–1.57)	1.17 (0.71–1.94)	
Child Disclosure (PR)	–0.18*** ^a	–0.05 ^a	–0.15***	–0.09**		0.67 (0.39–1.15)	1.17 (0.84–1.64)	0.57 (0.30–1.10)	1.02 (0.53–1.95)	
Parental Control (PR)	–0.01	–0.04	–0.01	–0.03		1.22 (0.70–2.15)	0.96 (0.74–1.27)	1.03 (0.54–1.96)	1.22 (0.64–2.31)	

* $p < 0.05$,** $p < 0.01$,*** $p < 0.001$;

^a Fisher Z-transformation correlation comparison, $p < 0.05$; N/A indicates a predictor that was not included in the specific model because either the predictor is the same variable as (e.g., ever puffed predicting ever puffed) or the necessary precursor to the outcome (e.g., ever sipped predicting ever had a full drink).