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The Enduring Impact of Parents' Monitoring, Warmth, Expectancies, and Alcohol Use on Their Children's Future Binge Drinking and Arrests: a Longitudinal Analysis

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Abstract Binge drinking is associated with many health and financial costs and is linked to risks of legal consequences. As alcohol use typically is initiated during adolescence, the current study assessed the relationship between parental behaviors and strategies in forecasting adolescents' likelihood of binge drinking and later arrest. Restricted data from waves I–IV of the National Longitudinal Study of Adolescent Health were used to assess hypotheses. A weighted path analytic model ($N = 9421$) provided a multifaceted picture of variables linked to later antisocial behavior. Low parental monitoring, low parental warmth, parent alcohol use, and parent expectancies regarding their children's alcohol use were associated with higher incidence of adolescent binge drinking. In turn, low monitoring, low warmth, parent alcohol use, parent expectancies, and underage consumption were associated with binge drinking in early adulthood. Binge drinking during both adolescence and young adulthood were predictive of respondents' likelihood of arrest 8–14 years later. Findings demonstrated the substantial, enduring effects of parental behaviors on child alcohol-related actions and have implications for parent-targeted interventions designed to reduce excessive alcohol consumption. They suggest campaigns focus on parenting strategies that involve setting effective and strict alcohol-related rules and guidelines, while maintaining a warm and supportive family environment.

Keywords Underage drinking · Binge drinking · Arrests · Parental influence

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Binge drinking—a risky pattern of alcohol consumption that brings the blood alcohol concentration (BAC) to 0.08 grams percent or above (National Institute on Alcohol Abuse and Alcoholism 2004)—is responsible for more than half the 80,000 deaths caused by excessive alcohol use in the USA annually (Center for Disease Control 2012). Most common among college-aged individuals (Substance Abuse and Mental Health Services Administration 2014), excessive alcohol ingestion is associated with many negative outcomes, including economic (Rehm et al. 2009) and legal burdens (McCutcheon et al. 2011), health problems (Foster et al. 2014), and alcohol-related deaths (National Institute on Alcohol Abuse and Alcoholism 2013).

The current study evaluated the relation between binge drinking and various youth risk factors in a path analytic framework guided by the tenets of self-determination theory (SDT; Ryan and Deci 2000). The goal of the investigation is to assess factors that foretell adolescent problematic drinking and later arrest. Based on a nationally representative sample, the results have the potential to guide future prevention efforts and to show the lasting influence of parental influences on child development.

Self-Determination Theory

SDT is a motivational model of social development used to understand behavioral instigation and regulation (Chawla et al. 2009; Wormington et al. 2011). It posits that people have innate psychological needs for autonomy and freedom to explore, grow, and endorse behaviors. In adolescence, intrinsic motivation and internalization underlie social and personality development (Ryan and Deci 2000, 2002).

Research on SDT distinguishes intrinsic from extrinsic motivation and elucidates their association with alcohol use.

Intrinsic motivation concerns behaviors freely chosen and pleasurable in their own right. It is associated with an autonomy orientation and predicts positive substance-related outcomes, such as abstinence or low alcohol consumption among adolescents (Wormington et al. 2011) and college students (Chawla et al. 2009). Extrinsic motivation is associated with the external behavioral regulation. It is related to a control orientation, leading individuals to feel impelled to take a given course of action. This motivation is linked with drinking and alcohol-related consequences (Chawla et al. 2009; Wormington et al. 2011) and can result in external forms of regulation. Extrinsically motivated individuals consume alcohol to establish a sense of autonomy or reduce stress from external sources.

Parental Influences

Youth alcohol use is associated with many detrimental outcomes, including delinquency, illicit drug use (Barnes et al. 2002), adult psychopathy (McGue and Iacono 2005), and criminal behavior (Mason et al. 2010). In response, research on the epidemiology of substance use has focused on risk and protective factors that influence use during the teen years. Parental warmth and monitoring are two protective parenting practices that foster autonomy and support intrinsic motivation (Joussemet et al. 2008) and curtail deviance (Crano et al. 2008; Donaldson et al. 2015; Hemovich et al. 2011; Lac et al. 2009; Lac and Crano 2009). Parental warmth is defined as the extent to which adolescents perceive their parents as loving, caring, involved, and responsive to their needs (Lowe and Dotterer 2013). It is concerned with parents' attention to and knowledge of a child's activities, whereabouts, and relationships (Kerr and Stattin 2000; Stattin and Kerr 2000). Parents use a variety of strategies to monitor their children. They can intensively surveil their child's whereabouts and activities (Kerr and Stattin 2000) or rely on information of the child's activities based on the child's voluntary disclosures (Lac et al. 2009; Ramirez et al. 2004).

