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Parental monitoring and alcohol use across adolescence in Black and White girls: A cross-lagged panel mixture model

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Abstract

Background—The link between parental monitoring and adolescent alcohol use is well established, but the directionality of this relationship is somewhat elusive. The literature suggests that parental engagement serves a protective function with respect to alcohol use, but that parental monitoring may also diminish in response to recurrent risk behavior. The lower rate of alcohol use despite evidence of lower levels of parental monitoring in Black vs. White youth raises the question of for whom and under what conditions parental monitoring and alcohol use are associated.

Methods—Data were drawn from a community sample of 1634 female adolescents (954 Black, 680 White) from four age cohorts, assessed annually in an accelerated longitudinal design. The current study uses data spanning ages 12–17; parental monitoring and alcohol use were assessed via self-report, while demographic and adolescent psychosocial risk factors were derived from parent-reports when the girls were age 12. An autoregressive cross-lagged panel mixture model was used to identify discrete patterns of parental monitoring and alcohol use associations across adolescence, and psychosocial factors that differentiate between them.

Results—Two discrete patterns of co-developing alcohol use and parental monitoring emerged: one with stable bidirectional and autoregressive links (79%), and another differing from the majority profile in terms of the absence (alcohol use to parental monitoring) and direction (parental monitoring to alcohol use) of cross-construct influences (21%). Those in the minority profile were, at age 12, more likely to have received public assistance, resided in single-parent households, reached puberty, and manifest more severe conduct problems.

Conclusions—Identifying subgroups of girls with distinct patterns of co-developing alcohol use and parental monitoring is particularly relevant to the development and implementation of family-

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level interventions, both in terms of targeting those with known demographic risk factors, and tailoring programs to address behavioral correlates, such as conduct problems.

Keywords

adolescent girls; alcohol use; parental monitoring; race/ethnicity; cross-lagged panel mixture analysis

Introduction

Parental monitoring has consistently been linked to adolescent alcohol use (Jackson and Schulenberg, 2013, Latendresse et al., 2008) with low monitoring increasing risk and high monitoring protecting against early initiation and heavy use (Ryan et al., 2010). The protective effects of high parental monitoring are robust; they are evident even among high-risk adolescents (Clark et al., 2008) and can continue into young adulthood (Abar et al., 2014). Although the association between parental monitoring and adolescent drinking is well established, their relationship remains a major subject of investigation because of the complexity of the pathways linking the two and the importance of disentangling them, as parental monitoring – unlike many risk and protective factors associated with adolescent drinking – is modifiable.

Bidirectional Influences between Parental Monitoring and Adolescent Alcohol Use

Much of the research in this area has examined the association between parental monitoring and adolescent alcohol use from the framework of parents' behaviors influencing adolescents' behaviors, but there is a growing recognition that the relationship is bidirectional and that investigating it as such is more informative for advancing adolescent alcohol use prevention strategies. One of the earliest of such investigations was conducted by Stice and Barrera with offspring of alcoholics and matched controls followed from ages 10 to 15 (1995), which revealed that parental control at Wave 1 was protective against substance use at Wave 2 and substance use at Wave 1 was associated with reduced parental control at Wave 2. Similarly, results from Clark and colleagues' longitudinal high-risk family study (Clark et al., 2008) indicated that in addition to higher initial monitoring being associated with lower subsequent levels of alcohol use, early adolescent alcohol use was associated with less effective monitoring in middle adolescence. In Wang et al.'s study of 11 to 15 year olds assessed annually from 6^{th} to 8^{th} grade (Wang et al., 2011), low levels of parental rule-making in a given year predicted greater problem behavior (i.e., substance use and antisocial behavior) in the following year and lower levels of problem behavior in a given year predicted higher levels of parental rule-making in the following year. Other studies have found evidence for bidirectional effects between parental monitoring and substance use that are specific to substances other than alcohol (Abar et al., 2014) or to boys (van der Vorst, 2010) and in one study composed of primarily Black adolescents, no evidence for bidirectional associations was found (Elkins et al., 2014). Additional work in this area is clearly needed to understand variability by population and type of substance use, but overall, research to date suggests that parental monitoring and substance use frequently influence each other. More specifically, they suggest that parents of adolescents engaging in

early substance use may be more likely either to withdraw from monitoring or to have difficulty obtaining information from their children about their whereabouts and activities.

Alcohol Use and Parental Monitoring in Blacks vs. Whites

Black youth initiate alcohol use later (Rothman et al., 2009, Sartor et al., 2013) and show different patterns and levels of substance use by age compared with White youth (Chung et al., 2013, Hipwell et al., 2005, Horton, 2007). A lower level of parental monitoring has also been observed in Black compared to White adolescents (Blustein et al., 2015, Clark et al., 2008), though not uniformly (cf. Shorey et al., 2013). Given the slightly later risk period (with Black youth starting to drink an average of a year later than their White peers) and lower overall likelihood of initiating alcohol use in combination with a potentially lower degree of parental monitoring in Black vs. White adolescents, the interplay between parental monitoring and alcohol use in the pre-adolescent to late adolescent years may also differ, but this possibility has yet to be investigated.

We are aware of only two prior studies examining parental monitoring and substance use that addressed differences between Black and White adolescents. In Blustein and colleagues' study of young adult female twins (2015), parental monitoring predicted early initiation of alcohol use in both racial/ethnic groups, but monitoring questions were specific to age 17 and thus did not capture the dynamic nature of the association with alcohol use over time. By contrast, Bohnert et al.'s (2009) investigation of parental monitoring and initiation of cigarette smoking by age 17 in Black and White youth revealed that protective effects of parental monitoring were specific to White adolescents. However, in addition to the difference in substance, the authors drew parental monitoring data from a single time point, in this case, prior to peak period of risk for substance use initiation (age 11). Thus, whether the association between parental monitoring and alcohol use differs between Black and White youth from early to late adolescence remains an open question.

Psychosocial Influences Common to Parental Monitoring and Adolescent Alcohol Use

In characterizing the association between parental monitoring and adolescent alcohol use, the overlap in psychosocial influences on the two constructs - many of which differ between Black and White adolescents - needs to be taken into account. In the current study, we examined three such common influences: socioeconomic status (SES), conduct problems, and timing of pubertal development. Lower rates of parental monitoring (Clark et al., 2008, Wang et al., 2009) and lower rates of adolescent alcohol use have been observed in low SES families in some (Blum et al., 2000; Green et al., 2013), but not all (Hanson and Chen, 2007) studies. History of conduct problems is a known risk factor for early alcohol use (Kuperman et al., 2013) and evidence of both protective effects of parental monitoring against conduct problems (Piko et al., 2005) and the influence of conduct problems on parenting (Dishion et al., 2004) have been found. Finally, early pubertal development is correlated with increased risk for early initiation and risky alcohol use (Biehl et al., 2007) and low parental monitoring has been found to exacerbate this risk (Costello et al., 2007).

