

# Parental support and monitoring influences on adolescent alcohol use: A peer selection mediation model

Lucas S LaFreniere<sup>1,2\*</sup>, Michelle G Newman<sup>2</sup> and John W Graham<sup>2</sup>

<sup>1</sup>Department of Psychology, Skidmore College, Saratoga Springs, NY, USA

<sup>2</sup>Department of Psychology, The Pennsylvania State University, State College, PA, USA

<sup>3</sup>Department of Biobehavioral Health, The Pennsylvania State University, State College, PA, USA

## Abstract

Previous studies on parental support have consistently shown it predicts lower adolescent alcohol use. Yet findings regarding the influence of parental monitoring have been mixed. The current study aims to resolve this concern while examining peer selection as a mediator of both parenting factors. The current study used structural equation modeling and bootstrapping mediation analysis on data from 3,027 youth across three waves of the Adolescent Alcohol Prevention Trial to examine these factors. We tested a latent path model where the effect of parental support and monitoring in 7<sup>th</sup> grade on adolescent alcohol use in 9<sup>th</sup> grade was hypothesized to be mediated by best friends' alcohol use in 8<sup>th</sup> grade. Results: Higher parental support in seventh grade predicted lower adolescent alcohol use in 9<sup>th</sup> grade, mediated by lower best friends' use in eighth grade ( $ab = -0.025$ ,  $CI = [-0.152, -0.003]$ ). Yet parental monitoring in seventh grade did not predict alcohol use in 9<sup>th</sup> grade when parental support was included as a co-predictor in the model ( $ab = 0.018$ ,  $CI = -0.135 - 0.025$ ). There was also no significant mediation effect for the monitoring to youth drinking path. Adolescent's closeness with their parents may direct them to choose non-drinking friends, which leads to lower alcohol use in high school. Previously suggested effects of parental monitoring may be accounted for by support from parents.

How to best raise a child may be one of life's most difficult and debated questions. How can one guarantee that the most feared scenarios are widely evaded—situations like criminality, pregnancy, or underage drinking? The current study aims to address this question by attending to the latter problem: How might parents best curb youth alcohol use? In the literature, this age-old parenting question has recently resurfaced after a decade of being woefully understudied. In recent years debate has arisen about the importance of properly defining parental monitoring. Many argue for differentiating the effects of parent efforts to monitor child activities, parents' actual knowledge of the child's alcohol behaviors, and the child's honest disclosure of those behaviors [1]. Yet across the sizable literature on parenting effects, there are generally *two* broad constructs theorized to be vital for socialization. In addition to parental control (monitoring, supervision, rules, and discipline), there is parental support [2].

## The importance of a combined parental support and monitoring model

Both parental support and control have been theorized to exert notable influence on child outcomes. Parental support has been defined as behaviors toward the child that indicate s/he is loved and valued. It can include praise, approval, encouragement, assistance, companionship, physical affection, and the conveyance of warmth, acceptance, and personal worth to children [2]. Theoretically, warmth and assistance forge powerful bonds between children and parents and promotes adolescents' social competence, identification with their parents, and development of autonomy [3]. Complementing support, parental control has been defined as "parental behaviors toward children that are intended to direct children's behavior in a manner acceptable to parents" [2]. Monitoring—a subtype of control—is parents' active awareness and regulation of children's activity [4]. The current study focuses on monitoring due to its special relation to support, as we

will later discuss. Parental support and control have been shown to have major effects on many forms of youth deviancy [5-7]. Underage drinking is itself a delinquent act and has been repeatedly linked to broader delinquency and other drug use [8]. Such a link suggests the many findings regarding parenting effects on general delinquency may be relevant for alcohol use.

Among forms of delinquency, there is much literature linking parenting to underage drinking. Alcohol use among adolescents is one of the most detrimental and prevalent public health concerns for youth, both in the United States and internationally [9-11]. By the final year of high school, nearly 75% of teenagers have consumed alcohol with 25% engaging in heavy drinking [10]. Understanding the causes and correlates of this phenomenon is important for engaging effectively in its prevention. Among these factors, parenting's influence has been prominent in past research, but could be notably extended and improved.

