

Reciprocal associations between friendship attachment and relational experiences in adolescence

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Abstract

The current study examined the reciprocal associations between friendship attachment and relational experiences. Data came from a longitudinal study that assessed adolescents ($N = 223$, 108 girls) in the 6th, 8th, 10th, and 12th grades. Cross-lagged models were fitted with structural equation modeling. Results showed that attachment avoidance was consistently predictive of more friendship exclusion, and friendship exclusion was consistently predictive of more attachment anxiety. Attachment avoidance was consistently related to less friendship intimacy across adolescence. Friendship intimacy was also consistently related to lower attachment avoidance across adolescence. Attachment anxiety was consistently related to more friendship intimacy across adolescence. This study shed light on the bidirectional influences between attachment security and relational experiences in adolescent friendships.

Keywords

Adolescence, attachment, cross-lagged model, friendship, longitudinal, structural equation modeling

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According to attachment theory, individuals internalize their experiences with close others and form attachment representations of these relationships (Bowlby, 1982; Cassidy, 1994; Furman, 2001; Furman & Wehner, 1994). Whereas supportive and warm relationships give rise to secure attachment, rejecting and uncaring relationships give rise to insecure attachment. These attachment representations shape how individuals perceive and understand subsequent interpersonal experiences. Although attachment theory traditionally describes parent–child relationships, a growing body of research suggests that the intimate nature of friendships gives rise to attachment representations that resemble those observed in parent–child relationships (Chow & Tan, 2013; Doherty & Feeney, 2004; Doyle, Lawford, & Markiewicz, 2009; Fraley, Heffernan, Vicary, & Brumbaugh, 2011; Welch & Houser, 2010; Wilkinson, 2010). Attachment security in friendships is assumed to be important for psychological adjustment (Wilkinson, 2010). Furthermore, understanding the developmental process of friendship attachment provides an important stepping stone toward understanding functioning in romantic relationships (Fraley & Davis, 1997; Furman & Wehner, 1994).

Although previous studies have examined the associations between friendship experiences and attachment security during adolescence (e.g., Furman, 2001; Furman, Simon, Shaffer, & Bouchee, 2002), an important issue remains to be addressed. That is, because most existing studies in this area have been cross-sectional, little is known about the stability and change that occurs in friendship attachment over the course of adolescence. More importantly, little is known about how attachment security in friendships is reciprocally related to friendship experiences over time. To address this research gap, the current study represents the first empirical effort to examine the reciprocal links between friendship attachment security and relational experiences across the developmental period from early to late adolescence.

Friendship attachment

Adolescents form close bonds with friends that function as supportive relationships (Buhrmester, 1996; Chow, Roelse, Buhrmester, & Underwood, 2011; Furman & Buhrmester, 1985). When upset, adolescents often turn to friends for advice and comfort. Thus, it is not surprising that supportive friendships play an important role in promoting adolescents' healthy psychological and social development (Hartup, 1993). Because friendships offer a rich context in which mutual disclosure and support occur, recurrent intimate interactions with friends may foster the development of friendship attachment security (Buhrmester, 1996; Furman, 2001; Miller, Notaro, & Zimmerman, 2002). Consistently, research suggests that internal working models of attachment are represented by distinctive attachment relationships, including those with parents, friends, and romantic partners (Fraley et al., 2011; Overall, Fletcher, & Friesen, 2003; Sibley & Overall, 2008). Further, friendship attachment security uniquely predicts social and emotional outcomes above and beyond that for which parent–child and romantic attachment relationships can account (e.g., Bartholomew & Horowitz, 1991; Goh & Wilkinson, 2007; Trinke & Bartholomew, 1997). For example, compared to parent–child attachment, friendship attachment is more predictive of romantic attachment during adolescence (Furman et al., 2002). Additionally, friendship attachment security is related

to better psychological adjustment (e.g., lower distress and higher self-esteem) after controlling for parent–child and romantic attachment (Goh & Wilkinson, 2007). Given that close friendships occupy unique and vital developmental functions during adolescence, friendship attachment during adolescence deserves more research attention than has previously been received. Furthermore, based on previous research, friendship attachment should be investigated independently from parent–child and romantic attachment relationships.