Researchers have begun to assess the effects on children of extreme parental monitoring undertaken to exert control over their children's behavior (Donaldson et al. 2015; Gere et al. 2012; Roche et al. 2011). SDT holds that psychologically controlling parenting can inhibit intrinsic motivation and activate non-optimal forms of internalization (Joussemet et al. 2008). This type of parenting technique typically involves high levels of surveillance and low levels of warmth and support. This pattern can lead to negative outcomes, including substance use (Bersamin et al. 2005; Donaldson et al. 2015) and depression (Aunola et al. 2015).

Parental alcohol use also influences adolescents' alcohol-related behavior (Ennett et al. 2013; Van Der Vorst et al. 2006), as youth tend to imitate parents' consumption (Poelen et al. 2007; Yu 2003). Merely having alcohol available at home has been linked to adolescent alcohol intentions and use (Komro et al. 2007), and parental drinking has been shown to influence normative perceptions, also increasing youth consumption (Van Der Vorst et al. 2006). Similarly, parent perceptions of adolescent substance use guide behavioral outcomes—parents may transfer subtle cues of their expectancies of their children's use, and these expectancies may become self-fulfilling (Lamb and Crano 2014).

Understanding parent behaviors that intensify adolescent deviance are crucial, as parents' substance use behaviors have a substantial and lasting impact on youth (Miller et al. 2013). For example, research has identified links between parenting practices and later alcohol use (de Looze et al. 2012; Serido et al. 2014) and incarceration (Dodge et al. 2006). Longitudinal studies have revealed negative relationships between the quality of parent-child relationships and later alcohol use (Ennett et al. 2013; Ryan et al. 2010), and certain parenting practices (Dodge et al. 2006), including low involvement (Henggeler et al. 1989; Patterson et al. 1992), are linked with later arrest. Binge drinking, too, has been implicated in negative outcomes, as it puts adolescents at risk for delinquent behaviors. Heavy consumption is associated with greater risk taking and an increased probability of being arrested (Greenfield and Weisner 1995; McCutcheon et al. 2011; Sloan et al. 2014).

Hypotheses and Research Questions

This investigation was designed to identify predictors in adolescence linked to problem drinking outcomes and arrest later in life (Fig. 1). Extending research on parental involvement and responsiveness (Donaldson et al. 2015) and SDT-based studies (Wormington et al. 2011), monitoring and warmth are expected to predict adolescents' binge drinking behaviors. Direct links between monitoring and warmth with binge drinking in young adulthood also are hypothesized.

It is also hypothesized that parent alcohol use and parents' positive expectancies of their children's use will be predictive of binge drinking—children of parents who frequently consume alcohol are hypothesized to be more prone to underage use and adult binge drinking. Extending studies on the predictors of alcohol misuse and incarceration, teen drinking is posited to predict binge drinking in young adulthood, and binge drinking during both adolescence and the college years is theorized predict a higher likelihood of delinquency, leading to arrest.