The Importance of Characterizing the Development of Alcohol Use in Girls

Adolescent girls and young women are initiating alcohol use at an earlier age and developing problem drinking at higher rates than in prior generations (Falk et al., 2006, Johnston et al., 2012, Keyes et al., 2008). With that trend comes an increase in alcohol related harms, such as sexual assault, that disproportionately affect women (Black et al., 2011). The pathway of risk to problem alcohol use also appears to vary by gender, as evidenced by the later age at first drink and more rapid development of alcohol related problems in female adolescents and young adults. The level and - more importantly - the impact of certain protective factors, including parental monitoring, vary by gender as well. Higher levels of parental monitoring in girls versus boys have been reported in numerous studies (e.g., Crosnoe et al., 2002, Svensson, 2003). Furthermore, although findings are mixed (e.g. Crosnoe et al., 2002, Véronneau and Dishion, 2010), there is evidence that the buffering effects of parental monitoring against a range of psychosocial outcomes, including alcohol use (Svensson, 2003), cigarette smoking (Sanchez et al., 2010), risky sexual behaviors (Donenberg et al., 2002), and emotional distress (Oberlander et al., 2011) are greater in girls, suggestive of gender-specific risk pathways that may be best explored in all-female samples.

Aims of the Current Study—Together, the literature reviewed above focuses exclusively on a generalized understanding of associations between adolescent perceptions of parenting practices and adolescent substance use, and how manifestations of these behaviors and their associations vary as a function of specific isolated sample characteristics. However, because we believe that behavioral development proceeds in response to a complex set of nonlinear and interactive associations among several important factors, as reflected in a broad range of developmental systems theories, it is necessary to explore the individual as the unit of analysis, and to explain similarities/differences in the patterns of associations that characterize them (Bauer and Shanahan, 2007). In fact, person-centered approaches have been used to operationalize parenting and/or alcohol use in many previous studies examining their association (e.g., Abar, 2012, Latendresse et al., 2009). Yet, no study has attempted to identify prototypical patterns based upon the co-active development among these constructs.

Building on the evidence for bidirectional influences between parental monitoring and adolescent alcohol use and distinctions between Black and White adolescents in the timing and prevalence of alcohol use initiation and potentially in the level of parental monitoring, we aimed to characterize longitudinal relationships between parental monitoring and alcohol use in a large sample of Black and White girls. Specifically, our goals were to identify distinct autoregressive and cross-lagged patterns of associations between parental monitoring and girls' alcohol use from ages 12 to 17 using a person-centered analytic approach, and to assess the extent to which these patterns could be uniquely and conditionally differentiated by race/ethnicity, SES, pubertal timing, and conduct problems.

Materials and Methods

Participants

The Pittsburgh Girls Study (PGS; N=2,450) is an urban community sample of four female age cohorts (ages 5–8 at wave 1), assessed annually via an accelerated longitudinal design. PGS sample ascertainment occurred in 1999–2000 and has been detailed elsewhere (Hipwell et al., 2002, Keenan et al., 2010). Briefly, the PGS oversampled low-income neighborhoods, with 85.2% of eligible families completing the first wave of data collection. PGS sample retention was high: 88.5% on average over the data collection years included in the current analyses (2003–2010). Given our interest in differences between Black and White girls, the current study excluded the small subsample identified by their primary caregiver as other race/ethnicity (n=145). In addition, girls with incomplete data on alcohol use and parental monitoring from ages 12–17 were excluded (n=671), as the computational intensity of the mixture analyses described below precluded model convergence when examining more than two latent profiles, specifically when data were missing on observed categorical variables serving both endogenous and exogenous functions within the model. Thus the final analytic sample included 1,634 girls (954 Black, 680 White). Sensitivity analyses comparing the analytic sample with 536 participants who did not meet criteria for this study, but who did have data at age 12, suggested that there were no initial group differences on parental monitoring ($\bar{x}_{\text{diff}}$ = .06, $\sigma_{\bar{x}_{\text{diff}}}$ = .05, $t_{(630.6)}$ = 1.09, p = .28) or alcohol use ($\bar{x}_{\text{diff}}$ = .02, $\sigma_{\bar{x}_{\text{diff}}}$ = .02, $t_{(684.5)}$ = .99, p = .32).

Procedure

Written informed consent from the caregiver and verbal assent from the child were obtained prior to data collection. Annual face-to-face interviews were conducted in participants' homes, separately for each girl and her primary caregiver (94% mothers), by highly trained research staff (Hipwell et al., 2002, Keenan et al., 2010). The protocol for maintaining confidentiality was explained to all participants, and the girls received reminders throughout the interview that their information would not be shared. The protocol was approved by the University of Pittsburgh's Human Research Protection Office. Respondents were compensated for participation.

Measures

Parental Monitoring and Alcohol Use—*Parental monitoring* was queried in girls annually using 3 items from the Supervision-Involvement subscale of the broader Supervision Involvement Scale (SIS; Loeber et al., 1998). All items (i.e., *'Do your parent(s) know who you are with when you are away from home?', 'When your parent(s) are not at home do you know how to get in touch with them?',* and *'When you are out, do your parent(s) know what time you will be home?'*) were rated on a 3-point scale (1=*almost always* to 3=*almost never*) and summed, such that higher scores reflected less parental monitoring. A fourth item (i.e., *'If your parent(s) are not at home, and you are going to leave the house do you leave a note for them, or call them about where you are going?'*) that is typically included in the scale (e.g., Byrd et al., 2012; Pardini et al., 2012) was removed in the present study due to relatively high rates of missing data, particularly in the earliest waves. Internal consistency coefficients ranged from .56 to .68 across waves. Despite being

low, reliability estimates were still higher than those observed among PGS participants in earlier waves of the study, with all four items included (Wong et al., 2013).

Alcohol use was assessed at each wave of data collection via self-report on a single item from the Nicotine, Alcohol, and Drug Substance Use measure (NADU; Pandina et al., 1984) wherein eight ordered response categories reflected frequencies of past year alcohol use ranging from “never” to “once or more daily”. Given highly truncated distributions within the earliest waves, and more generally among Black girls (see Table 1), responses were dichotomized for use in the present study (0=*no*, 1=*yes*), with ”yes” indicating endorsement of *any alcohol use within the past year (including sips and tastes)*.

Psychosocial Predictors—*Demographic characteristics* were assessed via girl and primary caregiver interviews when the girls were 12 years old. Binary variables representing primary caregiver’s highest level of education (0=*more than 12 years*, 1=*12 or fewer years*), receipt of public assistance (0=*no*, 1=*yes*), and single parent headed household (0=*no*, 1=*yes*) were included in models as proxy indicators of socioeconomic status. Race/ethnicity was coded dichotomously (0=*Black*, 1=*White*).

Pubertal status was defined according to menarche status at age 12 and assessed via a single self-report item on the Pubertal Development Scale (0=*no*, 1=*yes*) (Petersen et al., 1988).

Conduct problems were reported by the girl’s primary caregiver at age 12 using the Adolescent Symptom Inventory -4 (Gadow and Sprafkin, 1999), a DSM-IV based checklist that assesses the frequency of 15 past-year conduct disorder (CD) symptoms. Each symptom is rated on a 4-point scale (0=*never* to 3=*very often*) to generate a severity score (range 0–45). Internal consistency of the conduct problems score was moderate ($\alpha = .64$).

