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The Association Between Problematic Parental Substance Use and Adolescent Substance Use in an Ethnically Diverse Sample of 9th and 10th Graders

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Abstract

Adolescents of parents who use substances are at an increased risk for substance use themselves. Both parental monitoring and closeness have been shown to mediate the relationship between parents' and their adolescents' substance use. However, we know little about whether these relationships vary across different substances used by adolescents. Using structural equation modeling, we examined these associations within a racially and ethnically diverse sample of 9th and 10th graders ($N = 927$). Path analyses indicated that maternal closeness partially mediated the association between maternal problematic substance use and adolescent alcohol use. Parental monitoring partially mediated the relationship between paternal problematic substance use and adolescent alcohol, cigarette, marijuana, inhalant, and illicit prescription drug use. These results were consistent across gender and race/ethnicity. These findings suggest that parental interventions designed to increase closeness and monitoring may help to reduce adolescent substance use.

Keywords

Substance use; Adolescents; Parental monitoring; Parental closeness

Introduction

Adolescent substance use is a serious public health concern with negative individual and societal consequences (Chassin, Ritter, Trim, & King, 2003). Rates of substance use among youths aged 12–17 are high, with current (i.e., past month) alcohol use at almost 15 %, tobacco use at almost 12 %, and overall illicit drug use at 10 % (SAMHSA, 2012). The typical age of substance use onset occurs between 13 and 15 (Johnston, O'Malley, & Bachman, 1999). As such, it is important to understanding the risk and protective factors that affect substance use in adolescence, which may inform the content and timing of intervention programs designed to reduce substance use in this vulnerable population.

A substantial body of research has established that parental substance use affects their children's risk for alcohol and drug use (Chassin, Curran, Hussong, & Colder, 1996; Epstein, Williams, & Botvin, 2002). Children of parents who abuse alcohol are at high risk for early alcohol initiation (Hill, Shen, Lowers, & Locke, 2000) and greater alcohol consumption (Chassin & Barrera, 1993). Research also indicates a strong association between parental drug use and the development of drug use among their adolescents (Brook et al., 2001; Miller, Alberts, Hecht, Trost, & Krizek, 2009).

The relationship between parents' and their children's substance use may operate through both biological or heritable (Kendler, Karkowski, & Prescott, 1999; Schuckit, 2009) and psychosocial, mechanisms (Kerr & Stattin, 2000; Rutherford, Cacciola, Alterman, McKay, & Cook, 1997). Social learning theory suggests that parental substance use may have a modeling effect (Bandura, 1977), by which parents' substance use behaviors encourage imitation by adolescents. Parental substance use may also impair parenting (Van der Vorst, Engels, Meeus, Dekovic, & Vermulst, 2006), which may also affect the development of adolescent substance use. However, the theory of social control suggests that in the presence of parental substance use behaviors, adolescents will be less likely to use substances themselves if they experience high levels of parental support (e.g., closeness) and control (e.g., monitoring; Hirschi, 1969).

One particularly important parental influence on adolescent substance use is closeness. Parental closeness or family cohesion and bonding (Bahr, Marcos, & Maughan, 1995; Farrell, Barnes, & Barerjee, 1995), have been conceptualized as sharing discussion and leisure time (Zhang, Welte, & Wieczorek, 1999), and include nurturance, acceptance, and warmth (Schinke, Fang, & Cole, 2008). Researchers have demonstrated that adolescent children of alcohol-abusing parents receive less emotional support from their parents (Rutherford et al., 1997), and that adolescents who do not feel close to their parents are at greater risk for substance use and substance-related problems (Kandel, 1996; Kelly et al., 2011). Further, studies indicate that parents' closeness to their adolescents may prevent early substance initiation and decrease adolescents' frequency and amount of heavy drinking (Bahr et al., 1995; Zhang et al., 1999).

The relationship between parental monitoring and adolescent substance use is widely documented. Effective monitoring is typically based on parents' knowledge of their children's activities both in and outside of their home (Kerr, Stattin, & Burk, 2010), as well as acquaintance with their adolescents' friends or dating partners, and may include limits or restrictions on their activities and associations (Laird, Pettit, Bates, & Dodge, 2003). Parental substance use decreases the amount of monitoring parents provide to adolescents (Chassin et al., 1996; Dishion, Patterson, & Reid, 1988), which is a cause for concern since monitoring in turn reduces the likelihood of adolescent substance use and heavy use (Clark, Shamblen, Ringwalt, & Hanley, 2012; Engels & Van der Vorst, 2003; Kerr & Stattin, 2000; Lockman, 2003; Van der Vorst et al., 2006).