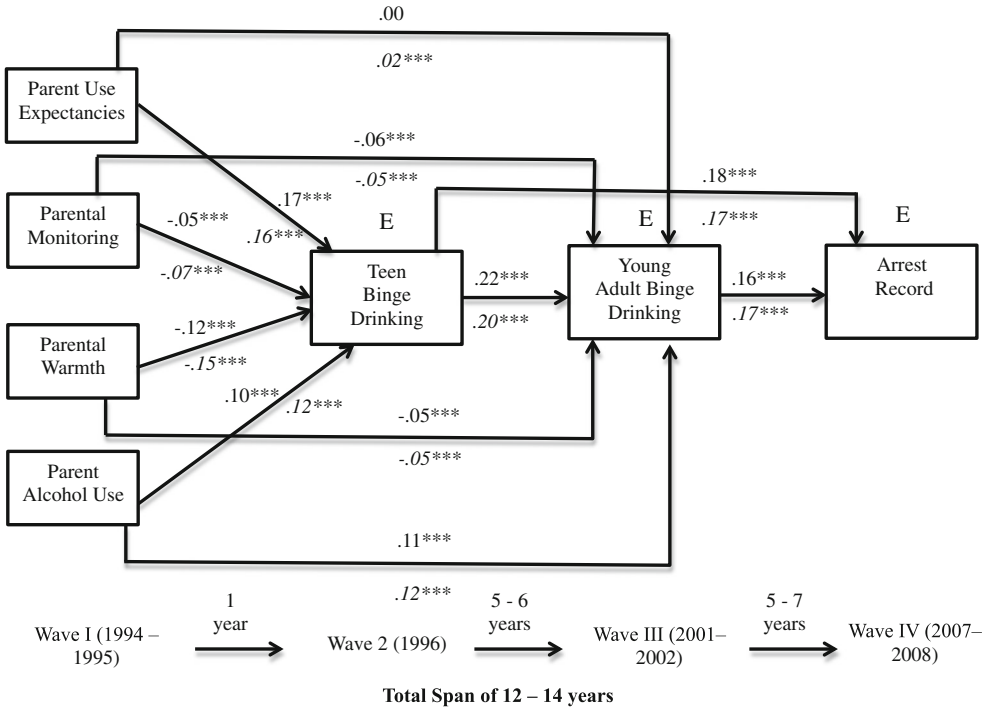

Fig. 1 Path analytic model of relationships between predictors of binge drinking and arrests ($N = 7857$). Sex, age, race, and income were entered in the model as covariates, but to maintain conceptual clarity, are not pictured. Values for the non-sibling subsample ($n = 5541$) are represented using italicized values. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Methods

Data were drawn from waves (W) I (1994–1995), II (1996), III (2001–2002), and IV (2007–2008) of the restricted version of the National Longitudinal Study of Adolescent Health (Add Health). This longitudinal dataset is comprised of a nationally representative sample of adolescents who were continuously followed from adolescence to adulthood and aims to explicate the underlying circumstances of adolescent health and behavior, with a special focus on the effects of multiple environmental contexts.

Sample selection used a multistage, stratified, school-based, cluster sampling design to ensure sample representativeness of the US population (Crano et al. 2015). The primary sampling frame was a list of all high schools in the USA. From this frame, a stratified sample of 80 high schools was selected, representative in terms of region, urbanicity, size, type, and ethnicity. Eligible high schools were required to have more than 30 students and an 11th grade. Participating high schools helped identify feeder middle schools, which included a seventh grade and sent at least five graduates to that high school. From the list of feeder schools, one was selected with probability proportional to its student contribution to the high school. Schools that declined to participate were replaced within each stratum. In total, more than 70 of the originally sampled high schools participated. A roster of students enrolled in each school was obtained, and the final core sample consisted of 12,105 adolescents.

Wave 1 in-home interview data were collected from April to December 1995, when respondents were in grades 7 through 12, between the ages of 10 and 20 ($M = 14.89$, $SD = 1.64$). In-home interview length ranged from 1 to 2 h. To help protect anonymity, data were collected using laptop computers. Parent interviews also were conducted during this wave.

Wave II data were collected 1 year later in 1996. Respondents who were seniors in high school during wave I were not interviewed at wave II. Respondents' ages ranged from 11 to 21 ($M = 15.89$, $SD = 1.64$). Wave III in-home interviews were conducted in 2001 and 2002 with all original respondents who could be located. In this phase, respondents were between the ages of 18 and 27 ($M = 21.81$, $SD = 1.84$). Wave I respondents who were out of the country were not included in the sample. Researchers made an effort to interview respondents held in correctional facilities. Wave IV responses were collected in 2008 and 2009 with the original respondents, whose ages now ranged from 24 to 34 years ($M = 28.54$, $SD = 1.82$). The wave IV follow-up was designed to be nationally representative of adolescents first interviewed in 1994 and 1995. The location rate at wave IV was 92.5 %, and the response rate was 80.3 %.[1]

Measures

Parental Monitoring Responses to seven items were summed to create the measure of parental monitoring (WI), which assessed numerous household guidelines and rules,

[1] More details on the Add Health study design are provided on their website, http://www.cpc.unc.edu/projects/addhealth/design

along with restrictions on friendships and curfews (e.g., Do your parents let you make your own decisions about…(a) the people you hang around with?, (b) what you wear?, (c) what time you go to bed on weeknights?). Response options were reverse coded as 0 (*yes*) and 1 (*no*). The sum of all items represented the final measure, with higher scores indicating higher levels of monitoring (0 = low monitoring to 7 = high monitoring; *KR20* = 0.64). This measurement has been used extensively in Add Health research, producing similar levels of reliability (Ornelas et al. 2007).