Analytic Strategy

An autoregressive cross-lagged panel model was used to assess longitudinal associations between parental monitoring and girls’ alcohol use between the ages of 12 and 17. Autoregressive paths assessed the temporal stability of both parental monitoring and girls’ alcohol use, while cross-lagged paths examined reciprocal influences between the two constructs across time. As such, for all adjoining time points from age 13 to 17, indicators of parental monitoring and girls’ alcohol use in the present year were simultaneously regressed on both parental monitoring and girls’ alcohol use in the previous year (e.g., age 13 on age 12), while age 12 indicators of the two constructs were allowed to correlate.

Latent variable mixture modeling (LVMM), a special case of finite mixture modeling, was combined with this autoregressive cross-lagged panel model. Using this approach, posterior probabilities of class (group) membership are derived on the basis of similarity in profiles of model parameter estimates. Each class therefore represents a different pattern of cross-lagged and/or autoregressive associations between parental monitoring and girls’ alcohol use. As such, this approach has the potential to advance the extant literature on associations between parental monitoring and alcohol use, which largely reflects a traditional variable centered analytic approach, wherein a single set of parameter estimates is theoretically sufficient to represent an entire sample.

The analyses proceeded in three stages, all of which were carried out in M*plus* 7.31 (Muthén and Muthén, 1998–2012) using a robust maximum likelihood estimation procedure that is robust to non-normally distributed data, as well as missing data among endogenous variables. In the first stage, a single autoregressive cross-lagged panel model was fit to the data for the analytic sample, where all individual parameter estimates were free to vary. Homogeneity of the autoregressive and cross-lagged paths was then tested, and the most parsimonious model was retained (Newsom, 2015). In the second stage, an unconditional LVMM was used to test whether a single autoregressive cross-lagged panel model of girls' alcohol use and parental monitoring was sufficient to represent the pattern of associations between the observed random variables in the present sample; or conversely, whether heterogeneous subgroups required distinct sets of parameter estimates. This was accomplished by fitting the autoregressive cross-lagged panel model from the previous stage to incremental numbers of classes while utilizing several criteria to compare relative improvement and/or the absence of a decrement in model fit: lower values of the Bayesian Information Criterion (BIC; Schwarz, 1978), significance of the adjusted Vuong-Lo-Mendell-Rubin likelihood ratio test (aVLMR; Lo et al., 2001), and values closer to 1 on an entropy criterion indicating precision in the classification of participants into their respective classes (Celeux and Soromenho, 1996). If/when fit indices failed to differentiate between models, the extent to which individual model results contributed to substantively meaningful interpretations grounded in theory, plausibility, and parsimony was also considered. In the final stage of analysis, the latent categorical variable from the best fitting unconditional LVMM was regressed on race/ethnicity, parent education, public assistance, single-parent household, puberty status, and conduct problem severity to determine the individual and collective utility of these predictors with respect to probabilistically characterizing girls into heterogeneous profiles of autoregressive and cross-lagged associations (i.e., class membership). Rather than predicting to a forced classification (i.e., 0/1) the multinomial regression procedure employed in M*plus* fractionally assigns (via posterior probabilities) each individual to all profiles represented by the latent categorical dependent variable, via the EM algorithm, wherein starting values are iteratively improved upon until converging on a final set of conditional probabilities and corresponding predictor effects.

Results

For reference, bivariate associations among all study variables are presented for the full sample, and by race/ethnicity, in supplementary Tables S1 and S2, respectively. Pearson's product moment correlation coefficients reflect associations among pairs of quasi-continuous indicators (including parental monitoring and conduct problem severity), tetrachoric correlation coefficients reflect associations among pairs of binary indicators (i.e., alcohol use, race/ethnicity, SES proxies, and puberty status), and biserial correlation coefficients reflect associations between pairs of indicators with disparate scales. As expected, the magnitude of association was generally larger within, versus across constructs, and for associations among indicators closer in temporal proximity, relative to those with longer lag between assessments.

Demographic characteristics and prevalence of measured risk factors are presented for the full analytic sample, and separately by race/ethnicity, with corresponding effect sizes, in

Table 2. Parental monitoring was somewhat lower among Black girls, though the effect showed modest attenuation over time, and alcohol use was marginally higher among White girls, a disparity that increased across waves. In addition, demographic and individual risk factors were uniformly higher among Black girls and their families, reflecting: lower primary caregiver education, more severe conduct problems, and greater likelihood of receiving public assistance, living in a single-parent household, and reaching puberty by age 12.

Stage 1 Analyses: Identifying a best fitting autoregressive cross-lagged panel model

An autoregressive cross-lagged panel model was fit to self-reported alcohol use and parental monitoring data from six annual assessments spanning ages 12–17 (BIC = 34914.23). Autoregressive paths were uniformly significant and positive, for girls' alcohol use and parental monitoring. In contrast, though cross-construct associations were generally positive (i.e., lower parental monitoring predicted more subsequent alcohol use, and higher alcohol use predicted less subsequent parental monitoring), they were somewhat less consistent with respect to individual variability, and therefore, statistical significance. However, given relative stability in the magnitude of path coefficients among temporally adjacent indicators of the two constructs, a second model was fit to the data wherein estimated effects were assumed to be homogeneous for each of four distinct associations: autoregression of alcohol use, autoregression of parental monitoring, alcohol use regressed on prior parental monitoring, and parental monitoring regressed on prior alcohol use (BIC = 34831.63). A likelihood ratio test comparing the relative fit of these nested models suggested that constraining the aforementioned parameters to equality did not result in a significant decrement in model fit ($\chi^2_{(16)} = 25.91$; $p = .06$), thereby supporting retention of the more parsimonious model. Findings revealed positive associations within constructs ($\beta = .38$, SE = .02, $p < .001$; $\beta = 1.94$, SE = .07, $p < .001$; for adjacent indicators of parental monitoring and alcohol use, respectively), suggested that alcohol use in the prior year was associated with lower levels of subsequent parental monitoring ($\beta = .09$, SE = .03, $p = .001$), and provided marginal support for a link between parental monitoring in the prior year and the increased likelihood of subsequent alcohol use ($\beta = .05$, SE = .03, $p = .09$).

Stage 2 Analyses: Identifying discrete autoregressive cross-lagged panel models

In the second stage of analysis, LVMM was used to determine whether meaningful subgroups, with different profiles of autoregressive and cross-lagged associations within and between constructs, could be identified. While maintaining homogeneity within the four discrete sets of autoregressive and cross-lagged paths, a 2-class model evidenced improvement in fit (BIC = 33476.45; aVLMR = 1477.27, $p < .0001$; entropy = .97) over the best fitting 1-class model from stage 1. In contrast, a 3-class model yielded an increase in BIC (33495.10), a non-significant likelihood ratio test (aVLMR = 113.67, $p = .51$), and reduced precision in classification (entropy = .94) when compared to the 2-class model. As such, the data appeared to support a 2-class solution, with the majority of girls (79%) characterized by positive autoregressive and cross-lagged associations (Figure 1a), and the minority of girls (21%) characterized by comparable autoregressive effects, but no associations between alcohol use and subsequent parental monitoring, and only marginal

negative effects of parental monitoring on subsequent alcohol use (e.g., higher levels of parental monitoring predicted more subsequent alcohol; Figure 1b).