Research thus suggests a relationship between adolescent substance use and both parental substance use and parental closeness and monitoring. However, few studies have examined whether parental monitoring or closeness mediates the relationship between parental and adolescent substance use. Two prospective studies have demonstrated that a father's participation in monitoring and discipline mediated the relationship between paternal alcoholism and adolescent alcohol use (King & Chassin, 2004), and one study explicitly tested a mediational model, but did not find a significant relationship between parental problem drinking and parenting behaviors (van der Zwaluw et al., 2008). While these studies examined mediational models of the relationship between parental and adolescent substance use, the authors focused only on parental alcohol use but did not also address the effects of parental drug use.

To date, only one study has examined the potential mediating role of parental closeness on the relationship between parental and adolescent substance use, finding no evidence for mediation (Zhang et al., 1999). No study has examined both parental closeness and monitoring as mediators of the relationship between parental and adolescent substance use within the same predictive model. Such a model has the potential to advance our knowledge of the significance of each variable relative to the other, and may have implications for more targeted parent- or family-based intervention programs.

Differential effects have been noted of the impact of maternal and paternal closeness on adolescents' substance use (Padilla-Walker, Nelson, Madsen, & McNamara-Barry, 2008), and on the relationship between parental substance use and closeness on adolescent drinking (Zhang et al., 1999). Much of the previous literature has been conducted with substance-using mothers of adolescents (Barnard & McKeganey, 2004), and there is a dearth of research on the impact of fathers' substance use on parenting and subsequent adolescent substance use. It is thus important to examine mothers and fathers separately when examining whether monitoring and closeness mediate the relation between parental and adolescent use.

Similarly, it is important to examine how these mediational pathways differ between male and female adolescents. For instance, boys display slightly higher rates of alcohol, tobacco, and marijuana use than girls (York, Welte, Hirsch, Hoffman, & Barnes, 2004). Research suggests that parental monitoring tends to impact boys' alcohol use more strongly than girls' (e.g., van der Vorst et al., 2006), and girls' cigarette and marijuana use more strongly than boys' (Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Lac & Crano, 2009). Other studies indicate that parental closeness may have a stronger effect on substance use for girls (Choquet, Hassler, Morin, Falissard, & Chau, 2008; Kelly et al., 2011). We thus examined whether parental closeness and monitoring mediated the association between parental and adolescent substance use. Further, we examined whether these pathways varied between male and female adolescents and by the gender of the parent.

Given the racial and ethnic variations in rates and timing of onset of adolescent substance use (Ellickson & Morton, 1999; Hawkins, Catalano, & Miller, 1992; Jackson, 1997; SAMHSA, 2012; Wu, Temple, Shokar, Nguyen-Oghalai, & Grady, 2010), it is also important to consider racial and ethnic differences in the proposed mediational model. Although rates of substance use in adolescence are well-defined, racial and ethnic differences in the association between parental and adolescent substance use, and mediators of this relationship, have received little empirical attention and pertinent findings have been inconsistent (Barnes, Farrell, & Banerjee, 1994; Turner & Wallace, 2003; Vega, Zimmerman, Warheit, Apospori, & Gil, 1993). We thus examined whether the proposed mediated pathways varied among Hispanic/Latino, African American, and Caucasian adolescents.

In addition to considering gender and race/ethnicity in the mediational model, our study makes several other contributions to the literature. First, we examined relationships among 9th and 10th graders, during a developmental period in which substance use has typically already been initiated but has not yet reached its peak (Johnston, O'Malley, Bachman, & Schulenberg, 2010). Second, we examine within our mediational model adolescents' use of a variety of substances, including alcohol, cigarette, marijuana, inhalant, ecstasy, and illicit prescription drug use; previous studies have often examined only a single substance (e.g., Ryan, Jorm, & Lubman, 2010). Third, while much of the empirical literature has reported relationships between parental and adolescent substance use based on frequency counts of parental substance use, we examined adolescents' perceptions of *problematic* parental substance use (i.e., the consequences associated with parental use), which may be a better predictor of both poorer parenting and greater subsequent adolescent substance use (Barnard & McKeganey, 2004). Fourth, we examined whether the proposed mediational model differed for adolescents who lived in a two- versus single-parent household, as previous studies suggest the latter is associated with greater risk for substance use (Breivik & Olweus, 2006).

We thus hypothesized that (1) parental closeness and monitoring would mediate the relationship between problematic parental substance use and adolescent substance use, and (2) parental closeness and monitoring would be a stronger predictor for female than male adolescents of the use of all substances except alcohol. Due to limited research on racial/ethnic differences in these relationships, we developed no specific hypotheses regarding the role of race/ethnicity in our mediational model.

