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The Influence of Representations of Attachment, Maternal–Adolescent Relationship Quality, and Maternal Monitoring on Adolescent Substance Use: A 2-Year Longitudinal Examination

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The present study examined the hypotheses that more secure representations of attachments to parents are associated with less adolescent substance use over time and that this link is mediated through relationship quality and monitoring. A sample of 200 adolescents (M = 14–16 years), their mothers, and close friends were assessed over 2 years. Higher levels of security in attachment styles, but not states of mind, were predictive of higher levels of monitoring and support and lower levels of negative interactions. Higher levels of security in attachment styles had an indirect effect on changes in substance use over time, mediated by maternal monitoring. These findings highlight the roles of representations of attachments, mother–adolescent relationship qualities, and monitoring in the development of adolescent substance use.

Many theories have been forwarded regarding why and how adolescents become involved with drugs and alcohol (see Petraitis, Flay, & Miller, 1995, for a review). Two such theories, the social control theory and the social development model (Costello, 2000; Drapela & Mosher, 2007; Elliott, Huizinga, & Ageton, 1985; Fleming, Brewer, Gainey, Haggerty, & Catalano, 1997; Hawkins & Weis, 1985; Huebner & Betts, 2002; Kierkus & Baer, 2002), emphasize the importance of the attachment or bond to parents as a protective factor against adolescent substance use. Both of these theories reflect the idea that adolescents who have poor opportunities for rewarding interactions at home and who received little rewards for interactions with parents are more likely to use substances. These theories suggest that an adolescent's lack of commitment to conventional values stems, in part, from an absence of close and loving relationships with parents or family. Subsequently, these individuals reject conventional values and associate with peers who support unconventional standards; it is through association with these peers that deviant behaviors such as drug use and criminal activity are observed, imitated, and rewarded. These and other theories of substance use in adolescence stress the importance of an adequate attachment or bond between adolescents and their parents as a key protective factor against substance use.

Social control and social development theorists have commonly used the term *attachment* interchangeably with the term *bond*, or *connectedness* (Resnick et al., 1997). This conceptualization is also reflected in the measures used to assess such attachments. For example, one study utilized a single question (''How satisfied are you with the way you get along with your parents?'' McGee, 1992, p. 359). Another study assessed an adolescent's ''attachment'' with parents through ''a group of questions [that] dealt with the relations between [children] and their families'' and loosely defined attachment as ''relations'' and ''ties'' with parents (Gerevich & Bacskai, 1996, p. 27).

In the developmental field, Bowlby (1969, 1973) developed a more extensive theory with a more specific definition of attachment. As part of that theory, he proposed that individuals develop representations of themselves, their attachment figures, and their attachment relationships that reflect their caretaking experiences. Those whose parents or attachment figures have been sensitive and responsive

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typically develop secure representations of these attachments, whereas those whose parents have been rejecting or unavailable typically develop insecure representations. Such secure or insecure representations of attachments to parents provide rules for the organization and accessibility of thoughts and feelings regarding attachment (Bowlby, 1973; Main, Kaplan, & Cassidy, 1985); these representations, in turn, are hypothesized to affect behavior toward parents. Individuals with insecure representations of attachments to parents are vulnerable to problems in adjustment and development (Bowlby, 1973). For example, individuals with insecure representations are more likely to demonstrate various forms of psychopathology including affective disorders, anxiety disorders, and eating disorders (see Dozier, Stovall-McClough, & Albus, 2008; van IJzendoorn & Bakermans-Kranenburg, 1996). Less is known, however, about the links between representations of attachments to parents and the use of substances such as alcohol and drugs. Many of the existing studies have examined adults' representations of attachments and the only study examining adolescents' representations was done with an inpatient population (Rosenstein & Horowitz, 1996). Consequently, there has been a call for prospective, longitudinal examinations of normative community samples to illuminate the potential role of representations of attachment on the development of adolescent substance use and psychosocial development further (Greenberg, 1999).

Representations of attachments are cognitions, and currently we know relatively little about the actual processes that may link such cognitions to psychopathology or substance use. One possibility is that adolescents' insecure representations of attachments to parents may affect the ability to have satisfying relationships; the negative representations could be expected to affect an adolescent's behavior toward a parent (Allen, Hauser, & Borman-Spurrell, 1996). In fact, research has demonstrated a link between more secure representations of attachments to parents and higher levels of support in the parent–adolescent relationship (Allen et al., 2003) and a similar link between greater security and maintaining the parent–adolescent relationship during time of disagreement or conflict (Allen et al., 2003). Both theoretical and empirical evidence from the field of attachment would predict that, relative to secure representations, insecure representations of attachments with parents could potentially lead to lower levels of relationship support, higher levels of negative interaction, and less parental monitoring.

An examination of the substance use literature supports the idea that several aspects of the parent–adolescent relationship are key predictors of adolescent substance use. For example, parental support (Barber, 1992; Marshal & Chassin, 2000; Wills, Resko, Ainette, & Mendoza, 2004), parental monitoring (e.g., Chilcoat & Anthony, 1996; Dishion, Nelson, & Kavanach, 2003; Griffin, Botvin, Scheier, Diaz, & Miller, 2000), and family conflict (Windle, 2000) have all been implicated as correlates or causes of adolescent substance use (see Spooner, 1999, for a comprehensive review). Unfortunately, however, the relations among representations of attachments to parents, parental monitoring, parent–child relationship qualities, and adolescent substance use have not been simultaneously examined in the same study. The present study sought to examine how adolescents' representations of their attachments to parents, maternal monitoring, and mother–adolescent relationship qualities (i.e., support and negative interactions) are associated with adolescent substance use. Additionally, the present study sought to examine these relations in a normative community sample over a critical 2-year period of development where substance use can increase nearly 40% (Johnston, O'Malley, Bachman, & Schulenberg, 2006).