For reference, bivariate associations among study variables are presented by profile (i.e., majority and minority groups) in supplementary Table S3, via Pearson's product moment, tetrachoric, and biserial correlation coefficients. Patterns are largely similar to those described above for the full analytic sample, and for racial/ethnic subgroups. Table 3 depicts frequency distributions of past year alcohol use by the original ordered response categories, separately for girls whose highest posterior probability of membership corresponds to majority and minority group profiles derived from the 2-class model described above. On average, girls in the minority profile appear to initiate alcohol use earlier (more than half by age 12), and continue to drink with greater frequency across adolescence. Likewise, the mean/prevalence for each study variable is presented separately for girls with the highest likelihood of membership in majority and minority group profiles derived from the same 2-class model, in Table 4, along with corresponding effect sizes. Again, endorsing any alcohol use in the past year was more common for the minority profile, whereas mean levels of parental monitoring were much lower. Despite continued significance, the magnitude of both of these effects generally decreased over time. At age 12, conduct problem severity was higher among girls characterized by the minority profile, as were the prevalence of pubertal onset, single-parent households, and receipt of public assistance, though none of these differences were as pronounced as the racial/ethnic group differences depicted in Table 2. Notably, no differences were observed between the majority and minority profile groups with respect to primary caregiver education or race/ethnicity.

Stage 3 Analyses: Psychosocial predictors of discrete profiles of associations

Finally, the 2-class mixture model was extended to formally include these six potentially relevant psychosocial factors, in order to assess their predictive utility, both independently and while holding all others constant. Importantly, model parameter estimates and standard errors, as well as posterior probabilities of profile membership were all highly stable in the presence of the predictors. Results for unconditional effects of the age 12 indicators suggested that likelihood of membership in the minority profile increased by 11% for every one unit increase in girls' conduct problem severity scores ($\beta = .10$, SE = .03, $p = .003$), and that membership in the minority profile was 39% more likely among girls who had reached puberty at an early age ($\beta = .33$, SE = .13, $p = .011$), 35% more likely among girls living in a single-parent households ($\beta = .30$, SE = .12, $p = .015$), and 31% more likely among girls whose families had received public assistance ($\beta = .27$, SE = .13, $p = .031$). Neither primary caregiver education nor race/ethnicity differed across profiles. When assessed collectively, conduct problem severity ($\beta = .09$, SE = .03, $p = .011$) and pubertal status ($\beta = .32$, SE = .13, $p = .016$) continued to have unique predictive utility – with corresponding likelihood increases of 9% and 38%, respectively – over and above the effects of the other covariates. In contrast, the effects of receiving public assistance ($\beta = .14$, SE = .14, $p = .318$) and residing in a single-parent household ($\beta = .25$, SE = .14, $p = .064$) on minority class membership were diminished, likely due to collinearity among the SES indicators (see Table S3).

Discussion

The current study expands the existing literature on coactive influences between parental monitoring and adolescent alcohol use in three important ways. First, this design uses data collected across six annual assessments to capture dynamic associations between parental monitoring and female offspring alcohol use during a critical early risk period in the development of problem drinking behaviors, that is, from early to late adolescence. In contrast, previous studies examining the bidirectionality of these influences have drawn data from fewer time points and/or covered shorter periods of time (e.g., Clark et al., 2008, Wang et al., 2011). A second major strength of the present study is the application of an analytic approach not previously used in this line of research - pairing autoregressive cross-lagged panel analyses with LVMM - to identify discrete subgroups of girls for whom archetypal patterns of within- and between-construct associations differed. Finally, the inclusion of a relatively large and roughly proportional sample of Black and White girls, a notable distinction among investigations of this dynamic (cf. Clark et al., 2008, Wang et al., 2011), provides us with the leverage needed to explore racial/ethnic differences in the likelihood of manifesting each of these distinct patterns.

Our findings provide additional support for previously observed racial/ethnic differences in both parenting behaviors and adolescent alcohol use. Specifically, Black girls reported receiving less parental monitoring than their White counterparts (Blustein et al., 2015, Clark et al., 2008), whereas White girls reported appreciably higher rates of alcohol use than did Black girls (Rothman et al., 2009, Sartor et al., 2013). Despite being modest in size, both effects were present across all six waves of data. Results also demonstrated similar patterns of behavior across racial/ethnic groups (Table 1), with respect to age-related decreases in parental monitoring (Masche et al., 2010), and developmentally normative increases in the likelihood of using alcohol from early to late adolescence (Duncan et al., 2012). Moreover, for both racial/ethnic groups, we found evidence of reciprocal effects between constructs (Table S2), wherein increased parental monitoring predicted subsequent decreases in the likelihood of alcohol use, and increased alcohol use predicted subsequent decreases in parental monitoring (Clark et al., 2008, Wang et al., 2011).

Most novel among our findings was the identification of discrete subgroups for which parental monitoring and alcohol use were differentially associated across adolescence. Whereas the vast majority of girls (79%) were characterized by the stable bidirectional associations described above, there was also a small but distinct class of girls (21%) for whom there appeared to be a modest unidirectional influence of parental monitoring on subsequent alcohol use. The effect was equal in magnitude to the effect observed in the majority class (despite having comparatively limited statistical power), but in the opposite direction. That is, whereas higher parental monitoring was associated with a lower prevalence of alcohol use within the majority class, it was associated with a higher prevalence of alcohol use within the minority class. These distinct patterns of association, which suggest differential effectiveness of parental monitoring as a deterrent against adolescent girls' alcohol use, may be explained in a couple of ways. It could be that for those in the minority class, who report significantly lower levels of parental monitoring (Table 4), alcohol use is an expression of negative reactivity in response to their parents'

attempts to exert authoritarian control. This may be particularly pronounced within the context of other correlated risk factors, namely early puberty and conduct problems. Conversely, antisocial or deviant behavior, i.e., severe conduct problems, can elicit premature adolescent autonomy through parental disengagement (Dishion et al., 2004); that is, parents may respond to deviant behaviors by decreasing their efforts to monitor their children's behavior. Alternately, the lower level of parental monitoring among girls in the minority class – who are also more likely to use alcohol (see Table 4) – may reflect the girl's lower willingness to inform their parents of their whereabouts and activities. Additional information on parenting practices would be needed to determine the most fitting interpretation of these findings.