Methods

Participants

We recruited 1,702 students from seven high schools in five school districts in southeast Texas for the current study. A total of 1,215 returned a parental permission form (71 %), of whom 1,119 gave their children permission to participate (66 % of those approached; 92 % of those who returned their permission forms); and 1,049 completed the survey (62 % of those approached; 94 % of those who received parental permission). We discarded seven surveys due to severely inconsistent responses, which yielded a total of 1,042 study participants. Because of the low number of students in the 11th grade ($n = 11$) and of those who reported their race or ethnicity as Asian ($n = 38$), American Indian ($n = 5$), multi-racial ($n = 20$), or "other" ($n = 40$), these students were also excluded from the present analyses, leaving those students who were in the 9th or 10th grade and who were Caucasian, African American, or Hispanic/Latino. This resulted in a final sample size of 927 students, of whom the majority were female (56 %, $n = 519$), 36.2 % were Hispanic/Latino, 32.5 % were Caucasian, and 31.3 % were African American. Most participants were between the ages of 14 and 16 (96.8 %) and in the 9th grade (75.4 %). As detailed elsewhere (Temple, Shorey, Fite, Stuart, & Le, 2013; Temple, Shorey, Tortolero, Wolfe, & Stuart, 2013) and below, this sample is representative of the larger student body from which they were recruited.

Procedures

In order to secure a representative sample of adolescents, we recruited students during normal school hours in required classes stratified by grade level (e.g., English). Students completed all measures during the spring semester of 2010, between the months of February and May. All students were eligible to participate in the study. We used a multi-stage approach to obtain active written parental permission. A member of the research staff attended each class period twice prior to the assessment to describe to the students the purpose and general design of the study and to answer any questions. Students were sent

home with detailed information about the study in both English and Spanish, along with a parental consent form for their parents to review, sign, and return. Regardless of whether parental permission was granted, students who returned a parental permission form received a \$5 gift card to a local retailer.

Students who obtained written and informed parental/guardian permission provided their assent on the day of the assessment. To this end, we “pulled” students from the class from which they were recruited and escorted them to a room on campus, where they completed the 35–45 min survey questionnaire in small groups. We gave participants another \$5 gift card for taking the survey. All study procedures were approved by the Institutional Review Board of UTMB.

Measures

Parental Problematic Substance Use—We asked students if their mother's (or mother figure's) “drinking or drug use had ever caused problems with her health, family, job, or police.” We then asked this same question for their fathers (or father figures). Students responded to these questions with a *yes* or *no*.

Parental Monitoring—We used three questions to assess parental monitoring. Students indicated how important it was for their parents (or parental figures) to know (1) who their friends are, (2) where they are, and (3) whom they are dating. We adapted these questions from the Parental Supervision scale, which has good internal consistency and validity (Bjerregaard & Smith, 1993). Students indicated their responses on a 4-point scale (1 = *Very Important* to 4 = *Not at all important*). This questionnaire did not distinguish between maternal and paternal monitoring. We calculated a total score by reverse coding and then taking the mean of score on all three items. Higher scores thus corresponded to greater parental monitoring. The internal consistency (α) of this scale was .74.

Parental Closeness—We used two items to examine parental closeness for mothers and fathers (or parental figures) separately. These two questions were (1) “Do you feel close to your mother [father],” and (2) “Do you share your thoughts and feelings with your mother [father].” We adapted these items from the Attachment to Parents scale, which has good internal consistency and validity (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002). Students rated their answers on a 4-point scale (1 = *very true* to 4 = *very false*). We secured a total score for maternal and paternal closeness by reverse coding and then taking the mean of scores on both items, so that higher scores corresponded to greater parental closeness. The internal consistency (α) was .70 for maternal and .83 for paternal closeness, respectively.

Adolescent Substance Use—Students indicated (*yes* or *no*) their lifetime use of alcohol, cigarettes, marijuana, inhalants, ecstasy, or illicit prescription drugs that were not prescribed by a health professional. We instructed students that alcohol use referred to “more than just a few sips.” We also provided students with examples of inhalants (e.g., sniffed glue) and prescription drugs (e.g., Xanax, Oxycontin, Ritalin) not prescribed to them by a doctor. Previous research has generally found that adolescents are reliable and valid reporters of their substance use behaviors (Johnston et al., 2010).