Figure 1 depicts the model guiding the present study. In general, we expected that an association between representations of attachment and adolescent substance use would be mediated by relationship qualities and maternal monitoring. More specifically, we expected that higher levels of security in representations of attachments with parents would be predictive of subsequent higher levels of support and lower levels of negative interactions. This prediction is consistent with previous work (Allen, McElhaney, Kuperminc, & Jodl, 2004). We also expected that increased levels of security in representations, as well as positive parent–adolescent relationship qualities (i.e., high support and

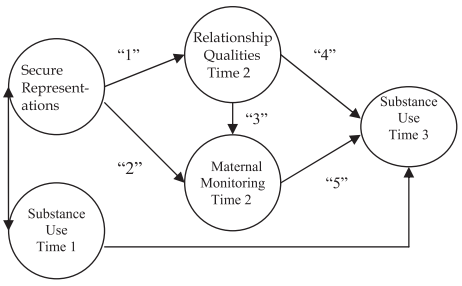

Figure 1. Hypothesized relations among study variables.
Note. Letters correspond to study Hypotheses 1–5.

low negative interactions), would be predictive of higher levels of maternal monitoring. Finally, we hypothesized that the high levels of monitoring lead to less use of alcohol and drugs over time. This hypothesis is based on a body of literature that demonstrates that parental monitoring, and specifically parental monitoring knowledge, is associated with less substance use behavior (e.g., Chilcoat, Dishion, & Anthony, 2001; DiClemente et al., 2001; Steinberg, Fletcher, & Darling, 1994).

Representations of attachments to parents have been assessed in two different ways, as *states of mind* (working models) and as *attachment styles* (Furman & Wehner, 1994). States of mind (working models) refer to internalized representations of relationships, whereas styles refer to self-perceptions of representations of relationships. In the developmental psychology tradition, states of mind regarding attachment have primarily been assessed with interviews such as the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). This tradition is based on the idea that representations are reflected in the individual's narratives of his or her experiences in close relationships; in particular, differences in representations are inferred from the approach to the discourse task and the degree of coherence in the discourse (Hesse, 1999). For example, those with secure representations have coherent and collaborative narratives. The narratives of those with dismissing representations are incoherent as such individuals present positive global impressions of their relationships but avoid discussing particular events. Those with preoccupied representations are incoherent as they attempt to maximize the attention to attachment-related experiences.

In the social psychology tradition, self-report questionnaire methods have been used for assessing attachment styles regarding various close relationships, including attachment styles regarding relationships with parents. Such self-report questionnaires typically assess how one approaches relationships and what one expects from these relationships. States of mind measures may assess a global model of processing attachment-related information in interpersonal relationships; for example, states of mind may reflect a control system of regulating emotions, which may be most salient when the attachment system is activated such as at times of stress (Spangler & Zimmermann, 1999). On the other hand, self-reported attachment styles may tap more specific attitudes, feelings, and beliefs about a type of relationship (Mayseless & Scharf, 2007).

Traditionally, however, investigators have typically only examined one type of representation. Indeed, the majority of the studies that provide the theoretical and empirical basis of the present study were developed and tested using attachment *states of mind* rather than attachment *styles*. However, states of mind and attachment styles are only moderately related to each other (see Crowell, Fraley, & Shaver, 1999); their relative independence underscores the importance of examining the two simultaneously. Moreover, such studies of both are needed so that we can elucidate the role each plays in close relationships and so that we can understand the similarities and differences in the constructs of states of mind and styles. In this study, we examined both states of mind and attachment styles. We made parallel predictions for states of mind and styles, as we still have a limited understanding of the conceptual and empirical overlap and distinction of the two constructs.

Hypotheses

1. Greater security in representations (both states of mind and attachment styles) will be related to relationships with mothers that are characterized by higher levels of support and lower levels of negative interactions (Figure 1, Path A).
2. Moreover, higher levels of security in representations will be related to greater levels of maternal monitoring (Figure 1, Path B).
3. Mother–adolescent relationship qualities will be related to maternal monitoring (Figure 1, Path C). Specifically, support will be positively related and negative interactions will be inversely related to maternal monitoring.
4. Furthermore, the influence of representations on substance use will be partially mediated through mother–adolescent relationship qualities (Figure 1, Path D).
5. Finally, the influence of representations on substance use will be partially mediated by maternal monitoring (Figure 1, Path E).

Method

Participants

Participants were part of a longitudinal study on the development of romantic relationships in adolescence. High school students (n = 200) were recruited from both urban and suburban public

schools in a large metropolitan area when they were in the 10th grade. Students were recruited through brochures and letters sent to families residing in a range of neighborhoods, varying in socioeconomic status (SES) and ethnicity. The sample consisted of an equal number of males (n = 100) and females (n = 100) with an average age of 15.3 years (range = 14–16 years) at Time 1. The sample was designed to be ethnically representative of the U.S. population, with 69.5% being Caucasian, 11.5% being African American, 12.5% being Hispanic, and 6.5% being Asian American, Native American, or of other ethnicities. With regard to family structure, 57.5% were residing with two biological or adoptive parents, 11.5% were residing with a biological or adoptive parent and a stepparent or partner, and the remaining 31% were residing with a single parent or relative. The sample was of average intelligence (Wechsler Intelligence Scale for Children, third edition [WISC–III] vocabulary score M = 9.8, SD = 2.44) and did not differ from national norms on 11 of 12 indices of adjustment derived from Achenbach's (1991) Child Behavior Checklist and Youth Self-Report, Spielberger's (1983) State Trait Anxiety Inventory, and the Monitoring the Future survey (Johnston et al., 2006). Of particular relevance to this study, they did not significantly differ from the national norm in tobacco use or in the last 30 days, alcohol use ever or in the last 30 days, marijuana use in the last 30 days, or hard drug use ever or the last 30 days. The higher proportion of our sample had used marijuana at some time (54% vs. 40%). All participants completed the first two waves of data collection; all but 1 completed the third wave.