Adult attachment researchers conceptualize individual differences in attachment security in terms of two relatively orthogonal dimensions, namely, attachment anxiety and attachment avoidance (e.g., Brennan, Clark, & Shaver, 1998; Fraley et al., 2011; Fraley & Shaver, 2000). First, the attachment anxiety component reflects an appraisal-monitoring system that determines the extent to which individuals are vigilant about their partners and relationships (Fraley et al., 2011). This component regulates individuals' tendencies to monitor aspects of a relationship, such as the attachment figure's availability and cues of rejection. Therefore, adolescents high in friendship attachment anxiety tend to worry about being abandoned or rejected by their friends and are hypersensitive to interpersonal cues regarding friends' availability and potential signs of rejection (Furman, 2001). Second, the attachment avoidance component governs the extent to which individuals choose to draw nearer to or withdraw from their attachment partner (Fraley et al., 2011). This component influences individuals' tendencies to seek intimacy and closeness from their partners, especially in times of stress. Therefore, adolescents high in friendship attachment avoidance are less likely to seek support or intimacy from friends and place greater emphasis on independence and interpersonal distance (Furman, 2001).

Friendship experiences

According to theory and research, adolescent friendships are built upon co-participation in activities, mutual disclosure, and support (Buhrmester, 1996; Buhrmester & Furman, 1986, 1987; Sullivan, 1953). Indeed, research indicates that exclusion from activities by friends during adolescence as well as mutual disclosure and support (i.e., intimacy) in friendships are related to emotional outcomes and psychological well-being (Almquist, Östberg, Rostila, Edling, & Rydgren, 2014; Kenny, Dooley, & Fitzgerald, 2013). Thus, we focused on examining exclusion and intimacy in adolescent friendships. First, *friendship exclusion* was defined as adolescents' perceptions of being left out or excluded by a close friend from activities. For the purposes of this study, perceptions of friendship exclusion were examined in the context of a dyadic friendship, which can differ from peer rejection that occurs at the peer group level. Indeed, research indicates that group-level peer relationships and dyadic-level friendships play unique roles in predicting adolescent adjustment (Laird, Pettit, Dodge, & Bates, 1999). Second, *friendship intimacy* was defined as an adolescent's engagement in intimate behavioral exchanges of feelings and thoughts with a close friend. This definition is consistent with existing research conceptualizing intimacy as an interpersonal process that involves mutual disclosure and support (Reis & Shaver, 1988). Because friendship exclusion and intimacy are especially salient during adolescence, these experiences may function as indicators, as well as outcomes, of friendship attachment security.

Friendship attachment and relational experiences

Attachment theory is founded on the tenets that attachment security is based on past relational experiences and remains relatively stable across the life span (Bowlby, 1982; Cassidy, 1994). Stability of attachment security is maintained through tendencies to elicit feedback in interpersonal interactions that confirm internal working models (Collins & Read, 1994; Scharfe & Batholomew, 1994). Although attachment security is assumed to be quite stable over time, interpersonal experiences that are not congruent with existing internal working models may lead to changes in attachment security (Kobak & Hazan, 1991; Scharfe & Batholomew, 1994). Indeed, a review of the literature suggests that attachment security is only moderately stable (Beijersbergen, Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2012; Choi, Hutchison, Lemberger, & Pope, 2012; Doyle et al., 2009). According to attachment theory and research, changes in attachment security may be partly explained by changes in relational experiences (Feeney, 1999; Mikulincer & Shaver, 2010; Ruhl, Dolan, & Buhrmester, 2014). Surprisingly, although numerous studies have examined the associations between attachment security and relational experiences (see Mikulincer & Shaver, 2010 for a review), one important question remains: does attachment security determine subsequent relational experiences or vice versa? Thus, more research is needed to examine how attachment security and relational experiences are reciprocally related over time.

Adolescents experience many changes in their interpersonal relationships, especially with the rising importance of close friendships during this developmental period (Allen & Land, 1999; Buhrmester, 1996; Buhrmester & Furman, 1986; Welch & Houser, 2010). Additionally, adolescent friendships are subject to instability due to biological and cognitive developments that are occurring at this time (Collins & Repinski, 1994; Shulman & Collins, 1995). Thus, some researchers have argued that both friendship attachment and experiences may change considerably over the course of adolescence (Allen & Land, 1999; Chow et al., 2011; Davila, Burge, & Hammen, 1997; Furman & Simon, 1998; Miller et al., 2002). However, only one known study has explicitly examined stability in friendship attachment over a meaningful length of time during adolescence (Miller et al., 2002). Using a categorical measure of attachment, this study found that approximately one-third of adolescents reclassified their friendship attachment styles over a 2-year period. Given the changes that occur in friendships during adolescence, it is reasonable to argue that adolescents may experience changes in their friendship attachment security due to their friendship experiences. It is equally possible, however, that adolescents' changing friendship experiences are attributable to their friendship attachment. Thus, examining the reciprocal associations between adolescent friendship attachment and relational experiences over time is important for determining which of these developmental constructs precede the others.