Most studies have addressed support and monitoring separately without comparing them within the same population, method, and statistical model. Those focusing solely on support have repeatedly shown it to be a promotive factor predicting lower alcohol use in adolescents [12-17]. Yet findings are mixed for monitoring. Although some studies showed that greater monitoring predicted lower drinking,

**\*Correspondence to:** Lucas S. LaFreniere, PhD., Assistant Professor; Skidmore College, 101 Tisch Learning Center Skidmore College, 815 N. Broadway, Saratoga Springs, NY 12866, USA, Tel: (906)-361-6958; Fax: (518)-580-5319; E-mail: llafreni@skidmore.edu

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a significant number did not find such a link [18-32]. For delinquent behaviors in general, several more recent studies have failed to find longitudinal link between monitoring and later delinquency [33-35]. In fact, some found monitoring predicted *greater* later delinquency [36,37]. Thus, whereas support's impact appears clear, monitoring's power is yet uncertain.

There are possible reasons why findings may be inconsistent for monitoring when support and monitoring are examined separately. Any apparent effects of parental monitoring may actually be more attributable to the influence of parental support. Children may seek to please, follow, and respect the monitored limits of parents with whom they feel close, as well as be more forthcoming about their true activities and whereabouts. Theorists have argued that higher support generally allows for greater control; the two cannot be separated [38]. Yet without controlling for support, the effect of monitoring is uncertain. Thus, it is most important to review studies that include both variables in the same model. However, most combined support and control studies have not examined monitoring specifically. For example, several grouped together various forms of control as restriction or rule-enforcement and thus did not capture monitoring [12,39,40]. Another study grouped monitoring with rule-enforcement under a singular score [41]. Furthermore, another used only a single monitoring item that asked solely about mothers' knowledge of the peers with whom their child spent time outside the home [42].

When support and monitoring *have* been measured purely and separately in the same model, studies improperly operationalized monitoring as honesty of disclosure by adolescents [2,43]. In fact, it has been suggested that the unintended assessment of child disclosure may account for monitoring's effect when it does appear significant [31,44]. Researchers have proposed that parents' intentional tracking of adolescents through soliciting child report is *not* the factor that reduces drinking likelihood. Rather, it is the *honest disclosure* of information by the child—willingness to be truthful with parents [45]. In fact, Kerr, *et al.* [36] found that adolescent disclosure was a significant longitudinal predictor of both parent's knowledge of problem behaviors and actual delinquency in both single- and cross-rater models. Yet neither of their models' measures of monitoring parental control or solicitation—were significant predictors of either knowledge or delinquency. This highlights the important distinction between solicitation of child information by the parent and the child's willingness to disclose that information truthfully. Parent knowledge of the child's actual whereabouts, friends, and behavior and its influence on alcohol use outcomes are dependent on the child's disclosure. When a child perceives a parent to be supportive and close, s/he may be more likely to give truthful disclosure. If parental monitoring is improperly assessed as disclosure instead of solicitation and regulation, significant promotive effects of "monitoring" may arise—effects that are better attributable to support. The optimal test of whether higher monitoring predicts lower drinking should 1) assess monitoring as parental solicitation and regulation rather than child disclosure and 2) include parental support to account for its influence alongside monitoring. Thus, no previous study has sufficiently examined the prediction of youth alcohol use by parental support and monitoring together with proper construct assessment.

### Peer selection as the mechanism of parenting effects on drinking

A much larger problem is the lack of research on the mechanisms by which supportive, aware parenting protects against alcohol use

[46]. Socialization theory again offers possible means of influence. In this theory, socialization starts with parents but grows increasingly peer-emphasized throughout adolescence. Many explicitly family-based models of substance use etiology propose that affiliation with deviant peers is an immediate antecedent of substance use (e.g., Family Interactional Theory, Social Coercion Theory, Social Control Theory, etc. [47]). In fact, a large body of empirical work has uncovered a positive relationship between the delinquency of an adolescent's peers and the adolescent's own alcohol use [48-52]. Some studies even find that peers have a greater influence on adolescent drinking than any parenting factor [28]. In fact, Nash, *et al.* [53] found that a promotive effect of positive family environment predicted weaker strength of peer influence, which then later predicted lower alcohol behaviors (although no mediation analyses were presented). Thus, the impact of parenting factors on youth alcohol use may be partly explained by the effect of parenting on selection of peers and their shared activities—activities that may include drinking.

