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Maternal risk taking on the balloon analogue risk task as a prospective predictor of youth alcohol use escalation☆

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HIGHLIGHTS

- Social learning theory implicates parental drinking in offspring consumption.
- Parental risk taking has not been examined as a predictor of offspring alcohol use.
- Maternal risk taking predicts youth drinking above and beyond maternal drinking.

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ABSTRACT

The transition from late childhood through middle adolescence represents a critical developmental period during which there is a rapid increase in the initiation and escalation of alcohol use. Alcohol use is part of a constellation of risk taking behaviors that increase during this developmental transition, which can be explained by environmental and genetic factors. Social learning theory (SLT) implicates observations of parental drinking in the development of alcohol use in youth. Parental risk taking more broadly has not previously been examined as a factor predictive of alcohol use escalation in youth across adolescence. The current study examined the relative contributions of maternal risk taking on the Balloon Analogue Risk Task (BART) and maternal alcohol use in the prediction of alcohol escalation among youth over three years. Participants were a sample of 245 youth (55.0% male, 49.6% Caucasian) who participated annually between grades 8 and 10, drawn from a larger study of adolescent risk taking. Within our sample, maternal risk taking, as measured by the BART, predicted increases in alcohol use. Interestingly, maternal alcohol use and other youth factors were not predictive of escalations in youth alcohol use. Our findings suggest the importance of considering maternal riskiness more broadly, rather than solely focusing on maternal alcohol use when attempting to understand youth alcohol use across adolescence. These findings emphasize the relevance of maternal risk taking as measured by a behavioral task and suggest a general level of riskiness displayed by mothers might encourage youth to behave in a riskier manner themselves.

1. Introduction

The transition from late childhood through middle adolescence represents a critical developmental period during which there is a rapid increase in the initiation and escalation of alcohol use. Although some alcohol use during adolescence is normative (Faden, 2006), youth who drink have an increased likelihood of engaging in risky sex behaviors (Mason et al., 2010), having accidents and injuries (Bonomo et al., 2001), being victims of sexual assault (Champion et al., 2004), having sleep problems (Huang, Ho, Lo, Lai, & Lam, 2013), and being aggressive (Maldonado-Molina, Jennings, & Komro, 2010). Further, elevated alcohol use during this period is associated with later impairments in mental and physical health, social functioning, and occupational functioning (Friedman, Terras, Zhu, & McCallum, 2004; McGue, Iacono, Legrand, & Elkins, 2001), as well as with problematic alcohol use in adulthood (Brown & Tapert, 2004; Hawkins et al., 1997; Hingson, Heeren, & Winter, 2006; Masten, Faden, Zucker, & Spear, 2008). Given these negative effects, identifying risk factors predictive of increases in early alcohol use, which could be targeted within prevention and intervention programs, is a critical public health goal.

Alcohol use is part of a constellation of risk taking behaviors that escalate during adolescence. More generally, risk taking behaviors like substance use, delinquent behaviors, risky sexual behaviors, and risky driving frequently co-occur (Hirschi & Gottfredson, 1994; Mishra &

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Lalumière, 2009; Mishra, Lalumière, & Williams, 2010), suggesting there are common factors predictive of their emergence (Zuckerman, 2007). Environmental and genetic factors are thought to underlie youth substance use behaviors, with environmental factors playing a stronger role earlier in development and genetic factors coming online later in adolescence (Baker, Maes, Larsson, Lichtenstein, & Kendler, 2011). One theory suggesting how environmental factors might influence youth substance use is social leaning theory (SLT; Bandura, 1986), which suggests risk taking behaviors like substance use emerge when youth mimic parental patterns of risk taking (e.g., Bandura, 2004; Harburg, Davis, & Caplan, 1982; White, Johnson, & Buyske, 2000). Here, youth observe parental risk taking behaviors, as well as the consequences of these behaviors, which influences their beliefs about the costs and benefits of risk taking (Petraitis, Flay, & Miller, 1995). Social learning theory has been used to explain links between maternal substance use and female offspring use (e.g. Denton & Kampfe, 1994; Hutchinson & Montgomery, 2007), parental drinking/tobacco use and offspring use of these substances (Richter & Richter, 2001), and maternal risky sex and risky sexual activity in offspring (Bonell et al., 2006; Brakefield, Wilson, & Donenberg, 2012; Cavazos-Rehg et al., 2010). Thus, SLT can help to explain how youth learn about and mimic parental patterns of risk taking.

Although SLT suggests that youth learn about specific risky behaviors (e.g., risky sex, substance use) by observing their parents, it is possible that this learning generalizes to risk taking more broadly. Specifically, youth might be more likely to engage in a variety of risky behaviors after observing their parents behave in a risky manner across contexts. Related to this, research demonstrates youth whose parents are risky across multiple contexts are more likely to behave in a risky manner themselves (Wilder & Watt, 2002), suggesting parental riskiness more broadly predicts youth risk taking behaviors. Thus, to better understand how parental riskiness affects youth alcohol use, it would be helpful to examine the effects of parental riskiness, within a controlled laboratory setting, on self-reported youth drinking. Because parental risk taking varies across contexts, it is difficult to ascertain its impact on youth drinking. Following from this, it is possible a more generalized measure of parental riskiness could provide a proxy for real-world parental risk taking behaviors youth observe across contexts. This perspective allows us to move beyond somewhat reductive theories that merely tie observations of parental alcohol consumption to youth consumption, by discussing the influence of generalized parental riskiness across contexts.