Influence of attachment on friendship experiences

A large body of research has investigated the associations between parental attachment security and friendship experiences during adolescence and emerging adulthood (Boling, Barry, Kotchick, & Lowry, 2011; Boman, Krohn, Gibson, & Stogner, 2012; Carr, 2009;

Grabill & Kerns, 2000; Weimer, Kerns, & Oldenburg, 2004). However, little research has directly investigated the associations between friendship attachment security and experiences, especially with the use of longitudinal methods (Furman, 2001; Furman et al., 2002). Thus, little is currently known about the role of friendship attachment in adolescents' subsequent relational experiences with close friends. Nevertheless, research on romantic relationships provides an important departure point for formulating hypotheses regarding the influence of friendship attachment on subsequent friendship experiences.

Research on romantic relationships suggests that anxiously attached individuals have intense fears of being abandoned by their romantic partner and a tendency to believe that their partner is deliberately unresponsive to their needs (Collins, 1996; Collins & Read, 1990; Hazan & Shaver, 1987). Ironically, anxiously attached individuals' intense desires for intimacy and proximity may eventually cause their partners to withdraw or flee, fulfilling their expectations for rejection or abandonment (Downey, Freitas, Michaelis, & Khouri, 2004). Based on research on romantic relationships, it is plausible that adolescents high in friendship attachment anxiety will have intense fears of rejection from close friends, unmet desires for closeness, and difficulties in regulating interpersonal closeness. These characteristics may lead them to perceive more exclusion and less intimacy in their friendships.

With regard to attachment avoidance, research on romantic relationships has found that individuals who are high in attachment avoidance feel uneasy with intimate relationships and place emphasis on independence and interpersonal distance, which leads to perceptions of less intimacy in the relationship (Cozzarelli, Hoekstra, & Bylsma, 2000; Feeney & Noller, 1991; Fraley & Shaver, 2000; Hazan & Shaver, 1987; Levy & Davis, 1988; Shaver & Brennan, 1992). Congruently, research on friendship suggests that adolescents high in attachment avoidance with friends describe their friendship experiences as less warm and supportive and feel less intimate with their best friends (Bauminger, Finzi-Dottan, Chason, & Har-Even, 2008; Furman, 2001). Furthermore, adolescents who are high in attachment avoidance often appear aloof and even hostile, which may push away peers who have the potential of becoming close friends (Kobak & Sceery, 1988). Therefore, it is plausible that greater attachment avoidance in adolescence will lead to perceptions of more exclusion and less intimacy in friendships.

Influence of friendship experiences on attachment

Because experiences of exclusion and intimacy are central features of adolescent friendships (Furman & Buhrmester, 1985), it is possible that these relational experiences will impact adolescents' friendship attachment security. This assertion is consistent with attachment theory, which suggests that relational experiences play an important role in impacting attachment security (Bowlby, 1982; Cassidy, 1994). Regardless, research has yet to directly examine the effects of early friendship experiences on subsequent attachment security. One study, however, provides tentative support for the notion that friendship experiences may predict subsequent attachment security. Specifically, a longitudinal study found that adolescents who experienced greater peer rejection (as

assessed by sociometric nominations) also scored higher in their subsequent rejection sensitivity, or expectations of rejection (London, Downey, Bonica, & Paltin, 2007). However, because the sociometric nominations approach focuses on the peer group dynamic, it offers limited insight into the link between dyadic friendship experiences and attachment. Furthermore, the measure of rejection sensitivity is only a proxy for anxious attachment and is conceptually quite different from attachment anxiety (London et al., 2007). It is also important to note that friendship intimacy was not considered in this study. However, based on this research and attachment theory, it is possible that friendship exclusion will predict more attachment anxiety and avoidance over time, whereas friendship intimacy will predict less attachment anxiety and avoidance over time (Cassidy, 1994).