Another noteworthy distinction between the majority and minority classes is that girls with a high probability of being in the minority class were more likely to come from families receiving public assistance and to be living in single-parent households. Importantly, class membership was not independently associated with race/ethnicity, suggesting that it is not race/ethnicity that distinguishes discrete patterns of relationships between parental monitoring and alcohol use, but rather socioeconomic disadvantage, which is far more common for Black than White families to experience. Although SES has not specifically been examined in relation to the association between parental monitoring and alcohol use, socioeconomic disadvantage is known to correlate with lower rates of parental monitoring (Clark et al., 2008, Wang et al., 2009), likely reflecting more limited availability of parents in low-income families to monitor adolescents (e.g., longer working hours), who may be supervised by other caregivers. Lower rates of adolescent alcohol use have also been associated with lower income class in some studies (Blum et al., 2000; Green et al., 2013). Thus, one possible reason that neither increased monitoring in response to alcohol use nor reduced drinking following monitoring would be expected in families of low socioeconomic status is that parents and adolescents may perceive the risk of alcohol use in early to late adolescence as low, either in absolute terms or relative to problems of greater concern within that environment. That is, given the elevated risk for other potentially harmful experiences, e.g., witnessing or being the victim of or violence (Breslau et al., 1998; Gibson et al., 2009) and the lower risk for alcohol use among adolescents from socioeconomically disadvantaged backgrounds, alcohol use might not be the primary concern for parents of adolescents in low-income families.

Limitations

Interpretation of these findings should be considered within the context of the following limitations. Although self-reported alcohol use is standard in large-scale epidemiological samples, and the assurance of confidentiality was present, it is possible that girls under-reported drinking behaviors. Furthermore, the use of a dichotomous alcohol use indicator is not optimal, as it does not capture quantity and frequency of consumption. Identifying a comparable, but somewhat larger replication sample could yield proportional increases in the frequency distribution sufficient to statistically power an analysis with additional ordered categories (e.g., "*never*", "*infrequently*", and "*frequently*"). Likewise, the composite scale for parental monitoring yields less than optimal reliability, and although limited to adolescence, we cannot be certain that the individual monitoring indicators are invariant

across time. Moreover, due to the computational intensity and complexity of these models, the inclusion of covariates was restricted to conduct problems and SES indicators assessed only at age 12. However, preliminary analyses indicated that these covariates are relatively stable through age 17. Likewise, although it is fair to conclude that the data reflect two discrete patterns of associations amongst parental monitoring and alcohol use, it is understood that modeling results may vary from ours in a different sample. Since low-income neighborhoods were oversampled by design, the observed levels of parental monitoring and alcohol use may differ from those in the general population. Finally, to reduce the burden on respondents (who complete comprehensive annual assessments) we used a brief measure of adolescents' perceptions of parental monitoring practices. Although the individual indicators are informative with regard to the possession of specific information (e.g., parents' knowing what time their child will be home), they do not differentiate between information that is acquired as a result of parental solicitation versus adolescent disclosure. Thus, any inferences regarding the relative contributions of parents and children to the parents' awareness of their child's whereabouts and activities (Stattin and Kerr, 2000) would be wholly unwarranted.

Future Directions

Several new empirical questions have emerged from our exploration of directional links between parental monitoring and alcohol use in White and Black girls from urban neighborhoods. First, it will be critical to assess this dynamic within a broader range of socioeconomic contexts in order to determine, for example, whether monitoring is more difficult and/or alcohol use less prevalent in disadvantaged neighborhoods – and if so, to identify potential sources of that variance. Extending the present design to include girls from other racial/ethnic groups might further clarify the role of this construct in the co-development of these behaviors. Comparable analyses within a sample of adolescent boys could serve to further inform on the nature of these associations given evidence suggesting that parental monitoring is generally higher among girls (Li et al., 2000), but more closely associated with problem behaviors in boys (Cernkovich and Giordano, 1987). Finally, utilizing a comparable indicator of marijuana use, for which prevalence is generally more consistent across White and Black adolescents (Kosterman et al., 2000), may provide additional stability in the modeling process, while serving as an exploration of associations between parental monitoring and substance use, more broadly construed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

Abar CC. Examining the relationship between parenting types and patterns of student alcohol-related behavior during the transition to college. Psychology of Addictive Behaviors. 2012; 26:20–29. [PubMed: 21842968]

Abar CC, Jackson KM, Wood M. Reciprocal relations between perceived parental knowledge and adolescent substance use and delinquency: The moderating role of parent-teen relationship quality. Developmental Psychology. 2014; 50:2176–2187. [PubMed: 25046124]

Abar CC, Turrisi RJ, Mallett KA. Differential trajectories of alcohol-related behaviors across the first year of college by parenting profiles. Psychology of Addictive Behaviors. 2014; 28:53–61. [PubMed: 23915366]

Bauer, DJ., Shanahan, MJ. Modeling complex interactions: Person-centered and variable-centered approaches. In: Little, TD.Bovaird, JA., Card, NA., editors. Modeling contextual effects in longitudinal studies. Lawrence Erlbaum Associates; Mahwah, NJ: 2007. p. 255-283.

Biehl MC, Natsuaki MN, Ge X. The influence of pubertal timing on alcohol use and heavy drinking trajectories. Journal of Youth and Adolescence. 2007; 36:153–167.

Black, M., Basile, K., Breidling, M., Smith, S., Walters, M., Merrick, M., Chen, J., Stevens, M. Series The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 summary report. Atlanta, GA: 2011. The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 summary report.

Blum RW, Beuhring T, Shew ML, Bearinger LH, Sieving RE, Resnick MD. The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. American Journal of Public Health. 2000; 90:1879–1884. [PubMed: 11111260]

Blustein EC, Munn-Chernoff MA, Grant JD, Sartor CE, Waldron M, Bucholz KK, Madden PAF, Heath AC. The association of low parental monitoring with early substance use in European American and African American adolescent girls. Journal of Studies on Alcohol and Drugs. 2015; 76:852–861. [PubMed: 26562593]

Bohnert KM, Ríos-Bedoya CF, Breslau N. Parental monitoring at age 11 and smoking initiation up to age 17 among Blacks and Whites: A prospective investigation. Nicotine & Tobacco Research. 2009; 11:1474–1478. [PubMed: 19897527]

Breslau N, Kessler RC, Chilcoat HD, Schultz LR, Davis GC, Andreski P. Trauma and posttraumatic stress disorder in the community: the 1996 Detroit Area Survey of Trauma. Arch Gen Psychiatry. 1998; 55:626–632. [PubMed: 9672053]

Byrd A, Loeber R, Pardini DA. Understanding desisting and persisting forms of delinquency: The unique contributions of disruptive behavior disorders and interpersonal callousness. Journal of Child Psychology and Psychiatry. 2012; 53:371–380. [PubMed: 22176342]

Celeux G, Soromenho G. An entropy criterion for assessing the number of clusters in a mixture model. Journal of Classification. 1996; 13:195–212.

Cernkovich SA, Giordano PC. Family relationships and deliquency. Criminology. 1987; 25:295–319.