Other Participants

At the time of the initial recruitment, mothers residing with the participant were asked to participate in the study. Specifically, 196 mothers completed a series of questionnaires in the first wave of data collection, 185 completed questionnaires in the second wave, and 174 completed questionnaires in the third wave. Additionally, each adolescent participant was asked to invite a close friend to complete questionnaires about the participant. A total of 192 friends participated and completed questionnaires in the first wave, and 162 completed questionnaires in the second wave and 159 completed questionnaires in the third wave. Participants, mothers, and friends were financially compensated for participating. All procedures followed the protocol approved by the University of Denver Institutional Review Board. The confidentiality of the data was protected by a Certificate of Confidentiality issued by the U.S. Department of Health and Human Services.

Measures

The AAI (George et al., 1985) was used as a measure of states of mind regarding attachment at the first wave of data collection. The AAI is a semistructured interview composed of 18 questions that explore participant's childhood relationships with his or her parents, specifically asking for general memories of growing up and then seeking specific descriptors and memories for each parent. The AAI then asks to which parent the participant felt closest; how the parents behaved when the participant was ill, injured, or emotionally upset; how the participant and his or her parents dealt with separations; if the participant ever felt rejected by his or her parents; how the parents may have influenced the participant's development; and how the relationships between the participant and his or her parents currently are.

The AAI interview was then transcribed verbatim for coding using Main and Goldwyn's (1994) scoring system. On the basis of ratings on 11 scales and characteristic descriptions of the categories, coders classified transcripts as secure, dismissing, or preoccupied. Classifications are based on the nature of the discourse and how coherently adolescents describe and understand their experiences with parents, regardless of the nature of those experiences. Secure states of mind are characterized by an ability to describe relationships with parents coherently and express valuing of these relationships and attachment-related experiences. Dismissing states of mind are reflected in attempts to limit the influence of relationships with parents by idealizing, devaluing, or failing to remember childhood attachment experiences. Preoccupied states of mind are characterized by being angrily preoccupied and caught up in relationships with parents or by being confused, vague, and passive regarding experiences with parents.

In addition to a primary classification, an individual was categorized as unresolved if a marked lapse in reasoning or discourse occurred with respect to discussing a loss or abusive experience. In the present sample, a total of 100 (50%) participants were classified as dismissing of attachment, 11 (5.5%) were classified as preoccupied with regard to attachment, and 87 (43.5%) were classified as secure. Six (3.0%) were also categorized as having an unresolved classification as well as one of the three primary classifications. This distribution

is similar to previous findings of attachment classifications in adolescence (Ammaniti, van IJendoorn, Speranza, & Tambelli, 2000; Furman, Simon, Shaffer, & Bouchey, 2002; Hamilton, 2000; Seiffge-Krenke, 2006).

Finally, in an effort to obtain continuous ratings for each of the three primary categories, coders indicated how prototypically secure, dismissing, and preoccupied the transcript was using 9-point Likert scales. Coders were instructed to indicate how characteristic the transcript was for each classification on a scale ranging from 1 = *has none of the features of this type* to 9 = *a prototypic instance of this category*. The highest prototype rating was always the same as the classification, but the level of the rating was influenced by the degree to which the person had characteristics of other categories; for example, a person categorized as secure but having some dismissing characteristics might receive a secure prototype rating of 7, a dismissing rating of 3, and preoccupied rating of 1, whereas a person who was prototypically secure might receive ratings of 9, 1, and 1, respectively. Prototype scores are highly related to corresponding dichotomous categorizations (e.g., secure vs. insecure; rs $\geq .90$), but these ratings have the advantages of continuous ratings (MacCallum, Zhang, Preacher, & Rucker, 2002) and are consistent with recent taxometric analyses of the AAI (Roisman, Fraley, & Belsky, 2007). Such ratings have been used in prior AAI studies (Furman & Simon, 2006; Furman et al., 2002; Shomaker & Furman, 2007) and have the scale properties appropriate for structural equation modeling (SEM). Finally, because the dismissing and secure continuous dimensions were strongly negatively correlated ($r = -.86$), we combined the two measures to create a single secure-dismissing dimension, with higher scores reflecting greater overall secure characteristics and lower scores reflecting greater overall dismissing characteristics. This method has previously been used to study states of mind and styles (Shomaker & Furman, 2007). Because the continuous preoccupied score was not strongly correlated with either the dismissing or the secure variable (rs $< \pm.27$), we did not combine it with other measures and evaluated preoccupied variables separately.

All interviews were rated by coders who had attended Main and Hesse's workshop and successfully passed their reliability certification test. Coders were naive to other information about the participants. Pairs of coders independently coded 10% of the transcripts; interrater agreement for the overall classification and the three continuous prototype scores was satisfactory (classification $\kappa = .67$; mean intraclass correlation of prototype ratings = .73), and similar to other studies (e.g., Bakermans-Kranenburg & van IJzendoorn, 1993).