Data Analysis Strategy

We performed statistical analyses using two programs. We first examined gender and racial/ethnic differences on key variables of interest in SPSS 18.0, and then used structural equation modeling (SEM) in Mplus Version 5.0 to examine the proposed mediation model. Prior to analyses, we mean-centered all predictor variables to aid in the interpretation of

findings (Aiken & West, 1991). We estimated SEMs with full information estimation (FIE), which uses all available data to estimate parameters and does not exclude observations with missing data (Kline, 2005). When compared to pairwise and listwise deletion, FIE is more efficient and less biased for handling missing data (Arbuckle, 1996). In addition, we used the bias-corrected bootstrap method to test the significance of mediated paths. As detailed by MacKinnon, Lockwood, and Williams (2004), the bias-corrected bootstrap method provides a more favorable balance between Type 1 and 2 errors than do other methods used to test the significance of mediated paths. Altogether, we used 500 bootstrap samples and 95 % bias-corrected confidence intervals (CIs) to estimate the significance of the mediated paths.

We also calculated the percentage of the total association between parental problematic substance use and adolescent substance use that was explained by parental monitoring and closeness (MacKinnon & Dwyer, 1993). To do so, we divided the estimated indirect effect (%IE) for parental monitoring and closeness by the total direct effect for the relationship between problematic parental substance use and adolescent substance use.

Due to the dichotomous nature of the outcome variable (adolescent lifetime substance use), we employed weighted least squares estimate with a mean and variance (WLSMV) adjusted χ^2 statistic for all SEM path analyses. WLSMV supplies standard errors, unbiased estimates, and model fit tests for dichotomous outcome variables and for non-normal data in general (Muthén, 1984; Muthén & Muthén, 2006). We evaluated model fit using the weighted root-mean square residual (WRMR) statistic; values falling below .90 indicated a good model fit (Muthén & Muthén, 2006; Yu & Muthén, 2001). The WRMR is the only model fit statistic available when examining dichotomous outcome variables (Muthén & Muthén, 2006).

After evaluating the initial mediational model, we examined whether any structural path varied as a function of gender, race/ethnicity (Caucasian, Hispanic/Latino, or African American), and adolescents' living arrangement, using a multiple group model approach (Muthén & Muthén, 2006). This approach entailed two steps, the first of which involved estimating an unrestricted model where all structural paths were free to vary across gender, race/ethnicity, or living arrangement. The second step involved estimating a model in which we constrained the structural paths among variables to be equal across gender, race/ethnicity, and living arrangement. We then used a χ^2 difference test ($\Delta\chi^2$), as described by Muthén and Muthén (2006), for use with WLSMV, to determine whether constraining paths across gender, race/ethnicity, or living arrangement resulted in a significant decrement in the model χ^2 . If constraining the paths to be equal across these variables resulted in a significant decrement to the model χ^2 , we could then assume that the relationships among them differed.

Results

Sample Characteristics and Group Comparisons

For parental problematic substance use, 9.6 % of students indicated that their mother's use was problematic and 26.9 % indicated their father's use was problematic. The lifetime prevalence of adolescent substance use for the entire sample was 65.7 % for alcohol, 22.1 % for cigarettes, 31.3 % for marijuana, 4.8 % for inhalants, 4.1 % for ecstasy, and 10.5 % for prescription drugs. These rates are similar to those found in nationally representative samples of 9th and 10th grade adolescents (e.g., Johnston et al., 2010). In addition, at the time of the study, 44.4 % of adolescents were living with their mother and father, 25 % with their mother only, 20.7 % with one parent and a step-parent, 3.5 % with their father only, 3 % with grandparents, and 3.3 % with someone else (i.e., "other"). The lifetime prevalence of substance use, as well as parental problematic substance use, did not differ between 9th and

10th grade students. We also created a sum variable of all types of lifetime substance use to examine the correlation between adolescent and problematic parental substance use. Results demonstrated that adolescent substance use was positively associated with both maternal ($r = .18, p < .001$) and paternal ($r = .27, p < .001$) problematic substance use.

Table 1 presents descriptive statistics for study variables for males, females, and each racial/ethnic group. Males had a higher prevalence rate of cigarette [$\chi^2(2) = 7.64, p < .05$] and marijuana [$\chi^2(2) = 14.82, p < .01$] use. Racial/ethnic groups differed for cigarettes [$\chi^2(4) = 35.14, p < .001$] and prescription drug [$\chi^2(4) = 26.16, p < .001$] use. Follow-up analyses showed that Caucasian adolescents had a higher lifetime prevalence of prescription drug use than Hispanic/Latino youth [$\chi^2(2) = 6.56, p < .05$] and a higher lifetime prevalence rate of both cigarette [$\chi^2(2) = 33.96, p < .001$] and prescription drug use [$\chi^2(2) = 25.66, p < .001$] than African American youth. Hispanic/Latino adolescents had a higher lifetime prevalence of both cigarette [$\chi^2(2) = 23.20, p < .001$] and prescription drug use [$\chi^2(2) = 8.18, p < .05$] than African American youth.