Parental Warmth A six-item measure of parental warmth (WI) was adapted from prior research (Wainright et al. 2004). This measure evaluated parent-child communication, how well the family unit got along, and whether parents and children had fun together. (e.g., How much do you feel that…(a) the people in your family understand you?, (b) you and your family have fun together?; How close do you feel to your mother and father?). Responses were assessed using Likert-type scales ranging from 1 (*not at all*) to 5 (*very much*). A mean score was computed for the final measure, with higher scores representing higher levels of warmth (1 = low warmth to 5 = high warmth; $\alpha = 0.80$).

Parent Alcohol Use Parent alcohol use (WI) was assessed using one item that made use of a six-point Likert-type response format. Parents were asked how often they consumed alcohol during the last month. Responses ranged from 1 (*never*) to 6 (*nearly everyday*). Higher values represented more frequent alcohol consumption.

Parent Expectancies of Adolescent User Status Expectancies (WI) were measured using one item. Parents were asked if they thought their child drank alcohol at least once a month during the last year. Responses were coded as 0 (*no*) to 1 (*yes*).

Binge Drinking Teen binge drinking (wave II; $\alpha = 0.95$) and young adult binge drinking (wave III; $\alpha = 0.92$) were assessed with two items using Likert-type scales. Both items measured binge drinking within the past 12 months. Respondents were asked how often they got drunk or very high on alcohol. Respondents also were asked on how many consecutive days they consumed five or more drinks, as this indicator also has been used in previous investigations as a measure of binge drinking (Guilamo-Ramos et al. 2005; Shin et al. 2009). Response options ranged from 0 (*have not drank in the past 12 months*) to 7 (*everyday /almost everyday*). A mean composite was computed, with higher scores representing a higher frequency of binge drinking (0 = no binge drinking, 7 = frequent binge drinking).

Arrests Arrest record was operationalized by asking respondents if they had ever been arrested. Responses were coded as 0 (*no*) and 1 (*yes*). In total, 25.6 % of the sample indicated that they had been arrested at least once in their lifetime. Comparable measures of arrest (Brame et al. 2012) have been used to understand delinquency.

Analytic Plan

Following the recommended guidelines for analyzing Add Health data (Chen and Chantala 2014), only cases with an assigned sampling weight were included in our final analytic sample ($N = 9421$). Due to the high drop-out rates common in longitudinal designs (Crano et al. 2015), the possible biasing effect of attrition and missing data was assessed.

In total, 1508 respondents had missing data at WI—missingness for each variable was as follows: monitoring ($n = 108$), warmth ($n = 8$), parent use ($n = 1055$), and parent expectancies ($n = 1303$). At WI, the response rate (RR) for teens was 98.9 %. The RR for parents was 84.6 %; 11 respondents had missing data on the measure of teen binging (WII 99.9 % RR); 19 displayed missing data on young adult binge drinking (WIII 99.8 % RR), and 28 respondents had missing data for arrests (WIV 99.7 % RR). Responses from participants lost from missing data ($n = 1508$) and attrition ($n = 58$) were compared to respondents with complete data. Results showed that teens with missing responses scored lower in parental monitoring, lower in parental warmth, higher in parent alcohol use, higher in perceptions of parent expectancies of teen use, higher in teen binge drinking, lower in young adult binge drinking, and had a higher likelihood of being arrested ($p < 0.05$). Despite significant differences, mean values and correlations between the two groups were similar, and analyses of the dataset have demonstrated minimal response bias when sample weights are used (<1 %; Chantala et al. 2004).

To further correct for bias from missing values on individual questionnaire responses, multiple imputation (MI) was implemented (Meyers et al. 2013). Sinharay et al. (2001) showed that the MI technique resulted in unbiased estimates and valid results for psychological data, as it uses all available data, preserving sample size and statistical power. This technique has been used in past Add Health studies on substance use (Roettger et al. 2011), and results from the current study showed that this approach did not alter the pattern of findings when compared with list-wise deletion and use of dummy variables.