Behavioral Systems Questionnaire (BSQ; Furman & Wehner, 1999). Adolescents were administered the 27-item version of the BSQ as a measure of self-perceptions of relational styles regarding relationships with their parents. Attachment styles were measured by assessing perceptions of how participants approach attachment in their relationships with their parents. Sample items included ''I seek out my parents for comfort and support'' and ''When I'm upset, my parents are often not able to comfort me.'' Secure, dismissing, and preoccupied attachment styles were each assessed with three 5-point Likert items. Internal consistencies of the three style scores were all satisfactory (Cronbach's αs = .76–.89). The BSQ scales have been found to be moderately to highly related to parallel scales on a version of Hazan and Shaver (1987) attachment style measure that asked about relationships with parents (see Furman & Wehner, 1999). Secure and dismissing attachment scores were highly negatively correlated ($r = .76$). Similar to the secure-dismissing variable created for states of mind, we created a secure-dismissing styles variable, with higher scores reflecting greater overall secure characteristics and lower scores reflecting greater overall dismissing characteristics. Again, because the preoccupied styles measure was not strongly related to the secure or dismissing styles variables (rs $< \pm.10$), it was not combined with other measures.

The Network of Relationships Inventory (NRI), Behavioral Systems Version (Furman & Buhrmester, 1985). The NRI is a 24-item self-report questionnaire that asked participants to rate aspects of their relationships with their mothers as well as other close figures. A parallel version was administered to the participant's mother, who reported on her relationship with her adolescent. The NRI consists of 8 three-item scales rated on a 5-point Likert scale (1 = *little or none* to 5 = *the most*). Two major factors are yielded: Negative Interactions (''How often do you and your mother point out each other's faults or put each other down?'') and Relationship Support (''How much does your mother show support for your activities?''). The Negative Interaction factor is composed three separate scales: (a) Conflict, (b) Antagonism, and (c) Criticism. The Relationship Support factor is composed five separate scales: (a) Seeking Secure Base, (b) Seeking Safe Haven, (c) Providing a Secure Base, (d) Providing a Safe

Haven, and (e) Companionship. The NRI has been widely used to assess relationship qualities, and there is good evidence for the NRI's reliability and validity (see Furman, 1996; Furman & Buhrmester, 1985). Reliability for each factor was acceptable (αs $\geq$ .85). In the models assessed, we created two latent variables: (a) relationship support, consisting of two indicator variables: adolescent participant's report and mother's report of support and (b) negative interactions, consisting of two indicator variables: adolescent participant's report and mother's report of negative interactions.

Monitoring Scale (e.g., Brown, Mounts, Lamborn, & Steinberg, 1993). The Monitoring Scale consists of five items asking: ''How much do your parents really know about: (a) who your friends are, (b) how you spend your money, (c) where you are after school, (d) where you are at night, and (e) what you do with your free time.'' The questionnaire is on a 4-point Likert scale (1 = *don't know* to 4 = *know a lot*). Participants were asked how much their parents knew, and mothers were asked how much they knew about their adolescent. Reliability for each scale was acceptable ($\alpha \geq .81$). In the models assessed, monitoring was reflected through one latent variable with two indicators: adolescent participant's report and mother's report of monitoring knowledge.

Drug Involvement Scale for Adolescents (DISA; Eggert, Herting, & Thompson, 1996). This scale was used as a comprehensive assessment of substance use. The DISA was administered using computer assisted self interviewing as such administration increases the candor of responses (Turner, Ku, Rogers, Lindberg, & Pleck, 1998). The DISA specifically inquires about the use of tobacco, beer, wine, liquor and 10 different drugs (marijuana, cocaine, opiates, depressants, tranquilizers, hallucinogens, inhalants, stimulants, over-the-counter drugs, and club drugs). To assess frequency over the last 30 days, participants were asked how often they had used that substance in the last 30 days, using a 7-point scale (0 = *not at all*, 1 = *used once in last 30 days*, 2 = *used 2–3 times in the last 30 days*, 3 = *used about once a week*, 4 = *used several times a week*, 5 = *used almost every day*, 6 = *used every day*). The frequencies of beer, wine, and liquor were standardized and averaged to derive a measure of alcohol use, and the frequencies of marijuana use and the sum of the 9 hard drugs were standardized and averaged to derive a measure of drug use. Table 1 displays descriptive statistics for the raw scores of alcohol use, marijuana use, and hard drug use individually. Additionally, participants answered 15 items assessing negative consequences arising from substance use (e.g., ''I missed an assignment or failed a test due to alcohol or drugs, I got into a fight due to alcohol or drugs'') and 6 items assessing difficulties in controlling substance use (e.g., ''I kept using even though I'd had plenty already and I felt guilty about my use of alcohol or drugs''; mean alpha of problem measures = .95, range = .94–.97). For analytic purposes, the alcohol, drug, and two problem measures were each standardized and averaged to form the teen report indicator.