The current study

This study examined the reciprocal associations between adolescent friendship experiences (i.e., exclusion and intimacy) and attachment security (i.e., anxiety and avoidance). In general, we hypothesized that more friendship exclusion would be related to higher attachment avoidance and anxiety reciprocally over time (*Hypothesis 1*) and more friendship intimacy would be related to lower attachment avoidance and anxiety reciprocally over time (*Hypothesis 2*). Furthermore, because co-participation in activities (i.e., inclusion) is central to friendships early in adolescence and intimate exchanges of disclosure and support (i.e., intimacy) gradually emerge as the prominent characteristics of friendships in middle adolescence and beyond, we argued that friendships would play different roles in friendship attachment at different developmental time points (Buhrmester & Furman, 1986). Specifically, we hypothesized that friendship exclusion would have a large impact on subsequent attachment anxiety and avoidance during early adolescence, whereas friendship intimacy would emerge as the prominent factor that predicts subsequent attachment anxiety and avoidance later in adolescence (*Hypothesis 3*).

Data were from a sample of adolescents whose friendship experiences and attachment security were assessed in Grades 6, 8, 10, and 12. In order to examine the longitudinal and reciprocal relationships among the studied variables, two trivariate cross-lagged panel models were fitted to the data (Gollob & Reichardt, 1987). This approach is useful for examining the reciprocal associations between friendship attachment and experiences over time while controlling for stability (autoregressive effects) and all within-time associations between the constructs.

Method

Participants and procedure

The data were drawn from a seven-year longitudinal study that assessed adolescents in Grades 6, 8, 10 and 12. Recruitment letters were sent home with sixth-grade students from 10 public schools in North Texas, USA. Participating families were visited in their homes for each wave of assessment by trained research

Table 1. Examining differences in key study variables based on participant attrition.

	Missing data at 1 or more time points		No missing data		<i>t</i>	<i>p</i>
	Mean	<i>SD</i>	Mean	<i>SD</i>		
Exclusion 6	1.78	.58	1.89	.69	1.16	.25
Exclusion 8	1.78	.58	1.64	.52	1.72	.09
Exclusion 10	1.74	.57	1.74	.58	.02	.98
Exclusion 12	1.69	.73	1.76	.63	.40	.69
Intimacy 6	3.39	1.08	3.34	1.14	.35	.72
Intimacy 8	3.54	1.03	3.58	1.05	.29	.77
Intimacy 10	3.89	.95	3.74	1.12	.84	.40
Intimacy 12	4.21	.94	3.72	1.17	1.53	.13
Attachment anxiety 6	1.62	.60	1.72	.67	1.06	.29
Attachment anxiety 8	1.62	.69	1.65	.67	.28	.78
Attachment anxiety 10	1.59	.74	1.59	.57	.05	.96
Attachment anxiety 12	1.43	.51	1.53	.59	.62	.54
Attachment avoidance 6	1.88	.59	1.93	.57	.63	.53
Attachment avoidance 8	1.85	.59	1.86	.62	.13	.90
Attachment avoidance 10	1.86	.64	1.86	.67	.05	.96
Attachment avoidance 12	1.58	.43	1.79	.59	1.31	.19

assistants. After families provided informed consent, parents and the target adolescent were separated into different rooms of the home to ensure confidentiality. Participants completed a battery of questionnaires at each wave and then sealed the completed surveys in envelopes to guarantee that other participants could not see their responses. Families received US\$40 for participating in the study at each wave.

At the sixth-grade wave of the study, 115 boys and 108 girls participated. At the subsequent waves, data were available for 185 adolescents (90 girls) in 8th grade, 153 (74 girls) in 10th grade, and 110 (53 girls) in 12th grade. A total of 96 adolescents provided data at all waves of the study, whereas 127 adolescents missed at least one wave of data. Only 28 adolescents dropped out of the study after the first wave. The mean ages of participants were 11.90 years ($SD = .43$) at Grade 6, 14.20 years ($SD = .43$) at Grade 8, 16.17 years ($SD = .44$) at Grade 10, and 17.84 years ($SD = .46$) at Grade 12. At the initial wave, most adolescents were Caucasian (88.9%; 3.9% African American, 2.6% Hispanic, and 4.6% other), lived with both biological parents (81%; 6.6% single parent, and 11% biological and step-parent), and were from middle- to upper middle-class families (88.3%). In order to detect potential bias due to attrition, adolescents who participated in all waves of data collection ($N = 96$) and those who missed at least one wave ($N = 127$) were compared with a series of independent samples *t*-tests, with friendship attachment and relationship experiences as the dependent variables (Miller & Wright, 1995). Results showed that the two groups did not significantly differ in any friendship attachment or relationship experience variables, suggesting that missing data were nonsystematic (see Table 1).