Males and females did not differ in the lifetime prevalence of either their mothers' [$\chi^2(1) = .82, p > .05$] or fathers' [$\chi^2(1) = .34, p > .05$] problematic substance use. However, the three racial/ethnic groups did differ as to problematic maternal substance use, [$\chi^2(2) = 20.23, p < .001$], insofar as Caucasian adolescents reported a higher prevalence than either Hispanic/Latino [$\chi^2(1) = 18.37, p < .001$] or African American adolescents [$\chi^2(1) = 7.52, p < .05$]. Males and females also differed on parental monitoring and father closeness; females scored lower on parental monitoring, [$t(921) = 7.23, p < .001$], and higher on paternal closeness [$t(922) = 2.33, p < .05$]. The three racial/ethnic groups did not significantly differ on parental monitoring or closeness.

We also examined whether adolescents with a lifetime history of substance use reported a greater prevalence of parental problematic substance use than youth who had never used substances. As evident in Table 2, female adolescents with a lifetime history of alcohol, cigarettes, and prescription drug use reported a greater prevalence of maternal problematic substance use than adolescents who had never used these substances. Further, females with a lifetime history of alcohol, cigarettes, marijuana, ecstasy, and prescription drug use reported a higher prevalence of paternal problematic use than females who had never used these substances. For males, adolescents with a lifetime history of cigarettes, marijuana, ecstasy, and prescription drug use reported a greater prevalence of maternal problematic substance use than those who had never used these substances. Moreover, males with a lifetime history of alcohol, cigarettes, marijuana, ecstasy, and prescription drug use reported a higher prevalence of paternal problematic use than males without lifetime use of these substances.

Mediation

To investigate mediation, we used SEM to examine the relationships maternal and paternal problematic substance use, parental monitoring, maternal and paternal closeness, and adolescent lifetime substance use. To provide a more conservative test of the relationship between parental problematic substance use and adolescent substance use, as mediated by parental monitoring and closeness, we also included direct paths from parental problematic substance use to adolescent substance use (see Fig. 1). As mentioned above, this first model did not take into account any potential gender, racial/ethnic, or living arrangement differences. This model fit the data well (WRMR = .152). As shown by the standardized path coefficients for this model (Table 3), paternal problematic substance use was positively associated with adolescent lifetime alcohol, cigarette, marijuana, ecstasy, and prescription drug use, and negatively associated with parental monitoring and closeness. Paternal closeness was unrelated to any of the substances. Maternal problematic substance use was positively associated with lifetime alcohol, cigarette, and prescription drug use, as well as

decreased closeness. Maternal closeness was negatively related to alcohol use. Parental monitoring was associated with a decreased likelihood of all types of substance use except ecstasy.

The association between maternal problematic substance use and their adolescents' lifetime alcohol use was partially mediated by maternal closeness ($B = .05$, 95 % CI .01–.12, % IE = 11.1). The associations between paternal problematic substance use and adolescent alcohol ($B = .03$, 95 % CI .00–.07, % IE = .07), cigarette ($B = .05$, 95 % CI .02–.09, % IE = .08), marijuana ($B = .08$, 95 % CI .04–.13, % IE = .15) prescription drug ($B = .04$, 95 % CI .00–.09, % IE = .08), and inhalant ($B = .04$, 95 % CI .01–.11, % IE = .20) use were partially mediated by parental monitoring.

Multiple Group Model

To determine whether any of the structural paths, indirect effects, and covariances varied as a function of gender, race/ethnicity, or living arrangement, we employed a multiple group model approach. We first permitted paths to vary across gender (then race/ethnicity, and then living arrangement), and then constrained them to be equal across gender. Paths did not vary either by gender [$\Delta\chi^2(35) = 26.256$, $p > .05$] or race/ethnicity [$\Delta\chi^2(59) = 73.56$, $p > .05$]. For living arrangement, we conducted a multiple group model comparing adolescents who lived with two parents to those living with anyone else (e.g., one parent, step-parent, grandparents), and found no differences in this regard [$\Delta\chi^2(36) = 32.36$, $p > .05$]. We attempted to run a multiple group model comparing adolescents who lived with two parents, one parent and a step-parent, one parent only, or “other” (i.e., grandparents). However, this model would not converge due to the small number of adolescents in the “other” group.