Chung T, Kim KH, Hipwell AE, Stepp SD. White and black adolescent females differ in profiles and longitudinal patterns of alcohol, cigarette, and marijuana use. Psychology of Addictive Behaviors. 2013; 27:1110–1121. [PubMed: 23438247]

Clark DB, Kirisci L, Mezzich A, Chung T. Parental supervision and alcohol use in adolescence: Developmentally specific interactions. Journal of Developmental and Behavioral Pediatrics. 2008; 29:285–292. [PubMed: 18562983]

Costello EJ, Sung M, Worthman C, Angold A. Pubertal maturation and the development of alcohol use and abuse. Drug and Alcohol Dependence. 2007; 88:S50–S59. [PubMed: 17275214]

Crosnoe R, Erickson KG, Dornbusch SM. Protective functions of family relationships and school factors on the deviant behavior of adolescent boys and girls: Reducing the impact of risky friendships. Youth & Society. 2002; 33:515–544.

Dickson DJ, Laursen B, Stattin H, Kerr M. Örebro Univerity, Institutionen för Juridik Posa. Parental supervision and alcohol abuse among adolescent girls. Pediatrics. 2015; 136:617–624. [PubMed: 26391935]

Dishion TJ, Nelson SE, Bullock BM. Premature adolescent autonomy: parent disengagement and deviant peer process in the amplification of problem behaviour. Journal of Adolescence. 2004; 27:515–530. [PubMed: 15475044]

Donenberg GR, Wilson HW, Emerson E, Bryant FB. Holding the line with a watchful eye: The impact of perceived parental permissiveness and parental monitoring on risky sexual behavior among adolescents in psychiatric care. AIDS Education and Prevention. 2002; 14:138–157. [PubMed: 12000232]

Duncan SC, Strycker LA, Duncan TE. Alcohol use of african americans and whites from ages 9–20: Descriptive results from a longitudinal study. Journal of Ethnicity in Substance Abuse. 2012; 11:214–225. [PubMed: 22931156]

Elkins SR, Fite PJ, Moore TM, Lochman JE, Wells KC. Bidirectional effects of parenting and youth substance use during the transition to middle school and high school. Psychology of Addictive Behaviors. 2014; 28:475–486. [PubMed: 24955670]

Falk DE, Yi HY, Hiller-Sturmhofel S. An epidemiologic analysis of co-occurring alcohol and tobacco use and disorders - Findings from the National Epidemiologic Survey on Alcohol and Related Conditions. Alcohol Research & Health. 2006; 29:162–171. [PubMed: 17373404]

Gadow, KD., Sprafkin, J. Youth's Inventory-4 manual. Checkmate Plus Ltd; Stony Brook, NY: 1999.

Gibson CL, Morris SZ, Beaver KM. Secondary exposure to violence during childhood and adolescence: does neighborhood context matter? Justice Quarterly. 2009; 26:30–57.

Green MJ, Leyland AH, Sweeting H, Benzeval M. Socioeconomic position and adolescent trajectories in smoking, drinking, and psychiatric distress. Journal of Adolescent Health. 2013; 53:202–208. [PubMed: 23643540]

Hanson MD, Chen E. Socioeconomic status and health behaviors in adolescence: A review of the literature. Journal of Behavioral Medicine. 2007; 30:263–285. [PubMed: 17514418]

Hipwell A, Kroneman L, Stouthamer-Loeber M, White HR, Loeber R, Keenan K. Characteristics of girls with early onset disruptive and antisocial behaviour. Criminal Behaviour and Mental Health. 2002; 12:99–118. [PubMed: 12357260]

Hipwell AE, White HR, Loeber R, Stouthamer-Loeber M, Chung T, Sembower MA. Young girls' expectancies about the effects of alcohol, future intentions and patterns of use. Journal of Studies on Alcohol. 2005; 66:630–639. [PubMed: 16331848]

Horton EG. Racial differences in the effects of age of onset on alcohol consumption and development of alcohol-related problems among males from mid-adolescence to young adulthood. Journal of Ethnicity in Substance Abuse. 2007; 6:1–13.

Jackson KM, Schulenberg JE. Alcohol use during the transition from middle school to high school: National panel data on prevalence and moderators. Developmental Psychology. 2013; 49:2147–2158. [PubMed: 23421801]

Johnston, LD., O'Malley, PM., Bachman, JG., Schulenberg, JE. College Students and Adults Ages 19–50, 2012, in Series College Students and Adults Ages 19–50, 2012, Vol. II, Monitoring the Future national survey results on drug use, 1975–2011. The University of Michigan; Ann Arbor, MI: Institute for Social Research; 2012.

Keenan K, Hipwell A, Chung T, Stepp S, Stouthamer-Loeber M, Loeber R, McTigue K. The Pittsburgh Girls Study: Overview and initial findings. Journal of Clinical Child & Adolescent Psychology. 2010; 39:506–521. [PubMed: 20589562]

Keyes KM, Grant BF, Hasin DS. Evidence for a closing gender gap in alcohol use, abuse, and dependence in the United States population. Drug and Alcohol Dependence. 2008; 93:21–29. [PubMed: 17980512]

Kosterman R, Hawkins JD, Guo J, Catalano RF, Abbott RD. The dynamics of alcohol and marijuana initiation: patterns and predictors of first use in adolescence. American Journal of Public Health. 2000; 90:360–366. [PubMed: 10705852]

Kuperman S, Chan G, Kramer JR, Wetherill L, Bucholz KK, Dick D, Hesselbrock V, Porjesz B, Rangaswamy M, Schuckit M. A model to determine the likely age of an adolescent's first drink of alcohol. Pediatrics. 2013; 131:242–248. [PubMed: 23296431]

Latendresse SJ, Rose RJ, Viken RJ, Pulkkinen L, Kaprio J, Dick DM. Parenting mechanisms in links between parents and adolescents alcohol use behaviors. Alcoholism Clinical and Experimental Research. 2008; 32:322–330.

Latendresse SJ, Rose RJ, Viken RJ, Pulkkinen L, Kaprio J, Dick DM. Parental socialization and adolescents alcohol use behaviors: Predictive disparities in parents' versus adolescents' perceptions of the parenting enviroment. Journal of Clinical Child and Adolescent Psychology. 2009; 38:232–244. [PubMed: 19283601]

Li X, Feigelman S, Stanton B. Perceived parental monitoring and health risk behaviors among urban low-income African-American children and adolescents. Journal of Adolescent Health. 2000; 27:43–48. [PubMed: 10867351]

Lo Y, Mendell NR, Rubin DB. Testing the number of components in a normal mixture. Biometrika. 2001; 88:767–778.

Loeber, R., Stouthamer-Loeber, M., Van Kammen, WB. Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence, L. Erlbaum Associates; Mahwah, N.J: 1998.

Masche JG, Högskolan K. Sektionen för lärande och m. Explanation of normative declines in parents' knowledge about their adolescent children. Journal of Adolescence. 2010; 33:271–284. [PubMed: 19782392]

Muthén, LK., Muthén, BO. Mplus user's guide. 7. Muthén & Muthén; Los Angeles, CA: 1998–2012.

Newsom, JT. Longitudinal structural equation modeling: A comprehensive introduction. Routledge; New York: 2015.