Measures

Attachment anxiety and avoidance. Adolescent friendship attachment was assessed with items from a modified version of Collins and Read's (1990) Adult Attachment Scale (AAS). All items are presented in Appendix 1. Adolescents were asked to respond to each item in terms of their general orientation toward friendships. The version used for this study consisted of three subscales (closeness, dependence, and anxiety) that are used to measure attachment anxiety and avoidance (Collins, 1996; Collins & Feeney, 2004). Together, the closeness and dependence subscales (5 items each) reflect the degree to which adolescents are comfortable with intimacy and with depending on others. Consistent with previous research, the measure of attachment avoidance was formed by reversing and averaging items from the closeness and dependence subscales (Collins & Feeney, 2004). For example, 1 item for attachment avoidance was, "I find it difficult to allow myself to depend on my friends." The anxiety subscale (5 items) measures the extent to which adolescents are anxious about their close friendships, such as their fear of being abandoned or not being loved. For example, 1 item for attachment anxiety was, "I worry that my friends do not really care for me." Because 1 item for attachment anxiety contributed to low reliability, it was dropped from the final subscale. Adolescents provided ratings on 5-point scales ranging from 1 (*False*) to 5 (*Very true*) to express the extent to which each item described them. Cronbach's α s for the attachment avoidance and anxiety subscales were satisfactory (Table 2).

Friendship intimacy and exclusion. Adolescents' experiences of friendship intimacy and exclusion were assessed with items from Furman and Buhrmester's (1985) Network of Relationships Inventory. Adolescents were instructed to answer the questionnaire based on their experiences with their closest same-sex friend at the time of the survey. The original measure includes 10 subscales that assess different features of adolescents' friendships. For this study, only some subscales were utilized. Adolescents' friendship intimacy was measured by 6 items that reflect adolescents' perceptions of closeness and intimacy with their best friend. For example, one friendship intimacy item was, "How often do you tell your friend everything that you are going through?" Adolescents rated these items on a 5-point scale ranging from 1 (*Never or hardly at all*) to 5 (*Always or extremely much*). A composite score for friendship intimacy was computed by averaging the corresponding items.

Adolescents' friendship exclusion was measured with 3 items that reflect adolescents' perceptions of being excluded by their closest friend and 3 items that capture companionship (reverse coded). Together, these two subscales reflect the degree to which an adolescent is involved (or not involved) in their closest friend's activities. One example item for exclusion was, "How often does your friend not include you in activities?" One example item for companionship was, "How often do you spend fun time with your friend?" Adolescents rated these items on a 5-point scale ranging from 1 (*Never or hardly at all*) to 5 (*Always or extremely much*). A composite score for friendship exclusion was computed by averaging the corresponding items. Cronbach's α s for friendship intimacy and exclusion were satisfactory (Table 2).