Discussion

We used a racially/ethnically diverse sample of 9th and 10th grade males and females to examine the relationships between maternal and paternal problematic substance use and adolescent substance use and to determine whether parental monitoring and parental closeness mediated these relationships. We also examined parental monitoring and parental closeness as mediators in the same model, taking into consideration their unique impact on adolescent substance use for mothers and fathers separately. We also examined six different substances that adolescents may have used in their lifetime, and determined whether these relationships differed on gender, race/ethnicity, or living arrangement.

Our findings were consistent with previous research showing that adolescents with substance using parents are at a heightened risk for substance use themselves, and that a portion of this risk is attributable to parenting factors. Specifically, maternal problematic substance use was associated with adolescent alcohol, cigarette, and illicit prescription drug use, and paternal problematic substance use was associated with adolescent alcohol, cigarette, marijuana, ecstasy, and illicit prescription drug use. These findings suggest that paternal problematic substance use may be more important than maternal problematic substance use in predicting a range of substances used by adolescents. However, due to the low prevalence of maternal problematic substance use reported in this study, we believe that this finding should be replicated before firm conclusions can be drawn. Further, this is one of the first studies to show the association between problematic parental substance use and adolescent prescription drug use across different racial/ethnic groups. This is an especially important finding given the increase in illicit use of prescription drugs among adolescents in recent years (Johnston et al., 2010).

Our findings demonstrate the importance of parenting practices as contributors to the transmission of substance use from parents to their offspring. Findings showed that, for

mothers, closeness played an important role in adolescent alcohol use, and partially accounted for the association between maternal problematic substance use and adolescent alcohol use. However, we did not find any differences with regard to gender, race/ethnic or living arrangement in the relationship between closeness and adolescent substance use. These findings speak to the importance of adolescents' connectedness to their mothers, who are often regarded as the parent who is most likely to provide emotional support and nurturance, as well as to engage in conversation and shared activities during early childhood and adolescence (Crouter & McHale, 1993; Waizenhofer, Buchanan, & Jackson-Newsom, 2004). Having a reduced sense of closeness with their mothers, above and beyond the influence of parental monitoring, may contribute to adolescents' experimentation with substances as a method of coping with their lack of connection. Alternatively, substance-using adolescents may distance themselves emotionally from their mother in order to conceal their risky behavior.

Maternal closeness only partially accounted for the association between maternal problematic substance use and adolescent alcohol use, and did not affect the use of any other substances. There are a few possible explanations for this finding. First, the most prevalent substance used by females is alcohol (Johnston et al., 2010), and it is therefore possible that adolescents were modeling the substance used most often by their mothers. Similarly, alcohol is a readily available substance, making it easier for adolescents to use as a coping mechanism or with their peers. However, maternal problematic substance use may also have less of an impact on adolescents' substance use, regardless of potential mediators. In our study, maternal problematic substance use was only directly associated with three of the six substances assessed.

Our findings also showed that parental monitoring partially accounted for the relationship between paternal problematic substance use and adolescent alcohol, cigarette, marijuana, prescription drug, and inhalant use. These findings stand in contrast to that of mothers, which showed that maternal closeness, not monitoring, played an important role in adolescent substance use. Most previous studies have failed to disentangle the effects of parental monitoring from both parents (e.g., Cleveland, Feinberg, & Greenberg, 2010), and these findings indicate that the ability of parents to effectively monitor their children's behavior may reduce the chances that paternal problematic substance use will impact adolescents' use of substances. It is possible that paternal problematic substance use leads to more adverse personal and family consequences that hinder the ability of fathers, and the family unit as a whole, to effectively monitor their adolescents' behavior. Again, we did not find any gender, racial/ethnic or living arrangement differences in the relation between monitoring and adolescent substance use. However, it is possible that the lack of significant differences may have been due to insufficient power in some of the subgroup analyses.

There are several limitations to this study. First, despite causal assumptions, its cross-sectional nature precludes determining the direction of causality. Longitudinal research is needed to replicate our findings in a prospective context, and to test competing models that provide similar patterns of results. For example, parents may have modified their parenting behavior in response to adolescent substance use. Second, since our measure of parental monitoring only contained three items and did not examine this construct for mothers and fathers separately, our results may have differed had we assessed monitoring individually for each parent. Our measure of parental closeness contained only two items, and future studies could employ better measures. Third, some of our subgroup analyses may have been underpowered, which could have limited our ability to detect significant effects.