One potential tool for gauging parental risk taking within the laboratory is the Balloon Analogue Risk Task (BART), a computerized assessment of risk taking propensity (Hopko et al., 2006; Lejuez, Aklin, Zvolensky, & Pedulla, 2003; Lejuez et al., 2002; Lejuez et al., 2007). On the BART, participants inflate a series of 60 animated balloons. The more an individual balloon is inflated, the more money a participant earns, with the caveat that all money earned for a given balloon will be lost if the balloon is inflated too much and explodes. Thus, the task is able to determine participants' likelihood of behaving in a risky manner by measuring the average number of pumps balloons are inflated in the context of earning monetary rewards (see "Method"). Importantly, performance on the BART is associated with substance use, psychopathy, and risky sex among adults (e.g., Hopko et al., 2006; Hunt, Hopko, Bare, Lejuez, & Robinson, 2005; Lejuez et al., 2002), suggesting it captures adults' likelihood of behaving in a risky manner across contexts. Thus, BART scores can serve as a proxy of individuals' general riskiness across multiple contexts.

To determine whether general level of parental riskiness on the BART could inform our understanding of youth drinking above and beyond actual parental drinking behaviors, it is necessary to compare the relative effects of both on youth drinking across development. Thus, the current study sought to examine the effects of parental risk taking on the BART, while taking parental drinking into account, in predicting the trajectory of youth alcohol use across three years. For added control, we examined youth alcohol use expectancies to ensure youths' positive beliefs about alcohol use did not solely predict outcomes. In line with previous research examining the effects of maternal behaviors on youth outcomes (Bonell et al., 2006; Brakefield et al., 2012; Cavazos-Rehg et al., 2010; Denton & Kampfe, 1994; Hutchinson & Montgomery, 2007), we hypothesized maternal risk taking, as measured by the BART, would predict youth drinking behaviors, such that youth of mothers with elevated risk taking on the BART would have the greatest increases in alcohol consumption across the three annual assessments.

2. Materials and methods

2.1. Participants

Participants were a convenience sample of 277 youth, recruited from the Washington D.C. metropolitan area (55.0% male, 49.6% Caucasian), taking part in a larger, longitudinal study of mechanisms for HIV-related risk behaviors (see Table 1). The study recruited English-proficient 9–13-year-old community youth and their families; no other inclusion criteria were used. Details of the larger longitudinal study are reported elsewhere (Daughters et al., 2009; MacPherson, Magidson, Reynolds, Kahler, & Lejuez, 2010). Youth and their parents (94% biologically related) completed six annual assessments; data from the current study includes children who participated in grades 8 through 10, because a comprehensive alcohol assessment was conducted during these years. All participants were invited to take part in each wave of data collection, regardless of their participation at previous waves (see Table 1).

2.2. Procedure

At each assessment, study procedures and confidentiality were separately described to parents and youth; informed consent and assent were obtained. Youth and their parents were administered all measures in separate private rooms. Parents provided demographics, including age, gender, and race/ethnicity about themselves and their child. Parents and youth were compensated for study participation. The University of Maryland Institutional Review Board approved study procedures.

2.3. Measures

2.3.1. Mother and adolescent alcohol use

We used a modified version (Aklin, Lejuez, Zvolensky, Kahler, & Gwadz, 2005) of the Youth Risk Behavior Surveillance System (Centers for Disease Control and Prevention, 2001) to assess past year alcohol use at each assessment among youth. Youth were asked to report how many alcoholic beverages in total they had consumed over the prior year. The number of alcoholic beverages youth reported consuming increased over time (see Table 1).

Participants' mothers also reported on their own alcohol usage. Since we assumed it would be difficult for mothers to accurately report the total number of drinks they had consumed during the prior year, we asked about their average frequency of past year alcoholic beverage consumption. Options (and percent endorsed) for past year alcohol consumption were "zero" (26.0%), "once" (8.1%), "monthly or less" (22.5%),

Table 1
Descriptive Data.

Factor *M (SD)*	Grade 8 N = 185	Grade 9 N = 198	Grade 10 N = 160
Past year youth alcohol use[a]	3.24 (11.53)	3.48 (8.87)	5.21 (11.79)
Age	13.12 (0.56)	14.10 (0.55)	15.12 (0.56)
Sex	55.0% male		
Maternal BART score[b]	34.62 (12.90)		
Positive alcohol expectancies	9.75 (3.09)		

[a] "Past year youth alcohol use" is the total number of alcoholic beverages youth reported consuming during the past year.

[b] "Maternal BART Score" is the adjusted average pumps score on the BART for mothers. The adjusted average pumps score is the mothers' average number of pumps on unpopped balloons across the 60 balloon trials.