Overall, 30.7 % of the respondents indicated that they had at least one sibling, also surveyed, in the final sample. Data from parent-child pairs from the same family are likely to be highly related, violating the independence assumption for regression models. Thus, separate analyses were conducted with the full sample ($N = 9421$) and a non-sibling subsample ($n = 6533$).

An exploratory factor analysis (EFA) using an oblique rotation was performed to determine the initial factor structure of the parental monitoring and warmth variables. Variables were standardized prior to the EFA, as they were measured using different scales. Results supported the two-factor solution. Using the pattern matrix, a criterion of greater than 0.40 was used to define variables within a given factor (Meyers et al. 2013). All items loaded sufficiently onto their relevant factor, except one item from the parental monitoring scale (i.e., parents let their child make their own decisions about the time they need to be home on weekends). However, this item has been used in other Add Health studies as a measure of monitoring (Ornelas et al. 2007), and so, it was included in the final measure.

To control for a group effect at the district level, two-level logit path analytic models using a Monte Carlo integration were weighted and conducted using the WLSMV estimator in Mplus 7.2 (Muthén and Muthén 2012). Individual responses were nested within 132 district clusters. Longitudinal, multilevel weights were computed and scaled using MPML Method A in Stata 13, before being transferred to Mplus (Chen and Chantala 2014).[2]

Sex, age, race (Donaldson et al. 2016), and income (Donaldson et al. 2015) have been associated with substance use, and as a result, these variables were entered as covariates in the model. Bachman et al. (2011) showed that White/Caucasian respondents were at a significantly higher risk for engaging in binge drinking and alcohol use. Thus, race was dummy coded before entry in the model with "White" race functioning as the control group.

Model fit was assessed using the χ^2 goodness of fit test, comparative fit index (CFI; Bentler 1990), Tucker–Lewis index (TLI; Tucker and Lewis 1973), and standard root mean square residual (SRMR; Hu and Bentler 1999). With the chi-squared test, smaller values suggest better fit. For the CFI and TLI, values ranging from approximately 0.94 to 1.0 indicate good fit, and with SRMR, a value of 0.08 or smaller indicates good fit. The final model was assessed using the recommended STDXY standardization (Muthén and Muthén 2012).

Results

The full sample (FS) consisted of 9421 adolescent and parent pairs. Gender was distributed as follows: 44.9 % were male, and 55.1 % were female. Average income was $10,023 per year. Further, 32.6 % of the sample was White, and 67.3 % identified as non-White. Descriptives on study variables (prior to implementing MI) were as follows: monitoring ($M = 1.95$, SD = 1.56), warmth ($M = 3.96$, SD = 0.72), parent use ($M = 1.97$, SD = 1.17), parent expectancies ($M = 0.04$, mode = 0, SD = 0.18), teen binge drinking ($M = 1.13$, SD = 1.62), young adult binge drinking ($M = 1.89$, SD = 1.69), and arrest ($M = 0.27$, mode = 0, SD = 0.44).

The non-sibling subsample (NSS) consisted of 6533 parent-child respondents. The distributions of gender, income, and race were virtually identical for the subsample. Descriptive statistics on key variables were as follows: monitoring ($M = 1.94$, SD = 1.54), warmth ($M = 3.98$, SD = 0.72), parent use ($M = 1.99$, SD = 1.19), parent expectancies ($M = 0.03$, mode = 0, SD = 0.17), teen binge drinking ($M = 1.10$, SD = 1.60), young adult binge drinking ($M = 1.94$, SD = 1.70), and arrest ($M = 0.26$, mode = 0, SD = 0.44).

The model chi-squared test for the FS was statistically significant, $\chi^2\,(4) = 920.32$, $p < 0.001$, but this test is sensitive to erroneous rejections with large sample sizes. The goodness of fit indices, CFI = 0.99 and TLI = 0.90, $\mathrm{SRMR}_{\mathrm{within}} = 0.001$, and $\mathrm{SRMR}_{\mathrm{between}} = 0.00$, were high, indicating excellent model fit. For the NSS, the model chi-squared test also was significant, $\chi^2\,(4) = 2117.49$, $p < 0.001$. The goodness of fit indices, CFI = 0.99 and TLI = 0.90, $\mathrm{SRMR}_{\mathrm{within}} = 0.001$, and $\mathrm{SRMR}_{\mathrm{between}} = 0.00$, were high, indicating excellent model fit.