Examination of both parents and peers suggest parenting factors lead to adolescent bonding with delinquent peers, although no mediation study has addressed support and monitoring together [54,55]. Both higher parental closeness and monitoring have predicted less involvement with deviant peers. Nonetheless, parental support has received the most attention [56-58]. For example, in an early study, parent-child attachment in the warmth-support sense was the strongest promotive factor against delinquency among a diversity of family and demographic characteristics [59]. Parental closeness also increased the likelihood of choosing drug-free friends and decreased the likelihood of drug use in another study [57]. In other research, close parent-child attachment in early adolescence led to greater intolerance of deviance and less rebelliousness, which were related to associating with nondeviant peers later on [56]. Associating with nondeviant peers was then related to less young adult drug use. A negative effect of low parental monitoring on peer deviance has research support as well. In one study, for 10-year-old boys poor parental monitoring was associated with involvement with antisocial peers at age 12 [58]. Another study found that lower monitoring predicted higher peer drug use, which then predicted higher child substance use later on [60].

### The current study: Parental support and monitoring effects through peer selection

Thus, it is possible that parenting factors influence adolescents to select peers with higher alcohol use, resulting in those adolescents using greater amounts of alcohol themselves. Yet no previous study has analyzed the predictive power of both parental support and monitoring on youth alcohol use while 1) assessing monitoring as solicitation and regulation (instead of disclosure) and 2) allowing support and monitoring to account for one another. Furthermore, 3) no study has examined the mechanism by which they work in a combined model. Better understanding which parenting factors are most crucial and why can improve recommendations for optimal parenting, lowering youth drinking. The need for clarity in the effects of these key, long-studied parenting factors call for a study that includes support, monitoring, and peer selection together.

Therefore, the current study aimed to test whether effects of parental closeness and monitoring on youth alcohol use were mediated by the alcohol use of adolescents' best friends in a combined model. Our methods improve on previous studies of support and control in alcohol use by including both parental support and monitoring as predictors in the same model, along with peer alcohol use as a

mediator. Furthermore, we attempted to properly operationalize monitoring by including multiple indicators that assessed solicitation and regulation, not child disclosure. Lastly, we employed a preferred analytical approach superior to those conducted on this topic in the past: Bootstrapping regression-based mediation analysis in the context of structural equation modeling [61]. According to our review, no prior parental support or control study utilized these better methods [62]. Given the uncontested promotive effects of support in previous literature, we hypothesized that when 7<sup>th</sup> grade adolescents who experienced greater parental support chose peers who used alcohol less in 8<sup>th</sup> grade, they would use alcohol less themselves in early high school (9<sup>th</sup> grade). Given mixed findings about monitoring and a lack of studies assessing solicitation, analyses of monitoring's effect were considered exploratory. Yet as a working hypothesis, we proposed that when 7<sup>th</sup> grade adolescents who experienced greater parental monitoring chose peers who used alcohol less in 8<sup>th</sup> grade, they would use alcohol less themselves in 9<sup>th</sup> grade.

## Method

### Parent study and participants

All measures and data were derived from one of four cohorts of the Adolescent Alcohol Prevention Trial (AAPT), an 8-year project intended to explore and test interventions for preventing youth substance use [9]. Participants were recruited from 12 junior high schools in Los Angeles and Orange Counties, California over the course of the 1987-1988 school year. The current study utilized the first three waves of AAPT data. At each assessment point participants completed the AAPT questionnaire, a 206-item survey on substance use, deviant attitudes, peers, and family experiences developed specifically for the AAPT. First wave responses were obtained during participants' 7<sup>th</sup> grade year. Subsequent responses were then gathered in 8<sup>th</sup> and 9<sup>th</sup> grade at approximately one-year intervals. These ages were chosen because initiation of drinking occurs in early to mid-adolescence for most individuals—63.4% have consumed alcohol by grade 9—and the transition to high school is a notable risk factor for increased alcohol consumption [23,63]. We analyzed data from 3,027 participants (52% female). The sample was 44.1% Caucasian, 26.5% Hispanic, 17.4% Asian, 1.9% African American, and 10.1% other. In terms of missing data, 80.2% of students ( $N = 2,416$ ) were tested at the last measurement.