In addition, our measure of parental substance use examined *problematic* use, not the frequency or intensity of parental substance use per se. Further, we did not examine the

types of substances the parents used. Future studies should investigate whether parental alcohol and drug use affect adolescents differently. Finally, our assessment of lifetime adolescent substance use was limited to the prevalence, not the frequency or intensity, of use, which if measured may have yielded different results.

Despite these limitations, our study suggests that pathways from parental problematic substance use to adolescent substance use are largely similar for males, females, racial/ethnic groups, and adolescents who live with either both or a single parent. In combination with previous research, our study suggests that prevention efforts aimed at reducing or delaying the initiation of adolescent substance use should focus on adolescents at high risk for use, including those who perceive high problematic parental substance use, and low closeness and monitoring. Screening programs should be established to identify these adolescents. Parental prevention programs aimed at increasing positive parenting skills (e.g., Dishion & Kavanagh, 2003), such as increasing closeness and effective monitoring, could also be implemented to decrease the likelihood of adolescent substance use.

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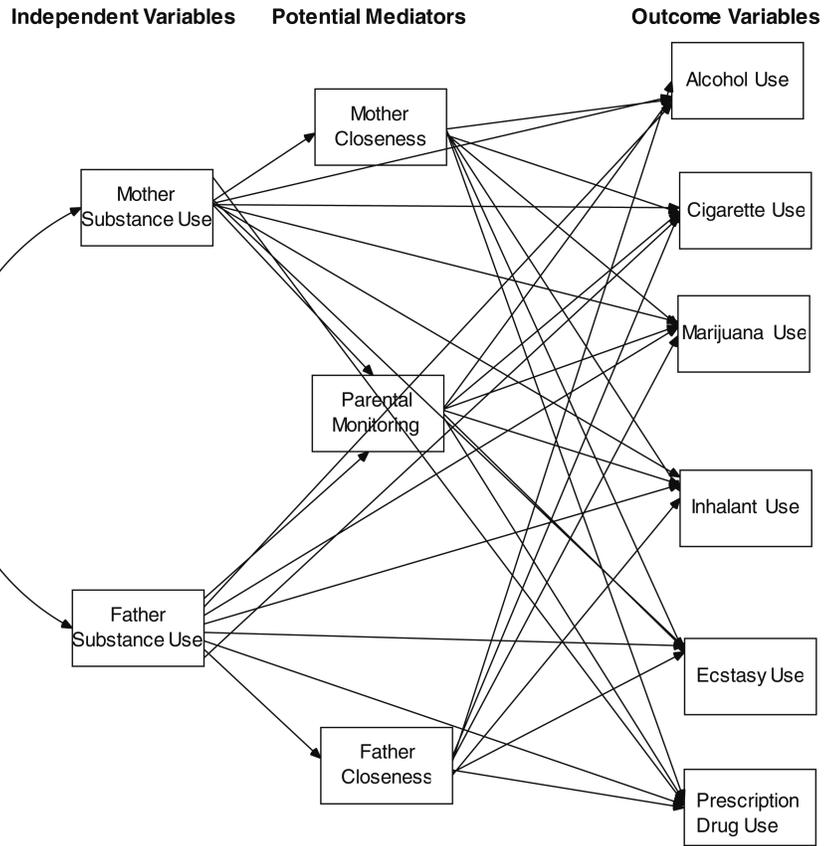


Fig. 1. Parental monitoring and closeness as potential mediators of the associations between problematic parental substance use and adolescent substance use. *Single-headed arrows* represent proposed unidirectional pathways and lines with *double-headed arrows* represent unanalyzed (correlational) associations. For the sake of clarity, disturbances and endogenous covariances were included in the model but not presented

Table 1

Descriptive statistics among study variables

	Male (n = 408)	Female (n = 519)	White (n = 301)	Hispanic/Latino (n = 336)	African American (n = 290)
<i>Lifetime use</i>					
Alcohol	65.4 % (n = 266)	66.0 % (n = 342)	69.8 % (n = 210)	65.8 % (n = 221)	61.0 % (n = 177)
Cigarettes	26.3 % (n = 107) *	18.8 % (n = 97) *	29.6 % (n = 89) *	25.3 % (n = 85) *	10.3 % (n = 30) *
Marijuana	37.9 % (n = 154) *	26.1 % (n = 135) *	36.2 % (n = 109)	30.7 % (n = 103)	26.6 % (n = 77)
Inhalant	4.7 % (n = 19)	4.8 % (n = 25)	7.3 % (n = 22)	2.4 % (n = 8)	4.8 % (n = 14)
Ecstasy	4.7 % (n = 19)	3.7 % (n = 19)	4.7 % (n = 14)	5.1 % (n = 17)	2.4 % (n = 7)
Prescription	11.6 % (n = 47)	9.7 % (n = 50)	16.9 % (n = 51) *	10.1 % (n = 34) *	4.1 % (n = 12) *
<i>Parental substance use</i>					
Mother	9.3 % (n = 38)	9.8 % (n = 51)	15.6 % (n = 47) *	4.9 % (n = 18) *	8.3 % (n = 24) *
Father	28.4 % (n = 116)	25.6 % (n = 133)	28.2 % (n = 85)	25.6 % (n = 94)	24.1 % (n = 70)
<i>Parental monitoring/closeness M (SD)</i>					
Parental monitoring	1.89 (.66) *	1.59 (.59) *	1.79 (.64)	1.70 (.66)	1.67 (.61)
Mother closeness	1.86 (.87)	1.89 (.92)	1.91 (.99)	1.90 (.82)	1.82 (.88)
Father closeness	1.98 (1.14) *	2.17 (1.31) *	2.17 (1.14)	2.03 (1.25)	2.08 (1.31)