Table 1
Means and Standard Deviations of Study Variables

	Minimum	Maximum	*M*	*SD*
Secure-dismissing state of mind	−8.00	8.00	−0.50	5.08
Secure-dismissing attachment styles	−3.56	3.78	−0.56	1.35
Teen report				
Support	1.00	5.00	2.91	0.97
Negative	1.00	5.00	2.19	0.99
Monitoring	1.00	4.00	3.14	0.66
Alcohol use[a]	0.00 (0.00)	6.00 (5.00)	1.21 (1.85)	1.44 (1.65)
Marijuana use[a]	0.00 (0.00)	6.00 (6.00)	0.90 (1.68)	1.62 (2.42)
Hard drug use[a]	0.00 (0.00)	1.62 (1.50)	0.63 (0.45)	1.98 (1.53)
Negative consequences[a]	0.00 (0.00)	2.84 (4.47)	0.71 (0.88)	0.70 (0.71)
Control problems[a]	0.00 (0.00)	3.50 (4.33)	0.79 (1.14)	0.81 (1.05)
Mother report				
Support	1.67	5.00	3.01	0.74
Negative	1.00	3.17	1.72	0.56
Monitoring	2.00	4.00	3.57	0.39
Friend report				
Participant substance use	1.00 (1.00)	4.00 (4.00)	3.39 (3.21)	0.68 (0.70)

[a]Values of Time 1 are given outside parentheses and values of Time 3 given inside parentheses.

Friends report of substance use. Friends were asked four questions about the participant's use of alcohol and drugs and problems related to the use of those substances. Questions were completed using Harter's structured alternative format (1982). For example, one item was: ''(A) some teens have problems caused by drinking alcohol . . . but . . . (B) other teens don't have problems caused by drinking alcohol.'' The participant's friend was asked to indicate which section of the statement (''A'' or ''B'') was most like the participant and then whether it was *sort of true* or *really true*, yielding a 4-point scale. For example, possible scores for the sample item above would be: 4 = *statement ''A'' is ''really true,''* 3 = *statement ''A'' is ''sort of true,''* 2 = *statement ''B'' is ''sort of true,''* and 1 = *statement ''B'' is ''really true*.'' Thus, higher scores indicate lower levels of potential substance use or substance use problems. The four items were averaged to derive the friend report of the participant's substance use and problems ($M = 3.39$, $\alpha = .84$).

These participant and friend report indicators were selected to represent adolescent substance use for several reasons. First, these indictors reflect the use of a range of substances in the past 30 days, a well-accepted measure of current use. Next, the inclusion of reports of problems with substance use helps characterize problematic use beyond casual or experimental use. Finally these indicators include the perceptions of substance use and related problems by a friend as well as the participant. Whereas this measure does not necessarily measure substance abuse or dependence per se, by assessing frequency of use, problems related to use, and peer report of use, we believe we have captured an overall construct of substance use involvement and problems.

Results

Examination of Psychometric Properties

All data were initially screened for the presence of outliers and problems of skew or kurtosis (Behrens, 1997). The normality of the distributions of all final indicators was acceptable (skew range = −1.18 to 0.74; kurtosis range = 0.09 to 1.5). In order to minimize the influence of outliers on the characteristics of the distribution, outliers were adjusted to fall 1.5 times the interquartile range below the 25th percentile or above the 75th percentile. This strategy was used because it minimally changes the distribution overall and avoids potential bias associated with eliminating outliers altogether.

Missing data were estimated using full information maximum likelihood as such procedures yield less biased outcomes than listwise or pairwise deletion (Schafer & Graham, 2002; see Table 1 for means and standard deviations and Table 2 for correlations among study variables).

SEM

SEM utilizing the Amos 7.0 statistical program (Arbuckle, 2006) was used to test models of the hypothesized relations among variables. Evaluation of the model fits were completed using standard chi-square, comparative fit index (CFI), and root mean square error of approximation (RMSEA) fit indices. According to conventional guidelines, a CFI of .95 and an RMSEA of .08 or less are considered to be a reasonable fit (Browne & Cudeck, 1993; Hu & Bentler, 1999).

Two separate structural equation models were evaluated to examine the hypotheses of the current study: the first utilizing the secure-dismissing states of mind and styles variables, and the second utilizing the preoccupied states of mind and styles variables. For both models, five latent substantive factors were created: (a) Substance Use (Time 1), (b) Maternal Monitoring (Time 2), (c) Mother–Adolescent Support (Time 2), (d) Mother–Adolescent Negative Interactions (Time 2), and (e) Substance Use (Time 3). In addition to the substantive factors of interest, two latent method factors were added to the model: (a) Teen Method Variance and (b) Mother Method Variance. The inclusion of these method variance factors allows the variance of each manifest variable to be partitioned into three components: (a) the substantive construct of interest, (b) common method variance, and (c) random error (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Such common method variance models have been increasingly advocated because of their ability to provide more accurate estimates of the effects of traits of interest independent of the influence of methodological processes (e.g., Billiet & McClendon, 2000; Lindell & Whitney, 2001; Marsh & Grayson, 1995; Podsakoff et al., 2003). In these models, each teen and mother questionnaire variable at Time 1 and Time 2 is loaded onto its appropriate method factor as well as its associated substantive construct. We did not include the teen report of substance use at Time 3 on the Teen QMV. By virtue of controlling for Time 1 substance use in the model, the teen-report of substance use at Time 3 represents a residual change score, which has the variance unrelated to change over time removed

Table 2
Correlations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Secure-dismissing styles	—											
2. Secure-dismissing state of mind	.13	—										
3. Teen: Support	−.62***	−.01	—									
4. Teen: Negative	.28***	−.14	−.26***	—								
5. Mother: Support	−.28***	.01	.40***	−.20***	—							
6. Mother: Negative	.21***	.02	−.10	.51***	−.07	—						
7. Teen: Monitoring	−.47***	−.01	.43***	−.24***	.15**	−.15**	—					
8. Mother: Monitoring	−.24***	−.08	.20***	−.21***	.31***	−.17**	.36***	—				
9. Teen-report substance use (T1)	−.30***	−.05	−.15**	.16**	−.14	−.17**	−.42***	−.16**	—			
10. Teen-report substance use (T3)	−.28***	.01	−.19**	.17**	.17**	.18**	−.49***	−.20***	.60***	—		
11. Friend-report substance use (T1)	.20***	−.07	.17**	−.11	−.06	.12	.20***	.18***	−.52***	−.40***	—	
12. Friend-report substance use (T3)	.23***	−.11	.19**	−.10	−.14	−.11	.42***	.20***	−.50***	−.62***	−.44***	—