The model relationships (Fig. 1) indicated that parent alcohol use, and parent use expectancies were positively associated with teen binge drinking. Parental monitoring and warmth were negatively linked to teen binging. These results suggest that teens experiencing few household rules and regulations and low warmth, with parents who use alcohol and expected that their children used alcohol, were more likely to report they had binged during the teen years.

Parental monitoring, warmth, parent alcohol use, and teen binge drinking were predictive of binge drinking during young adulthood. Parent expectancies had a small but statistically significant effect on young adult binging for the NSS. Results imply that low monitoring, low warmth, binge drinking during the teen years, and having parents who consumed alcohol and expected that their child was an alcohol user were predictive of higher incidences of their child's binge drinking during young adulthood. In turn, teen binge drinking and young adult binging were positively predictive of having an arrest record.

Discussion

Binge drinking is a public health concern, costing millions of dollars and thousands of lives annually (Center for Disease Control 2012). The current investigation was designed to complement previous research by assessing the association of adolescent predictors with subsequent long-term deviant outcomes. The SDT framework of Ryan and Deci (2002) was used to frame the influence of external developmental stimuli that have been shown to inhibit or enhance growth

[2] User-written Stata programs for scaling sampling weights to estimate two-level models can be downloaded from the following website: http://www.cpc.unc.edu/research/tools/data_analysis/ml_sampling_weights

and autonomy. Findings demonstrated the powerful impact of the teen years on later life outcomes and have implications for future prevention efforts aimed at preventing unhealthy alcohol consumption.

Teen binge drinking was most common for participants whose parents imposed low levels of monitoring and warmth, highlighting the importance of parenting style during adolescence (Donaldson et al. 2015; Joussemet et al. 2008; Lac et al. 2009). Findings imply that parents should employ strategies that communicate high levels of warmth and understanding while striving to enable children to feel that their freedom to make decisions is not threatened arbitrarily. Analysis also demonstrated a direct effect of parental monitoring and warmth on adult binge drinking 7 to 8 years after the initial assessment. This finding contributes to the literature by indicating the long-term impact of ineffective parenting on children and corroborates Barber and Harmon's (2002) contention that power assertions, inherent in low warmth parenting styles, may have exceptionally detrimental developmental outcomes.

SDT (Ryan and Deci 2000, 2002) emphasizes the dimension of autonomy support versus control and its relationship with parenting and child outcomes. Research by Joussemet and associates (2008) and Wormington and colleagues (2011) indicates that parents who strictly enforce rules and restrict personal freedoms fail to support their children's need for autonomy, and this may lead children to experience internal forms of pressure that may result in negative outcomes such as consuming alcohol to regain control and cope with problems.

In line with SDT, Baumrind (1978) distinguished authoritarian from authoritative parents and their differential influence. Youth experiencing authoritarian parenting, characterized by harsh rules and low warmth, are more likely to suffer emotional problems (Rothrauff et al. 2009), to develop resentment to authority, and to be delinquent (Trinkner et al. 2012). In comparison, authoritative parenting, which employs structure in a warm and autonomy-supportive way, is associated with the most positive outcomes (Baumrind 1978; Dornbusch et al. 1987), including family cohesion and low parent-child conflict (Steinberg et al. 1991).

The associations between harsh parenting practices and low levels of responsiveness also have been replicated in substance use contexts (Wormington et al. 2011). For example, Donaldson and associates (2015) showed that stringent monitoring combined with low parental warmth increased young adolescents' likelihood of misusing prescription medications. Along with research on SDT and authoritative parenting style, this finding demonstrates the significance of effective parent-child communication and the enduring importance of parental openness, understanding, and fairness.

Parent expectancies predicted underage consumption (for both samples) and binge drinking later in adulthood (for the NSS only). It is likely that effects for expectancies on adult binging were non-significant due to violations of independence assumptions for regression models. Regardless, expectancies had an impact on teen binging measured 1 year later.

It is possible that parental expectations were accurate, and their children did engage frequently in deviant acts. However, it also is plausible that parental expectations influenced their children's immediate behaviors, which had lasting effects. Research by Lamb and Crano (2014) on self-fulfilling prophecy effects showed that parent discrepancies between their child's expected and actual substance use may have enduring consequences. When children's parents believed that they were drug free, the child was less likely to initiate marijuana use or to continue to use marijuana within the next year. In contrast, children of parents who thought their child was using marijuana were more likely to initiate use or to continue using marijuana (assuming they had initiated use) in the prior year. The present findings expand the earlier research by demonstrating that such parent expectancies may have long-term influence on substance use.