### Measures

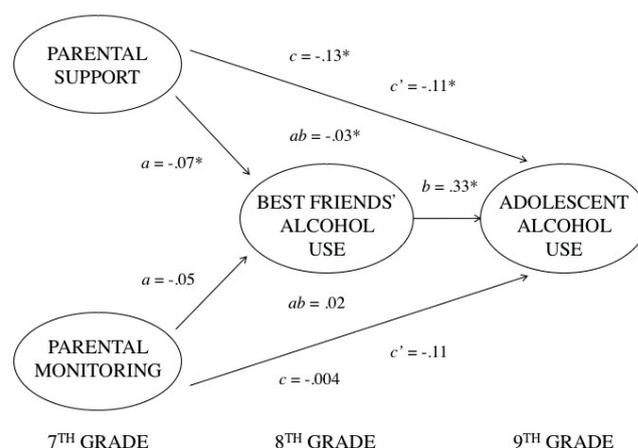
All items were taken from the Adolescent Alcohol Prevention Trial Questionnaire (AAPT questionnaire), a 206-item survey developed for the AAPT that inquired about topics such as participant alcohol and drug use, attitudes toward substance use, proximal adult substance use, parenting/parent-child factors, self-perceptions, peer substance use, and participant-peer relationships, among other topics. The four variables of interest in the current study (Parental Support, Monitoring, Best Friend's Alcohol Use, and Participant Alcohol Use) and covariates were comprised of a subset of specific items chosen from the questionnaire in accordance with theoretical considerations (see Appendix A) and shown to have acceptable fit. For each factor of survey items, we conducted a confirmatory factor analysis (CFA). We also calculated scale reliabilities using a CFA-based method as recommended by Raykov [64]. Raykov joins several other authors in arguing that Cronbach's alpha is insufficient under the conditions of latent variable modeling, suggesting an alternative be used [65].

The Parental Support latent factor had 5 items asking participants how close they felt to their parents, how much free time they spent with

their parents, how often parents told him/her they were proud of him/her, how well the participant believed his/her parents understood what was important to him/her, and how much his/her parents cared about him/her (see Appendix A). Both the factor's fit (CFI = 0.97, TLI = 0.94) and internal reliability ( $\rho = .914$ ) were acceptable. Parental Monitoring included 3 items asking how often their parents asked them where they were going when they left the house, how often parents refused to let them do things with peers, and how often parents told them what time to be home when they went out with friends. Again, both the factor's fit (CFI = 1.00, TLI = 1.00) and internal reliability ( $\rho = .817$ ) were acceptable. Best Friends' Alcohol Use was indicated by items asking about the alcohol use frequency and degree (i.e. drunkenness) of three people in their grade and school who they considered to be their best friends, as well as how often they were around drunk peers. For this factor, both its fit (CFI = 1.00, TLI = 1.00) and internal reliability ( $\rho = .905$ ) were acceptable as well. Lastly, Alcohol Use was indicated by 5 items asking how many drinks they had their entire life, in the past 30 days, and in the past 7 days, how many days in the past month they had at least one drink, and the most drinks they had on the day in the past month when they drank the most. This factor also had acceptable fit (CFI = 0.97, TLI = 0.94) and internal reliability ( $\rho = .766$ ).

### Statistical analyses

Analyses employed Mplus 7 software. Structural equation modeling was used to perform a latent variable mediation analysis on the factors previously presented. To account for missing data, we used Full-Information Maximum Likelihood (FIML) estimation for mediation analyses with the MPlus ML estimator. We employed bootstrapping regression-based path analysis [61] with 10,000 bootstraps. Analyses tested causal paths in which parental support and parent monitoring of time with friends in 7<sup>th</sup> grade predicted participant alcohol use in 9<sup>th</sup> grade, both mediated by best friends' substance use in 8<sup>th</sup> grade (Figure 1). Best friend's alcohol use in 7<sup>th</sup> grade, participant alcohol use in 7<sup>th</sup> grade, participant gender, and whether the participant was of Caucasian ethnicity were included in this model as covariates. Seventh



**Figure 1.** Conceptual Diagram of a Mediation Model Where the Relationship Between Parental Support in 7<sup>th</sup> Grade (X) and Adolescent Alcohol Use in 9<sup>th</sup> Grade (Y) is Mediated by Best Friends' Alcohol Use in 8<sup>th</sup> Grade (M)

Regression Coefficients: a = Effect of X on M, b = Effect of M on Y, ab = Indirect Effect (Mediation), c' = Direct effect of X on Y (with M Included in the Model), c = Total Effect of X on Y (with M Not Included in the Model). \*Result was Significant by 95% Bootstrap Confidence Interval.