**$p \leq .01$. ***$p \leq .001$.

from the score, including the common method variance (Cronbach & Furby, 1970). The inclusion of these method factors in the models described subsequently improved the fit above corresponding models without the method factors: Model 1, $\Delta\chi^2(8) = 18.30$, $p < .05$, and Model 2, $\Delta\chi^2(8) = 19.83$ $p < .05$.

Model 1, presented in Figure 2, provided a good fit to the data, $\chi^2(50) = 72.10$, $p = .02$, CFI = .97, RMSEA = .05, 90% CI = .02–.07 (see Table 3 for specific model parameter estimates). Hypothesis 1 predicted that, relative to adolescents with more insecure attachment scores, adolescents with more secure attachment scores would have relationships with mothers that are characterized by higher levels of support and lower levels of negative interaction. Consistent with this hypothesis, greater security in attachment styles at Time 1 were associated with higher levels of relationship support at Time 2 and lower levels of negative interactions at Time 3. On the other hand, greater security in states of mind was not associated with either relationship support or negative interactions.

Hypothesis 2 stated that adolescents with greater security in representations of attachment would have higher levels of maternal monitoring. Higher levels of secure attachment styles at Time 1 were significantly related to higher levels of maternal monitoring at Time 2. Again, however, security in states of mind was not associated with maternal monitoring.

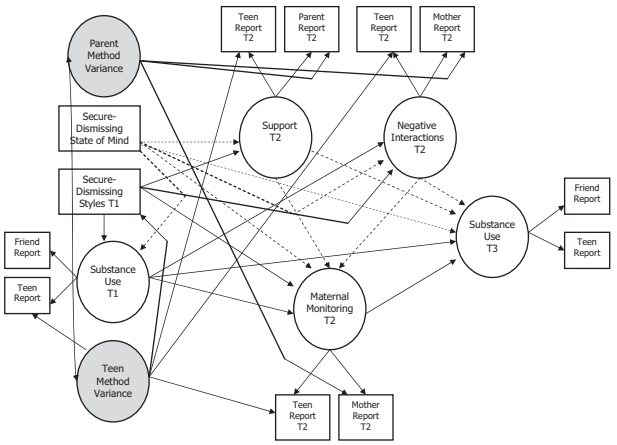

Figure 2. Structural equation model of secure dismissing representations, parenting variables, and substance use.
Note. Solid lines indicate statistically significant relations; dashed lines indicate nonsignificant relations. T1 = Time 1; T2 = Time 2; T3 = Time 3.

Hypothesis 3 stated that the qualities of the mother–adolescent relationship would be related to maternal monitoring. However, neither relationship support nor negative interactions were related to maternal monitoring.

Hypothesis 4 stated that the influence of higher security representations on substance use would be partially mediated by mother–adolescent relationship quality. There was no support for Hypothesis 4 with regard to the states of mind measure because neither maternal support nor negative interactions were related to substance use at Time 3.

Table 3
Model Parameter Estimates and Standardized Indirect Effects

	States of mind	Styles	Substance use T1	Support	Negative	Monitoring	Substance use T3
States of mind	—	.00	.00	.00	.02	−.03	−.04
Styles	.32**	—	.00	.01	−.05	.21	−.33
Substance use T1	.08 (.01)	−.25 (.07)**	—	.00	.00	−.02	.15
Support	−.01 (.01)	.57 (.08)**	.02 (.08)	—	.00	.00	−.08
Negative	−.07 (.01)	−.22 (.13)	.22 (.08)*	N/A	—	.00	.02
Monitoring	.04 (.01)	.33 (.07)**	−.35 (.06)**	.12 (.09)	−.05 (.08)	—	.00
Substance use T3	−.13 (.02)	.07 (.10)	.49 (.10)**	.02 (.07)	.05 (.10)	−.40 (.21)**	—

Note. Lower quadrant represents standardized coefficient estimates represented in Figure 2, with standard error in parentheses. Upper quadrant represents standardized indirect effects; no p values reported.
*$p < .05$. **$p < .01$.

Finally, Hypothesis 5 stated that the relation between security in representations and substance use would be partially mediated through maternal monitoring. Support was found for Hypothesis 5 such that higher levels of security in attachment styles were related to monitoring, which, in turn, was significantly related to substance use at Time 3. However, security in states of mind was not related to maternal monitoring.

To fully examine the final hypothesis that the relation between more secure attachment styles and substance use is partially mediated through maternal monitoring, several methods were used. First, in accordance with recommendations by Cole and Maxwell (2003), a test of omitted paths was conducted. This method compares a full structural model to a reduced model in which the direct path from secure attachment styles to substance use at Time 3 was restricted to zero. The reduced model provided a satisfactory fit, $\chi^2(51) = 72.1.8$, $p = .02$, CFI = .96, RMSEA = .05, 90% CI = .02–.07. There was no significant difference between the chi-square full and reduced models, $p > .05$. This suggests that the direct path from secure attachment styles to substance use at Time 3 is not required for a good model fit.