Oberlander SE, Wang Y, Thompson R, Lewis T, Proctor LJ, Isbell P, English DJ, Dubowitz H, Litrownik AJ, Black MM. Childhood maltreatment, emotional distress, and early adolescent sexual intercourse: Multi-informant perspectives on parental monitoring. Journal of Family Psychology. 2011; 25:885–894. [PubMed: 21928888]

Pandina RJ, Labouvie EW, White HR. Potential contributions of the life span developmental approach to the study of adolescent alcohol and drug use. Journal of Drug Issues. 1984; 14:253.

Pardini DA, Loeber R, Farrington DP, Stouthamer-Loeber M. Identifying direct protective factors for nonviolence. American Journal of Preventive Medicine. 2012; 43(2S1):S28–S40. [PubMed: 22789956]

Petersen AC, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: Reliability, validity, and initial norms. Journal of Youth and Adolescence. 1988; 17:117–133. [PubMed: 24277579]

Piko BF, Fitzpatrick KM, Wright DR. A risk and protective factors framework for understanding youth's externalizing problem behavior in two different cultural settings. European Child & Adolescent Psychiatry. 2005; 14:95–103. [PubMed: 15793688]

Rothman EF, Wise LA, Bernstein E, Bernstein J. The timing of alcohol use and sexual initiation among a sample of black, hispanic, and white adolescents. Journal of Ethnicity in Substance Abuse. 2009; 8:129–145. [PubMed: 19459121]

Ryan SM, Jorm AF, Lubman DI. Parenting factors associated with reduced adolescent alcohol use: a systematic review of longitudinal studies. Australian and New Zealand Journal of Psychiatry. 2010; 44:774–783. [PubMed: 20815663]

Sanchez ZM, Opaleye ES, Martins SS, Ahluwalia JS, Noto AR. Adolescent gender differences in the determinants of tobacco smoking: A cross sectional survey among high school students in São Paulo. BMC Public Health. 2010; 10:748–748. [PubMed: 21129177]

Sartor CE, Agrawal A, Lynskey MT, Duncan AE, Grant JD, Nelson EC, Madden PAF, Heath AC, Bucholz KK. Cannabis or alcohol first? Differences by ethnicity and in risk for rapid progression to cannabis-related problems in women. Psychological Medicine. 2013; 43:813–823. [PubMed: 22804877]

Schwarz G. Estimating the dimension of a model. The Annals of Statistics. 1978; 6:461–464.

Shorey RC, Fite PJ, Elkins SR, Frissell KC, Tortolero SR, Stuart GL, Temple JR. The association between problematic parental substance use and adolescent substance use in an ethnically diverse sample of 9th and 10th graders. The Journal of Primary Prevention. 2013; 34:381–393. [PubMed: 24006209]

Stattin H, Kerr M. Parental monitoring: A reinterpretation. Child Development. 2000; 71:1072. [PubMed: 11016567]

Stice E, Barrera M Jr. A longitudinal examination of the reciprocal relations between perceived parenting and adolescents' substance use and externalizing behaviors. Developmental Psychology. 1995; 31:322–334.

Svensson R. Gender differences in adolescent drug use: The impact of parental monitoring and peer deviance. Youth & Society. 2003; 34:300–329.

Véronneau M-H, Dishion TJ. Predicting change in early adolescent problem behavior in the middle school years: A mesosystemic perspective on parenting and peer experiences. Journal of Abnormal Child Psychology. 2010; 38:1125–1137. [PubMed: 20532814]

von der Vorst H, Burk WJ, Engels RCME. The role of parental alcohol-specific communication in early adolescents' alcohol use. Drug and Alcohol Dependence. 2010; 111:183–190. [PubMed: 20605374]

Wang J, Simons-Morton BG, Farhat T, Luk JW. Socio-demographic variability in adolescent substance use: Mediation by parents and peers. Prevention Science. 2009; 10:397–397.

Wang M-T, Dishion TJ, Stormshak EA, Willett JB. Trajectories of family management practices and early adolescent behavioral outcomes. Developmental Psychology. 2011; 47:1324–1341. [PubMed: 21688899]

Wong TML, Loeber R, Slotboom A-M, Bijleveld CCJH, Hipwell AE, Stepp SD, Koot HM. Sex and age differences in the risk threshold for delinquency. Journal of Abnormal Child Psychology. 2013; 41:641–652. [PubMed: 23183920]

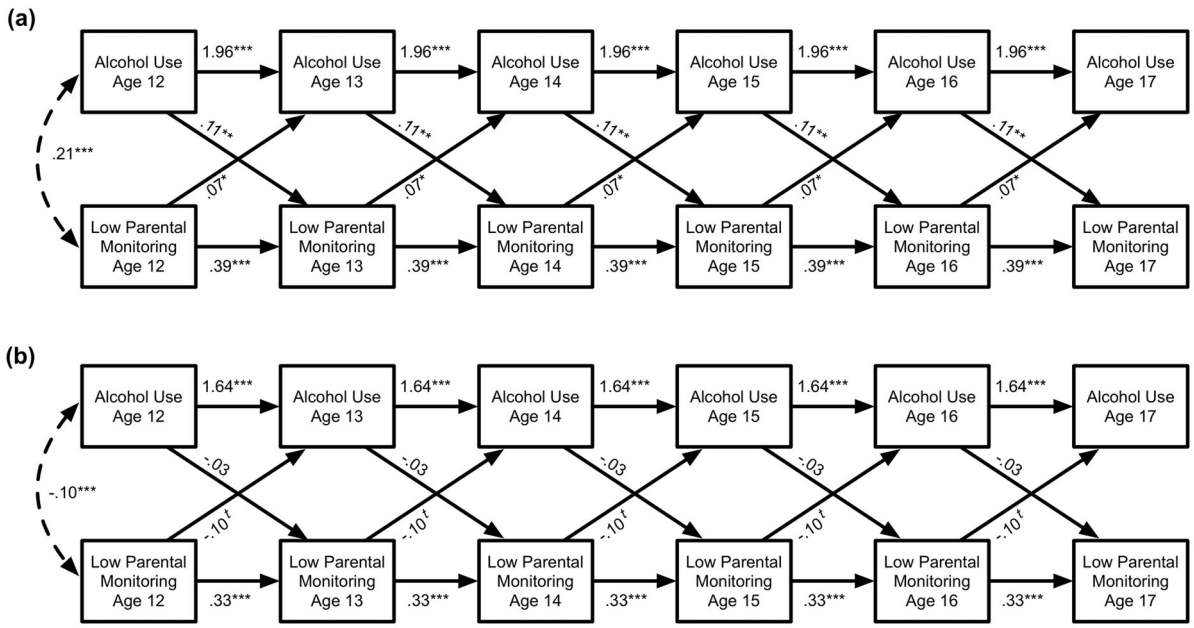

Figure 1.