Table 2. Means, standard deviations, and correlations for studied variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Anx 6	—															
2. Anx 8	.50*	—														
3. Anx 10	.41*	.44*	—													
4. Anx 12	.32*	.38*	.55*	—												
5. Avo 6	.58*	.36*	.40*	.25*	—											
6. Avo 8	.37*	.63*	.38*	.19*	.49*	—										
7. Avo 10	.33*	.35*	.72*	.47*	.49*	.50*	—									
8. Avo 12	.25*	.41*	.55*	.65*	.31*	.35*	.60*	—								
9. Exc 6	.37*	.20*	.30*	.29*	.43*	.17*	.30*	.26*	—							
10. Exc 8	.27*	.41*	.28*	.28*	.40*	.39*	.32*	.26*	.31*	—						
11. Exc 10	.08	.21*	.36*	.25*	.27*	.39*	.39*	.27*	.29*	.30*	—					
12. Exc 12	.15	.15	.28*	.32*	.32*	.22*	.33*	.38*	.23*	.29*	.36*	—				
13. Int 6	-.11	-.08	-.22*	-.06	-.42*	-.28*	-.35*	-.23*	-.39*	-.24*	-.27*	-.13	—			
14. Int 8	-.06	-.16*	-.17*	-.07	-.41*	-.47*	-.37*	-.20*	-.16*	-.44*	-.23*	-.13	.60*	—		
15. Int 10	-.12	-.14	-.30*	-.17	-.48*	-.41*	-.44*	-.39*	-.21*	-.30*	-.49*	-.30*	.57*	.65*	—	
16. Int 12	-.11	-.14	-.30*	-.18	-.37*	-.30*	-.47*	-.46*	-.10	-.13	-.31*	-.56*	.35*	.37*	.60*	—
M	2.63	2.43	2.56	2.61	3.31	2.13	2.87	3.06	2.91	3.13	3.07	2.78	3.06	3.46	3.63	3.35
SD	.63	.67	.62	.59	.58	.59	.65	.58	.63	.55	.57	.64	1.1	1.02	1.04	1.13
Alpha	.65	.75	.77	.72	.76	.80	.85	.78	.82	.74	.75	.79	.91	.90	.95	.95

Note. Anx: attachment anxiety, Avo: attachment avoidance, Exc: friendship exclusion, Int: friendship intimacy. Estimates were computed based on $N = 223$ with Full Information Maximum Likelihood. Flagged coefficients are significant at $p < .05$.

Plan of analysis

Two separate trivariate cross-lagged models were specified for friendship exclusion and attachment security, and for friendship intimacy and attachment security. Figure 1 depicts an example of a generic trivariate cross-lagged model which estimates (1) the autoregressive effects for each construct (*a* paths), (2) the second-order autoregressive effects (*b* paths), and (3) the cross-lagged effects from friendship experience to attachment security and vice versa (*c* paths). Although not shown in Figure 1, the within-wave correlations among the variables were also estimated.

In order to obtain the most parsimonious model, a series of models were successively analyzed in which different parameters were constrained to be equivalent across intervals. Specifically, the model specifications for each set of variables (e.g., friendship exclusion, attachment anxiety, attachment avoidance) took the following steps. First, an unconstrained model was specified in which all parameters were allowed to vary freely (Model 1). Second, the unconstrained model was compared to a model (see Figure 1) in which all autoregressive effects (*a* paths) and secondary autoregressive effects (*b* paths) were constrained to be equal across intervals (Model 2). For instance, the path of attachment avoidance from time 1 to time 2 was constrained to be equal to the path of attachment avoidance from time 3 to time 4 (*a* paths). In addition, the path of attachment avoidance from time 1 to time 3 was constrained to be equal to the path of attachment avoidance from time 2 to time 4 (*b* paths). A significant decrease in model fit when these constraints were imposed (reflected by a significant change in the chi-square as compared to that of the unconstrained model) would indicate developmental differences in the stability of friendship attachment and experiences. Third, the cross-lagged effects from attachment to friendship experiences (paths *c1* and *c2*) were constrained to be equal across intervals (Model 3). For instance, the path of attachment avoidance at time 1 to intimacy at time 2 was constrained to be equal to the path of attachment avoidance at time 2 to intimacy at time 3. Significant change in model fit when these constraints were imposed would indicate developmental differences in the effects of friendship attachment on relationship experiences. Finally, the cross-lagged effects from friendship experiences to attachment (paths *c3* and *c4*) were constrained to be equal across intervals (Model 4). For instance, the path of friendship intimacy at time 1 to attachment avoidance at time 2 was constrained to be equal to the path of friendship intimacy at time 2 to attachment avoidance at time 3. Significant change in model fit when these constraints were imposed would indicate developmental differences in the effects of relationship experiences on attachment. Evaluation of model fit was based on fit indices including the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square error of approximation (RMSEA), with CFIs and TLIs greater than .95 and RMSEAs less than .05 indicating acceptable fit (Hu & Bentler, 1998). When two competing models showed a nonsignificant difference in fit, the more parsimonious model (with more degrees of freedom) was considered the preferred model.