To further examine if parental monitoring is a statistically significant mediator of secure attachment styles and substance use at Time 3, a distribution-of-products method was used. We selected the distribution-of-products approach to test for indirect effects because it has better statistical power and less likelihood of Type I errors than traditional methods (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004). In this method, the path from the potentially mediated exogenous factor (i.e., attachment styles) to the intervening factor (i.e., maternal monitoring) is converted into a z score by dividing the unstandardized path coefficient by its standard error. Second, the path from the intervening variable to the outcome variable is also converted into a z score. Third, the product of z scores is obtained. Finally, the product is compared to a critical value using MacKinnon's $Z_\alpha Z_\beta$ distribution table (MacKinnon et al., 2002). Using this method, there was evidence that maternal monitoring was a statistically significant ($p \leq .05$) mediator of the relation between secure attachment styles and substance use at T3.

Finally, Amos 7.0 provides estimates of standardized indirect (mediated) effects. Results of these estimates reflect an indirect effect of secure attachment styles on substance use of −.33, again providing support for Hypothesis 5 (see Table 3 for a complete listing of standardized indirect effects among model variables).

To examine the potential effect of preoccupied attachment representations, a second SEM model was run, which replaced the secure-dismissing styles exogenous variable with preoccupied styles and the secure-dismissing state of mind exogenous variable was replaced with preoccupied state of mind. Whereas this model demonstrated adequate data–model fit, $\chi^2(50) = 68.03$, $p = .04$, CFI = .97, RMSEA = .06, 90% CI = .01–.06, neither the preoccupied styles nor preoccupied state of mind variables were related to any other study variable.

Discussion

This study examined the effect of increased security in representations of attachments, mother–adolescent relationship qualities (i.e., support and negative interactions), and maternal monitoring on adolescent substance use. The study contributes to the literature by using a longitudinal design, assessing two domains of representations of

relationships (states of mind and attachment styles), assessing a community sample of adolescents, and incorporating multiple reporters. The results of the present study suggest that an attachment framework may be a promising approach for understanding the links between experiences with parents and substance use. Using SEM models we found significant relations among more secure attachment styles, mother–adolescent relationship qualities, and maternal monitoring. Moreover, we found that the effect of more secure attachment styles on substance use was mediated through maternal monitoring. We also were able to rule out the possibility that shared method variance was responsible for these associations; thus, the fact that we found more significant relations for attachment styles than states of mind cannot be attributed to the idea that the style measure was a self-report questionnaire like several other measures in the study.

Secure Attachment Styles and Mother–Adolescent Relationship Qualities

Consistent with prior work (Allen, Hauser, Bell, & O'Connor, 1994; Allen et al., 2003), more secure attachment styles were predictive of higher levels of support and predictive of low levels of negative interactions in relationships with mothers. A major task of adolescence is seeking autonomy from parents while increasing reliance on peers (e.g., Collins, 1990). Those with more secure attachment styles may learn to do this by balancing a fine line between achieving their own agenda of achieving autonomy and maintaining certain objectives within their relationships with their parents (Kobak & Duemmler, 1994). That is, these adolescents may seek autonomy, yet still be attentive to the need to maintain a stable, trusting relationship with parents. Therefore, when there is a disruption within parent–adolescent relationships, such as an episode of conflict or a breech of trust, more secure adolescents may make corrections in order to reestablish the relationship (Allen & Land, 1999). The result, therefore, may be higher levels of support and lower levels of negative interactions within the parent–adolescent relationship.

Secure Attachment Styles, Maternal Monitoring, and Adolescent Substance Use

More secure attachment styles were also related to maternal monitoring. In the present study, we specifically assessed one dimension of the multidimensional construct of parental monitoring (Cottrell et al., 2007). Specifically, we assessed the construct of maternal monitoring knowledge, from both the perspective of the adolescent and from the perspective of the mother. Stattin and Kerr (2000) proposed that monitoring knowledge is composed two important dimensions: (a) a parent's active tracking of an adolescent's activities and (b) an adolescent's willing disclosure of accurate information. Moreover, the latter dimension was found to be a stronger predictor of various indices of adjustment than the former (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Although disclosure was not directly assessed in the present study, it is likely that adolescents with more secure attachment styles regarding relationships with parents are more inclined to disclose information about their whereabouts and activities to their parents. Indeed, open communication is an important characteristic of secure attachment in parent–adolescent relationships (Kobak & Cole, 1994). It is likely that adolescents with more secure attachment styles see themselves and their parents as valuing the relationship, as trying to understand each others' point of view, as mutually contributing to the relationship, and as jointly making important decisions within the relationship (Furman & Wehner, 1994). With this view of the parent–adolescent relationship, an adolescent is not likely to see parental attempts to solicit monitoring information as a violation of autonomy; instead, they are likely to see monitoring attempts as a part of a reciprocal, trusting exchange. Together, the open communication style and the interpretation of parental monitoring behavior as part of a caring relationship that are characteristic of more secure attachment styles result in increased overall parental monitoring knowledge. Subsequent research should test these ideas by examining the links between representations and different components of parental monitoring.

Furthermore, as expected, maternal monitoring was associated with a reduction in substance use. Such a finding is consistent with prior work showing that adolescents who are not monitored well by their parents have higher rates of substance use (e.g., Flannery, Williams, & Vazsonyi, 1999; Fletcher, Darling, & Steinberg, 1995). Consistent with expectations, maternal monitoring also mediated the link between more secure attachment styles and substance use. Contrary to expectations, however, was the finding that mother–adolescent relationship qualities did not mediate this link. In fact, neither support nor negative interactions

between mother and adolescent were predictive of changes in substance use. These patterns of findings, however, are consistent with Stattin and Kerr's (2000) finding that disclosure was a stronger predictor of norm breaking than relationship qualities. Similarly, attachment styles may be a better predictor of monitoring and substance use than mother–adolescent relationship qualities because attachment styles provide a more direct index of the adolescent's overall approach to and interpretation of the relationship than the amount of support and negative interactions, which reflect overt behaviors rather than a perception of the underlying relationship as a whole.