**Table 1.** Descriptive statistics: Means and standard deviations of observed variables.

Grade	Factor	Indicator	M (SD)
7th	Parental Support	PS1	3.05 (0.68)
		PS2	2.29 (1.34)
		PS3	2.71 (0.92)
		PS4	3.09 (1.23)
		PS5	3.70 (0.38)
7th	Parental Monitoring	PM1	3.31 (1.01)
		PM2	1.70 (1.03)
		PM3	2.95 (1.43)
7th	Best Friend's Alcohol Use	BF1	1.31 (0.54)
		BF2	1.35 (0.60)
		BF3	1.12 (0.21)
7th	Participant's Alcohol Use	AU1	3.05 (4.43)
		AU2	1.56 (1.60)
		AU3	1.32 (1.10)
		AU4	1.24 (0.49)
		AU5	2.11 (2.55)
8th	Best Friend's Alcohol Use	BF1	1.54 (0.88)
		BF2	1.60 (0.99)
		BF3	1.24 (0.43)
9th	Participant's Alcohol Use	AU1	4.40 (6.02)
		AU2	2.09 (3.36)
		AU3	1.61 (2.36)
		AU4	1.49 (0.97)
		AU5	2.72 (4.28)

grade best friend's and participant's alcohol use were latent variables using the same indicators as their second and third wave counterparts. Autocorrelations were specified between the first, second, and third wave iterations of each of the individual item responses within these two covariate-outcome pairs. Ninth grade participant alcohol use was regressed on 8th grade best friend's alcohol use, 7th grade closeness to parents, 7th grade parental monitoring, and the covariates (7th grade gender, ethnicity, participant alcohol use, and best friends' alcohol use); 8th grade best friends' alcohol use was regressed on closeness to parents and monitoring and the covariates. Concurrent correlations were specified between all 7th grade variables. Thus, we estimated all associations between latent variables. The relation between covariates best friends' alcohol use and participant alcohol use in 7th grade exhibited high collinearity in the path model ( $r = 0.648$ ). Thus, two separate models were run: One with 7th grade participant alcohol use removed from the model and one with 7th grade best friends' use removed. Both models resulted in identical statistical conclusions regarding prediction and mediation. We present the statistical indices from the model with 7th grade participant alcohol use removed. Although both models' conclusions were identical, we present this model because our focus is on mediation by best friends' use and including the covariate closer in time to its later counterpart is arguably more conservative.

**Results**

Descriptive statistics for the observed variables are presented in Table 1. Zero-order correlations between the factors prior to specifying the path model are presented in Table 2. The current model's fit was good. Although the  $\chi^2$  for this model was significant ( $\chi^2 (167) = 971.486, p < .001$ ),  $\chi^2$  is notably sensitive to sample size [66]. Given the sample size of the current study ( $N = 3,027$ ), even trivially slight deviations from an ideal model would be statistically significant. For that reason, judgments of goodness of fit were made on the basis of four indices of practical model fit: CFI, TLI (also known as NNFI), RMSEA,

and SRMR. RMSEA is incorrect in the case of missing data due to the incorrect use of the full sample size N, which ignores missing data [67]. Accordingly, each RMSEA has been corrected in this study by making use of  $N' = (\% \text{ of values observed}) \times N$  as suggested by [68]. Based on the net pattern of RMSEA, TLI, and CFI (CFI = 0.95, TLI = 0.94, RMSEA = 0.048, SRMR = 0.045), the fit of the model was considered good.

Main results of the pre-to-post mediation analyses are summarized in Figure 1. The coefficients ( $a$ ,  $b$ , and  $c'$ ) represent standardized regression coefficients for each respective model path. First, the paths emanating from closeness to parents were as expected. Analyses revealed a significant total effect where higher closeness to parents in 7th grade led to lower youth alcohol use in 9th ( $c = -0.134$ , 95% bootstrap CI = [-0.627, -0.130]). Higher closeness to parents in 7th grade predicted lower best friends' alcohol use in 8th grade ( $a = -0.074$ , 95% bootstrap CI = [-0.190, -0.002]) and lower best friends' use significantly predicted lower youth alcohol use in 9th grade ( $b = 0.333$ , 95% bootstrap CI = [0.507, 0.987]). Most importantly, results supported the hypothesized mediation model: According to a 95% bias-corrected bootstrap confidence interval, the indirect effect of closeness to parents in 7th grade on youth alcohol use in 9th grade through lower best friends' use was statistically different from zero ( $ab = -0.025$ , 95% bootstrap CI = [-0.152, -0.003]). Thus, the association between higher closeness to parents in 7th grade and lower youth alcohol use in 9th grade was mediated by lower best friends' alcohol use in 8th grade. A significant direct effect remained ( $c' = -0.110$ , 95% bootstrap CI = [-0.549, -0.063]).