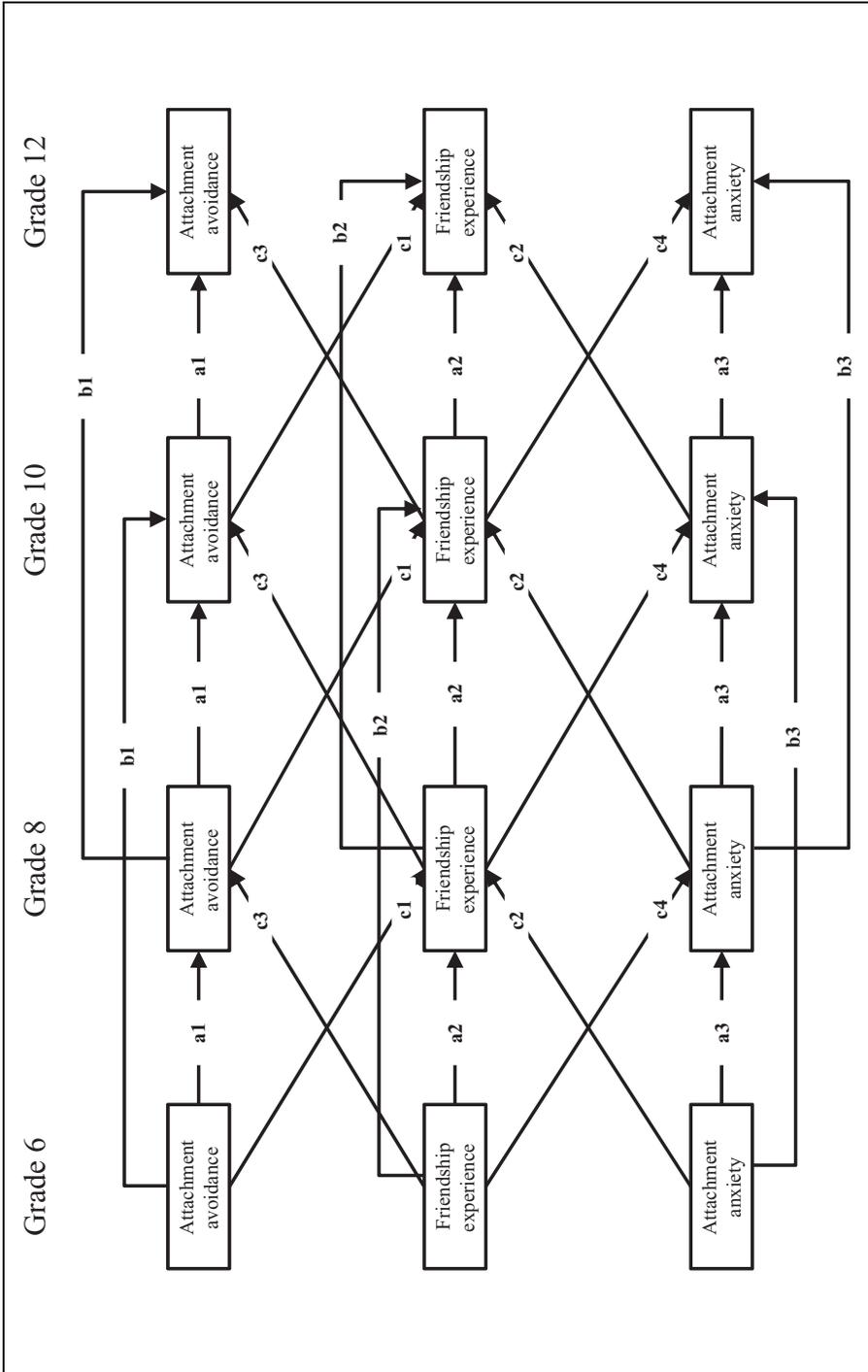


Figure 1. Theoretical example of a trivariate cross-lagged model. Within-wave correlations are allowed to covary but are not shown in this figure.