Youth whose parents consumed alcohol were more likely to engage in both teen and adult binge drinking. These findings emphasize the long-lasting influence parents can have on drinking behaviors, whether it involves being permissive toward use or modeling normative drinking behaviors at home. Parent attitudes toward alcohol use represent a form of social modeling that can be expressed via parent behaviors (Wood et al. 2004). Thus, parents who consumed alcohol frequently were likely inadvertently communicating to teens that they perceived frequent use as acceptable. These behaviors were shown to be associated with drinking outcomes over time, which, in turn, predicted the likelihood of arrest many years later. Overall, the relationships associated with parent actions point to the need for widespread public consideration of information and guidelines that may ameliorate drinking behaviors in adolescents.

This study's findings should be interpreted in light of several limitations. Due to the nature of secondary data, the researchers could not specify the exact questions used in surveying respondents, and as a result, each measure may have missed the mark to some extent. However, although this limitation probably weakened the findings, its cost was offset by the benefit of the longitudinal, nationally representative nature of the data, which could not have been collected without massive federal support. The self-report measures also may represent a study limitation. Since substance misuse can lead to arrests or stigmatization, the validity of such self-reports may be questioned (Morral et al. 2003). However, research suggests that the validity concerns of underreporting substance use are minor and unlikely to affect study results (Cornelius et al. 2004).

The use of parent-child pairs for families with more than one child also represents a study limitation; however, including a NSS analysis offset biases from violations of the independence assumption for regression models. There also was a high rate of missing data for the parent variables in this study, which is inherent to the Add Health dataset, but use of MI helped offset biases from missing values, as this technique is shown to produce unbiased estimates. The relatively low effect size of standardized coefficients is arguably a study limitation. However, results are still practically significant, as they show the lasting impact of risk variables over time. Additionally, similar effect sizes have been found with other secondary studies (Donaldson et al. 2015), and the relatively weak effect sizes do not lessen the importance of the nationally representative results, which are generalizable across millions of adolescents and their parents.

Conclusion

Based on a longitudinal and nationally representative sample, these findings provide one of the first multidimensional pictures of the different risk factors that may exacerbate adolescents' alcohol-related difficulties. It highlights the importance of parental behaviors in reducing (or potentially increasing) their children's likelihood of engaging in underage drinking and binge drinking, which, in turn, predicts later, serious behavioral problems resulting in arrests.

Generally, youth have their first encounters with alcohol in early or middle adolescence (Patrick and Schulenberg 2010), and the current research demonstrated that parents can have a substantial impact on their children's alcohol use at this time. Consequently, a well-designed prevention campaign might profitably focus on educating parents about the importance of responsiveness (Donaldson et al. 2015) and democratic rule setting (Ennett et al. 2013) in addition to the influence of their own drinking behaviors (Van Der Vorst et al. 2006) and expectancies (Lamb and Crano 2014).

Glatz and Koning's (2015) recent experimental intervention study assessed the efficacy of enhancing parent competence for preventing adolescent drinking habits. Their intervention was designed to alter positive parental perceptions of self-efficacy via concrete household guidelines and rule setting. When parents were given specific and tangible instructions about how to deal with their child's potential drinking, they had more confidence about implementing effective prevention strategies at home. Building on the results of this intervention, future research could assess the usefulness of teaching parents about the long-term effects of proper monitoring, of their own drinking behaviors, and the importance of social modeling. In particular, they could be educated about the benefits of refraining from both alcohol consumption in front of vulnerable adolescents and storing alcohol at home. An effective intervention could focus on teaching parents clear and specific strategies for communicating household rules that maintain of warmth and support while also communicating clear guidelines and expectations. The use of persuasive information aimed at parents has an added benefit of being less likely to be resisted by adolescents and, thus, may prove effective in preventive persuasion applications for adolescents as well as their parents (Crano et al. 2007). We believe that adopting parent-targeted (versus child-targeted) intervention strategies will improve the likelihood of attaining sought-after outcomes and maximize the effectiveness of future prevention campaigns.

Compliance with Ethical Standards

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Conflict of Interest The authors declare no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board.

Informed Consent The Add Health researchers obtained informed consent from all individual participants included in the study.

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