Parental monitoring paths did not align with hypotheses. There was no total effect for the path from parental monitoring in 7th grade to alcohol use in 9th grade ( $c = -0.004$ , 95% bootstrap CI = [-0.320, 0.202]). Higher parental monitoring in 7th grade did not significantly predict lower best friends' alcohol use in 8th grade ( $a = -0.054$ , bootstrap CI = [-0.169, 0.037]). Again, lower best friends' use significantly predicted lower youth alcohol use in 9th grade ( $b = 0.333$ , 95% bootstrap CI = [0.507, 0.987]). Yet results did not support the hypothesized mediation model: According to a 95% bias-corrected bootstrap confidence interval, the indirect effect of parental monitoring in 7th grade on youth alcohol use in 9th grade through lower best friends' use was not significant ( $ab = 0.018$ , 95% bootstrap CI = [-0.135, 0.025]). Thus, the association between higher parental monitoring in 7th grade and lower youth alcohol use in 9th grade was not mediated by lower best friends' alcohol use in 8th grade. Note that the direct effect was not significant either ( $c' = 0.110$ , 95% bootstrap CI = [-0.262, 0.240]).

**Discussion**

Previous studies of the effect of parental support and monitoring on youth alcohol use have had mixed findings regarding parental monitoring's influence. Since past studies have not combined support and monitoring in the same model, have operationalized parental monitoring as child disclosure, and have not used contemporary mediation methods, studies with improved methods could clarify

**Table 2.** Correlations between latent variables prior to specifying the path model.

Factor	1	2	3	4	5	6
1. 7th Gr. Parental Support	--					
2. 7th Gr. Parental Monitoring	0.28***	--				
3. 7th Gr. BF's Alcohol Use	-0.24***	-0.08*	--			
4. 7th Gr. Participant Alcohol Use	-0.22***	-0.08**	0.65***	--		
5. 8th Gr. BF's Alcohol Use	-0.22***	-0.11**	0.60***	0.48***	--	
6. 9th Gr. Participant Alcohol Use	-0.22***	-0.09*	0.39***	0.41***	0.45***	--

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

the uncertain impact of these parenting factors. In addition, research has not sufficiently addressed mechanisms of the promotive effect of parenting factors on adolescent drinking, such as selection of peers—particularly not in a combined model. The current study used structural equation modeling and bootstrapping mediation analysis on data from the Adolescent Alcohol Prevention Trial [9]. We tested a model where the effect of parental support and monitoring in 7<sup>th</sup> grade on adolescent alcohol use in 9<sup>th</sup> grade was hypothesized to be mediated by best friends' alcohol use in 8<sup>th</sup> grade. Our predictions regarding parental support's effect were supported, but our exploratory hypotheses regarding parental monitoring's effect were not. Higher parental support in seventh grade predicted lower adolescent alcohol use in 9<sup>th</sup> grade, mediated by lower best friends' use in eighth grade. When adolescents who experienced more parental love and attention chose close friends who drank less alcohol a year later, they drank less themselves in their first year of high school. Yet in contrast to expectations, when parental support was a co-predictor, parental monitoring in 7<sup>th</sup> grade did not predict alcohol use in 9<sup>th</sup> grade. There was also no significant mediation effect for best friends' alcohol in 8<sup>th</sup> grade for the monitoring to youth drinking path.