The best fitting cross-lagged panel mixture model yields two distinct profiles, each with four sets of associations constrained to equality: autoregression of alcohol use, autoregression of low parental monitoring, alcohol use regressed on prior low parental monitoring, and low parental monitoring regressed on prior alcohol use. Panel (a) depicts the pattern of significant autoregressive and cross-lagged associations characterizing the majority of girls (79%). In contrast, panel (b) reflects associations characterizing a relative minority of girls (21%), including autoregressive links comparable in direction and magnitude to the majority group, cross-lagged associations between low parental monitoring and subsequent alcohol use that are similar in size, but run in the opposite direction of those in the majority group, and the absence of significant cross-lagged associations between alcohol use and subsequent low parental monitoring. All parameter estimates are unstandardized: $^{t}\,p = .057$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 1

Percent Past Year Alcohol Use Endorsement by Age and Race/Ethnicity

Frequency	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17
Black						
Never	91.5	87.9	85.4	78.9	74.7	69.7
Less than 5 times	7.4	9.5	11.3	15.2	16.5	19.4
More than 5 times, but not monthly	.6	.9	1.7	2.8	3.9	5.3
About once a month	.0	.7	.5	1.6	2.5	2.4
About once a week	.3	.4	.4	.8	1.4	2.2
A couple of times a week	.0	.2	.4	.4	.9	.8
Nearly ever day	.1	.1	.2	.2	.1	.1
One or more times a day	.0	.1	.0	.0	.0	.0
White						
Never	84.7	78.2	68.8	62.8	56.0	46.2
Less than 5 times	12.6	18.7	21.9	23.5	24.3	25.9
More than 5 times, but not monthly	1.2	1.6	5.6	8.5	8.4	11.5
About once a month	.6	.6	1.6	1.9	6.6	10.3
About once a week	.9	.9	1.3	2.6	2.8	4.1
A couple of times a week	.0	.0	.4	.4	1.9	2.1
Nearly ever day	.0	.0	.1	.0	.0	.0
One or more times a day	.0	.0	.1	.1	.0	.0

Table 2

Demographic Characteristics and Risk Prevalence by Race/Ethnicity

	Full Sample Mean (SD)/PR	Black Girls Mean (SD)/PR	White Girls Mean (SD)/PR	Race/Ethnicity Effect Size
Age 12 Low Primary Caregiver Education	.47	.53	.37	.15
Age 12 Public Assistance	.37	.52	.16	.37
Age 12 Single Parent Household	.44	.60	.21	.39
Age 12 Pubertal Status	.61	.69	.51	.19
Age 12 Conduct Problem Severity	.93 (1.63)	1.13 (1.79)	.64 (1.30)	.32
Age 12 Alcohol Use	.11	.08	.15	.11
Age 13 Alcohol Use	.16	.12	.22	.13
Age 14 Alcohol Use	.21	.15	.31	.20
Age 15 Alcohol Use	.28	.21	.37	.18
Age 16 Alcohol Use	.33	.25	.44	.20
Age 17 Alcohol Use	.40	.30	.54	.24
Age 12 Low Parental Monitoring	3.47 (.86)	3.57 (.95)	3.33 (.67)	.30
Age 13 Low Parental Monitoring	3.52 (.87)	3.64 (.95)	3.36 (.72)	.33
Age 14 Low Parental Monitoring	3.62 (.93)	3.74 (1.03)	3.44 (.74)	.34
Age 15 Low Parental Monitoring	3.65 (.98)	3.76 (1.06)	3.49 (.84)	.29
Age 16 Low Parental Monitoring	3.63 (.97)	3.71 (1.04)	3.52 (.84)	.21
Age 17 Low Parental Monitoring	3.73 (1.09)	3.84 (1.20)	3.59 (.91)	.24

Notes. Effect sizes are expressed in terms of Cohen's *d* and Cramer's *V* for mean and prevalence differences, respectively. All racial/ethnic group differences are significant at $p < .0001$. Abbreviations: SD = standard deviation; PR = prevalence rate.

Table 3

Percent Past Year Alcohol Use Endorsement by Age and Most Likely Class Membership

Frequency	Age 12	Age 13	Age 14	Age 15	Age 16	Age 17
Majority Class						
Never	99.5	88.2	81.5	76.2	71.2	63.2
Less than 5 times	.5	10.2	13.8	15.8	18.0	20.9
More than 5 times, but not monthly	.0	.7	2.6	4.6	4.6	7.6
About once a month	.0	.3	1.1	1.8	3.6	4.7
About once a week	.0	.3	.8	1.2	1.5	2.4
A couple of times a week	.0	.1	.2	.3	1.2	1.1
Nearly ever day	.0	.1	.0	.1	.0	.1
One or more times a day	.0	.1	.1	.0	.0	.0
Minority Class						
Never	47.7	67.5	67.3	57.3	50.9	47.4
Less than 5 times	44.2	25.1	23.1	29.5	26.3	26.6
More than 5 times, but not monthly	4.1	3.2	6.1	7.3	10.2	9.1
About once a month	1.2	2.0	.6	1.5	6.7	9.4
About once a week	2.6	1.8	.9	2.9	3.5	5.3
A couple of times a week	.0	.3	1.2	.9	2.0	2.3
Nearly ever day	.3	.0	.9	.3	.3	.0
One or more times a day	.0	.0	.0	.3	.0	.0

Table 4

Demographic Characteristics and Risk Prevalence by Most Likely Class Membership

	Majority Class Mean (SD)/PR	Minority Class Mean (SD)/PR	Class Effect Size
Race/Ethnicity (Black)	.58	.62	.04 [a]
Age 12 Low Primary Caregiver Education	.46	.50	.04 [a]
Age 12 Public Assistance	.35	.42	.05 [e]
Age 12 Single Parent Household	.42	.50	.06 [d]
Age 12 Pubertal Status	.60	.68	06 [c]
Age 12 Conduct Problem Severity	.87 (1.59)	1.16 (1.73)	.15 [b]
Age 12 Alcohol Use	.00	.52	.67
Age 13 Alcohol Use	.12	.32	.23
Age 14 Alcohol Use	.18	.33	.14
Age 15 Alcohol Use	.24	.43	.17
Age 16 Alcohol Use	.29	.49	.18
Age 17 Alcohol Use	.37	.53	.13
Age 12 Low Parental Monitoring	3.21 (.49)	4.44 (1.18)	1.95
Age 13 Low Parental Monitoring	3.43 (.79)	3.86 (1.07)	.65
Age 14 Low Parental Monitoring	3.53 (.87)	3.97 (1.06)	.66
Age 15 Low Parental Monitoring	3.59 (.94)	3.87 (1.11)	.39
Age 16 Low Parental Monitoring	3.56 (.91)	3.89 (1.13)	.45
Age 17 Low Parental Monitoring	3.67 (1.04)	3.98 (1.24)	.40

Notes. Effect sizes are expressed in terms of Cohen's *d* and Cramer's *V* for mean and prevalence differences, respectively. All profile differences are significant at $p < .0001$, unless otherwise noted:

[a] *non-significant*,

[b] $p = .003$,

[c] $p = .010$,

[d] $p = .013$,

[e] $p = .031$.

Abbreviations: SD = standard deviation; PR = prevalence rate.