* $p < .05$ difference between groups

Table 2
Differences in prevalence of problematic parental substance use by prevalence of lifetime adolescent substance use

	Males		Females			
	Lifetime alcohol (n = 262) (%)	No lifetime alcohol (n = 141) (%)	χ^2, p	Lifetime alcohol (n = 342) (%)	No lifetime alcohol (n = 175) (%)	χ^2, p
Problematic mother substance use	11.4	5.6	3.58, >.05	12.5	3.4	8.34, <.01
Problematic father substance use	34.3	17.7	12.74, <.001	30.1	17.1	9.40, <.01
	Lifetime cigarette (n = 104) (%)		χ^2, p	Lifetime cigarette (n = 97) (%)		χ^2, p
Problematic mother substance use	16.3	7	7.85, <.01	19.5	7.9	13.37, <.001
Problematic father substance use	43.2	23.4	14.61, <.001	47.4	22.4	29.09, <.001
	Lifetime marijuana (n = 129) (%)		χ^2, p	Lifetime marijuana (n = 118) (%)		χ^2, p
Problematic mother substance use	16.3	7.2	5.78, <.05	14.4	9.4	1.76, >.05
Problematic father substance use	52.7	20	33.06, <.001	39.8	24.7	7.91, <.01
	Lifetime inhalant (n = 19) (%)		χ^2, p	Lifetime inhalant (n = 20) (%)		χ^2, p
Problematic mother substance use	15.7	9.1	.94, >.05	25	10	3.19, >.05
Problematic father substance use	47.3	27.4	3.48, >.05	32	28	.46, >.05
	Lifetime ecstasy (n = 19) (%)		χ^2, p	Lifetime ecstasy (n = 17) (%)		χ^2, p
Problematic mother substance use	31.5	8.4	11.31, <.01	11.7	10.6	.02, >.05
Problematic father substance use	63.1	26.7	11.63, <.01	70.5	26.9	15.88, <.001
	Lifetime prescription (n = 47) (%)		χ^2, p	Lifetime prescription (n = 38) (%)		χ^2, p
Problematic mother substance use	23.4	7.6	12.10, <.01	31.5	8.9	12.90, <.001
Problematic father substance use	51.1	25.3	13.31, <.001	60.5	25.5	12.38, <.001

Percentages represent number of adolescents who endorsed problematic parental substance use

Table 3

Standardized path estimates for overarching model

Mediators	Mother substance use → Mediator		Father substance use → Mediator		Substance use outcomes						
		Mediator		Mediator	Alcohol	Cigarettes	Marijuana	Inhalants	Ecstasy	Prescription drugs	
Mother closeness	-.36 (.13)	**	-	-	-.13 (.05)	-.06 (.05)	-.03 (.05)	-.12 (.08)	.00 (.09)	-.05 (.06)	
Father closeness	-		-.24 (.10)	*	.01 (.03)	-.01 (.03)	.06 (.03)	.00 (.05)	-.02 (.06)	-.01 (.05)	
Parental monitoring	-.12 (.08)		-.20 (.05)	***	-.13 (.06)	-.23 (.07)	-.39 (.06)	-.22 (.10)	.17 (.12)	-.19 (.09)	
Mother substance use	-		-		.38 (.16)	.42 (.14)	.17 (.14)	.25 (.23)	.26 (.21)	.53 (.15)	
Father substance use	-		-		.39 (.09)	.51 (.09)	.46 (.08)	.17 (.16)	.65 (.14)	.45 (.11)	

Standard errors are in parentheses

* $p < .05$ ** $p < .01$ *** $p < .001$