### Why did support outperform monitoring for alcohol use?

The finding that higher parental support lowered risk for youth alcohol use is consistent with the vast majority of the literature. Both theory and research have offered explanations for how parental support buffers against alcohol use. Parental warmth and closeness may lead children to respect, agree, and identify with their parents' wishes, such as wishes that they avoid drinking. Increased satisfaction from relationships with parents, identification with parents, and the promotion of social competence that comes from parental support may keep youth from having the desire to drink for pleasure or for any perceived social effects it may have [3]. Wills, *et al.* [17] have proposed that support from parents builds self-control and acquaints children to mainstream institutions as well. Similarly, close parent-child attachment in early adolescence leads to greater responsibility, less rebelliousness, and intolerance of deviance (a.k.a. "conventional behavior")—all factors that would suggest lower likelihood of alcohol use [56]. The novel contribution made by the current study is the revelation that parental support lowers risk for adolescent alcohol use by leading youth to choose peers that use less alcohol, if any. When adolescents feel close to and spend more time with parents, believing their parents care for and understand them, they not only feel a stronger desire to abide by their parents' rules out of admiration and respect, but they have a significant foundation of social support from family as well. Thus, they have stronger intimacy bonds and may feel less of a need to engage in risky behaviors to acquire desired social connection. Consequently, they are less likely to forge close friendships with peers who do not follow their parents' wishes and rules. They may also feel less need to seek out costly relationships that could lead to punishment, because their needs for closeness are satisfied by major attachment figures (the costs outweigh the benefits). Once adolescents have formed best friendships with non-drinking peers, a wealth of literature shows it is much less likely for them to drink later in life [52].

When accounting for support in our combined model, parental monitoring neither predicted participant alcohol use nor best friends' alcohol use. Although there is literature suggesting parental monitoring protects against choosing deviant peers and adolescent alcohol use, our study suggests that parental support accounts for the majority of this effect. Similarly, the only other combined study to operationalize monitoring as parent solicitation and regulation in adolescents also

found that support significantly predicted youth alcohol use, but monitoring did not (though it was assessed by only one item about mothers [42]). Note that a recent Bolivian study on young adults included both parental monitoring and father-child relationship in one model, finding that only parental monitoring significantly predicted alcohol consumption [69]. Yet the mean age of their Bolivian sample was 19-years-old (the legal drinking age is 18 in Bolivia), they did not report the content of any of their self-constructed items, and they omitted the mother-child relationship. Theorists have suggested that when children feel close with their parents, they are more likely to follow their rules out of respect and a desire to please [38]. In fact, Barnes, *et al.* [2] found that higher parental support prospectively predicted higher monitoring, which later resulted in lower drinking. As another study demonstrated, parenting styles marked by high warmth and low strictness prevent alcohol use to the same degree as parenting with both high warmth and high strictness [70]. Such results suggest control forms like monitoring may be less relevant in the context of support.

Importantly, children who feel close and supported by their parents may also be more forthcoming. A cohort of researchers following the work of Kerr, *et al.* [44] have proposed that it is not parental tracking of adolescent children, or solicitation of children's report, that predicts lower alcohol use [1,45]. Rather, it is the child's truthful disclosure about activities—the adolescent's tendency to be open with his or her parents about activities. Parental support variables have longitudinally predicted honest child disclosure in several studies, which may be why support overcomes parental monitoring in our combined model [71,72]. Keijsers, *et al.* [33] used a bidirectional multi-informant design to study both parental monitoring, questioning about the adolescent's activities, and adolescent disclosure. They found that parental monitoring did not predict delinquency. Rather, the child's own disclosure was negatively associated with delinquency. The same results were found by Kerr, *et al.* [36]. In addition, Keijsers, *et al.* [33] also revealed that high delinquency predicted low disclosure. Also relevant, Laird, *et al.* [73] found that adolescents with parents who had relatively less true knowledge about their child had higher levels of delinquent behavior and more deviant peers, both of which increased over time. Similarly, Abar, *et al.* [74] found that greater discrepancies between parent reports of knowledge about their children and children's report of parents' knowledge significantly predicted greater youth alcohol use. Lastly, a sophisticated random-intercept cross-lagged model by Keijsers [1] found that links between parental monitoring and delinquency were not explained by causal processes of monitoring operating at the family level, but adolescent disclosure and delinquency *were* associated [75]. It may be that parental monitoring is only as good as adolescents' willingness to reveal their true behaviors—an act more likely in the context of parental warmth.

Note that in the most extensive and cited longitudinal studies on parental support and control, both parental support and "monitoring" did predict lower later drinking [43]. Yet this may have occurred only because the included monitoring items truly assessed child disclosure (e.g., "How often do you tell your parents where you're really going?") rather than parental solicitation and regulation of child activity.