States of Mind

More secure states of mind were modestly related to more secure attachment styles, similar to the findings of prior investigations (see Crowell et al., 1999; Furman et al., 2002). Contrary to expectations, however, more secure states of mind were not related to any of the other variables in the models. The absence of such findings are particularly surprising in light of prior work finding states of mind to be related to psychopathology (e.g., Green & Goldwyn, 2002; Ward, 2006) and interactions with mothers (Allen et al., 2003). Additionally, it has been hypothesized that states of mind may represent a more underlying or core guide for interactions with attachment figures that may be activated in times of stress or distress. Attachment styles, on the other hand, reflect an individual's ongoing self-perceptions and offer a more conscious, immediate guide for predicting and understanding the behavior of an attachment figure. In fact, a number of studies have found a relation between states of mind and internalizing disorders, such as anxiety disorders and eating disorders, and externalizing disorders, such as conduct disorder and antisocial behavior (Guttmann-Steinmetz & Crowell, 2006). Fewer studies, however, have examined how secure states of mind may be predictive of a reduction in specific problem behaviors such as substance use (see Allen et al., 1996; Caspers, Cadoret, Langbehn, Yucuis, & Troutman, 2005; Rosenstein & Horowitz, 1996, for exceptions). In fact, none have examined such questions in a community sample of adolescents.

It has been hypothesized that states of mind may represent a more underlying or core guide for interactions with attachment figures that may be activated in times of stress or distress. Attachment styles, on the other hand, reflect an individual's ongoing self-perceptions and offer a more conscious, immediate guide for predicting and understanding the behavior of an attachment figure. Adolescent substance use is likely to give rise to a number of issues that directly or indirectly affect relationships with parents; for example, adolescents and their parents would need to negotiate what activities adolescents could attend and when they would be expected to be home. Attachment styles may serve as a better, more direct, guide for managing these interactions around issues of day-to-day social activities. States of mind may become important around issues of intimacy or closeness when the attachment system is activated (Spangler & Zimmermann, 1999). For example, measures of states of mind may be more salient at times when the adolescent has to decide whether to seek out support from a parent.

Insecure Representations

The present study assessed security of attachment representations using a continuous measure that reflected the difference in the degree to which the representations were secure versus dismissing. In our discussion, we described how secure styles were related to mother–adolescent relationship qualities, maternal monitoring, and substance use. It would have been equally accurate to discuss the findings in terms of how dismissing styles were related to these characteristics. In adolescence, secure and dismissing styles are opposite ends of the same continuum. Moreover, the present study and other studies of adolescents find that the vast majority of insecure states of mind are dismissing ones with preoccupied and unresolved states being relatively uncommon (Ammaniti et al., 2000; Furman et al., 2002; Hamilton, 2000; Seiffge-Krenke, 2006). Similarly, continuous ratings of adolescents' security are strongly negatively related to ratings of deactivating (dismissing) states of mind on a hyperactivating–deactivating continuum ($r = -.78$; Allen, Porter, McFarland, McElhaney, & Marsh, 2007). Thus, it would be most accurate to describe the present findings as differences between more secure and more dismissing styles rather than differences between secure styles and all forms of insecure styles.

Results of the model with the two preoccupied exogenous predictors demonstrated that neither the preoccupied states of mind measure nor the preoccupied styles measure was related to any other study variable. It is very possible that our power to detect significant effects of either of these

preoccupied measures was limited as this and other community samples of adolescents contained a very low number of adolescents with preoccupied working models when defined in the classical categorical manner (6%). Because adolescents with greater levels of socioemotional difficulties tend to have higher levels of preoccupied attachment representations (Allen et al., 1996; Rosenstein & Horowitz, 1996), future studies could see if the present findings are replicated with a subclinical sample of adolescents with greater socioemotional difficulties.

Future Directions

The present study only examined parenting processes. As peers are the most powerful proximal influence on an adolescent's use of drugs (Dishion, Capaldi, Spracklen, & Li, 1995) future studies should examine how peer influences work in concert with parental influences to affect substance use among adolescents. Specifically, it would be of interest to examine how attachment styles and parental monitoring combine to influence the selection of friends and how the representations of peer relationships influence adolescent substance use. It seems possible that attachment styles and parental monitoring would work to reduce the selection of delinquent or drug-using peers much in the same manner as they influence the use of drugs and alcohol. Specifically, if the relationships with parents were threatened by interactions with a delinquent peer, an adolescent with a more secure style may be more likely to make the necessary changes to ensure the trust and stability of their relationship with their parents.

Similarly, future work should investigate what role states of mind play, if any, in the development of adolescent substance use. States of mind of relationships with parents are related to patterns of interactions with friends and moderate the relation between friendship quality and delinquency (McElhaney, Immele, Smith, & Allen, 2006). Thus, those with secure states of mind regarding attachments to parents may be likely to develop positive relationships with peers or may be influenced differently by their peer relations.

Although important questions remain to be examined, the present study does suggest that an attachment perspective may provide some insight into adolescent substance use. The examination of relationship quality and monitoring provides some indication of the processes by which representations of attachment with parents may influence adolescent development.

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