It is important to make the distinction between solicitation and disclosure for practical reasons. Parents have direct control over their solicitation of children's information and regulation of child activities, but they do not have control over the truthfulness of children's replies. Taken together, this study's results suggest that parents wishing to prevent drinking may benefit most from emphasizing the conveyance of love, warmth, and acceptance and building closeness with their

children *over* tracking their activities. Yet it is important to recognize that control should not be entirely abandoned. Parental support can aid the effectiveness of efforts at discipline and monitoring and may be impactful partly because of its influence on monitoring's power. Control is an arguably necessary component of effective parenting that should not be done away with simply because support bears the most effect [38].

## Limitations

The current study was not without limitations. It is important to recognize that data for this analysis was taken from a trial for a particular intervention. The AAPT study included four different treatment conditions, including 1) lessons about the negative consequences of substances, 2) lessons about consequences and education on resisting peer pressure to use substances, 3) lessons on consequences in addition to lessons correcting erroneous perceptions of prevalence and acceptance of substance use among peers (Normative Education), and 4) lessons on consequences, resistance to peer pressure, and conservative norms of peer use. Note that some of these conditions attempted to teach youth how to resist peer pressure, which could possibly have skewed findings on best friends' alcohol use predicting participant use. There are reasons to believe the AAPT data are appropriate for the current study though. First, Hansen, *et al.* [9] found that the programs designed to teach techniques to resist and refuse peer pressure substance use offers had "no discernable positive impact on substance use behavior" (p. 425). Thus, it caused no change in substance use and was unlikely to influence results through reducing peer pressure response. Second, engaging in substance prevention programs in an educational setting is actually a very normative experience for junior high students. Based on a large nationally representative survey of schools, on average, U.S. students receive 1.62 substance use prevention programs during their school years from elementary through high school [76]. Our sample's experience of such programs during the study arguably increases the external validity of our findings.

Several other possible study limitations exist. Due to the self-report nature of this assessment, young participants may have inaccurately over- or under-reported their behavior. Despite repeated assurance that their reports were confidential, completing the questionnaire in a school environment around teachers may have led students to under-report their deviant behaviors, feeling threatened by potential negative consequences of revealing their substance use. It is also possible that junior high participants gave faulty reports regarding drunkenness. Many participants may not have acquired enough experience with alcohol to understand at what level of intoxication one is reasonably "drunk," leading to erroneous reporting. In addition, a much larger proportion of participants in this study were White, with a quarter being of Hispanic ethnicity. Such restricted ethnic breadth reduced the external validity of results to other groups.

## Future directions

This study is one of several that are beginning to explore the intricacies of the means by which parenting factors influence adolescent drinking. There are many avenues for future research to follow beyond our current foundation. It may be a worthy cause for researchers to include the effect of child variables within the context of parental support. The reciprocal effects model of socialization suggests that child behavior affects parenting just as parenting behavior affects the child, with both children and parents eliciting behavioral patterns from one another [77]. Future research should test transactional models of how children's influences on parenting eventually affect later alcohol use, as some are already doing [35]. Child factors in general

may be important to examine, such as level of child empathy. Some studies suggest children's trait empathy may affect support's influence. In several studies children with low levels of dispositional affective empathy were less responsive to parental practices and had greater antisocial behavior [78]. Such child factors may be possible moderators of the influence of parental support on later adolescent alcohol use. Study of other child and parent factors may reveal interaction effects in these paths, such as child temperament, child gender differences, and father-child vs. mother-child relationships [79-81]. It is also important to study other mediators of parental support's preventative effect on adolescent drinking beyond best friends' alcohol use, such as sibling substance use, self-regulation and risk-taking tendency [16,82,83].

Future research should continue to devote attention to mediators of the influence of parental factors on alcohol use to improve youth health behavior. Peer bonds are a highly impactful motivator of adolescent behavior. Friend variables are an explanatory factor within the parenting-alcohol use relationship. As suggested by this study, research on such variables is likely to reveal fruitful findings. As the current findings suggest, parenting support and the control it fosters can direct adolescents' selection of friends, which in turn influences their later alcohol use. Expressing love and understanding and cultivating closeness may be a parent's best bet for curbing relationships marked by deviance and, eventually, underage drinking.

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## Competing interests

There are no competing interests or conflicts of interest to disclose for this study.

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