Results

Preliminary analyses

Table 2 displays the means and standard deviations of the measured variables for Grades 6, 8, 10, and 12. These estimates were based on the original sample size ($N = 223$) and missing data were addressed using Full Information Maximum Likelihood (FIML) procedures implemented by AMOS 17.0 (Arbuckle, 2008). FIML procedures were also used for all cross-lagged models. This method is a more adequate way of handling missing data than conventional listwise deletions, pairwise deletions, or mean substitutions because it allows for the inclusion of all available data points and retains all participants for the analyses (Schafer & Graham, 2002; Schlomer, Bauman, & Card, 2010). In order to ensure that the results using FIML were reliable, a correlation matrix generated by the maximum likelihood procedure was compared with a correlation matrix using multiple imputed data sets with complete cases ($m = 100$ data sets). Results demonstrated that the estimates generated by the different procedures were very similar; the correlation between the two correlation matrices was extremely high ($r = .95, p < .001$). With regard to bivariate associations among attachment and relationship experience variables, the pattern of results was as expected (see Table 2). As expected, attachment anxiety and avoidance were moderately stable over time. Furthermore, attachment avoidance was concurrently related to higher friendship exclusion and lower friendship intimacy at each time point. Although not all correlations were significant at each time point, attachment anxiety was related to higher friendship exclusion and lower friendship intimacy.

Attachment security and friendship exclusion

A series of trivariate cross-lagged models were fitted to examine the reciprocal associations between attachment security (i.e., attachment avoidance and attachment anxiety) and friendship exclusion (Table 3). Results showed that constraining the autoregressive effects (a and b paths) and cross-lagged effects (c paths) to be equivalent across intervals did not significantly reduce the model fit. These findings suggest that there were no significant developmental differences in the stability of attachment or exclusion, or in the cross-lagged paths. Therefore, results are based on the most parsimonious model with the most degrees of freedom (Model 4). Path coefficients for the final exclusion model are presented in Table 4. This model was an excellent fit to the data based on the fit indices. Autoregressive effects showed that attachment avoidance and anxiety and friendship exclusion were moderately stable over time. Consistent with the hypothesis, cross-lagged effects showed that higher attachment avoidance was associated with more perceptions of exclusion at the subsequent time point. In contrast, attachment anxiety was not significantly associated with subsequent perceptions of exclusion. When predicting attachment security, cross-lagged effects showed that friendship exclusion was predictive of higher subsequent attachment anxiety but not attachment avoidance.

Table 3. Model comparisons fitted to cross-lagged models of friendship exclusion, intimacy and attachment.

	Friendship Exclusion							
	χ^2	df	$\Delta\chi^2$	Δdf	Comparison	CFI	RMSEA	TLI
Unconstrained model (Model 1)	44.21**	27				.98	.05	.93
Autoregressive effects equivalent across lags (Model 2)	53.13*	36	8.92	9	M2 vs. M1	.98	.05	.95
ATT → EXC equivalent across lags (Model 3)	54.11	40	.98	4	M3 vs. M2	.98	.04	.96
EXC → ATT equivalent across lags (Model 4)	57.18	44	3.07	4	M4 vs. M3	.98	.04	.97

	Friendship Intimacy							
	χ^2	df	$\Delta\chi^2$	Δdf	Comparison	CFI	RMSEA	TLI
Unconstrained model (Model 1)	53.19**	27				.97	.07	.91
Autoregressive effects equivalent across lags (Model 2)	64.83**	36	11.64	9	M2 vs. M1	.97	.06	.93
ATT → INT equivalent across lags (Model 3)	68.17**	40	3.34	4	M3 vs. M2	.97	.06	.94
INT → ATT equivalent across lags (Model 4)	68.86**	44	.69	4	M4 vs. M3	.97	.05	.95

Note. EXC: friendship exclusion; INT: friendship intimacy; ATT: attachment security (avoidance and anxiety). * $p < .05$; ** $p < .01$.

Attachment security and friendship intimacy

A series of trivariate cross-lagged models were fitted to examine the reciprocal associations between attachment security (i.e., attachment avoidance and attachment anxiety) and friendship intimacy (Table 3). Results showed that constraining the autoregressive effects (a and b paths) and cross-lagged effects (c paths) to be equivalent across intervals did not significantly reduce the model fit. These findings suggest that there were no significant developmental differences in the stability of attachment or intimacy, or in the cross-lagged paths. Therefore, results are based on the most parsimonious model with the most degrees of freedom (Model 4). Path coefficients for the final intimacy model are presented in Table 4. This model was an excellent fit to the data based on the fit indices. Autoregressive effects showed that attachment avoidance and anxiety and friendship intimacy were moderately stable over time. Consistent with the hypothesis, cross-lagged effects showed that higher attachment avoidance was associated with lower perceptions of intimacy at the subsequent time point. Although it was hypothesized that more attachment anxiety would predict lower subsequent intimacy, cross-lagged effects showed that attachment anxiety was significantly associated with higher perceptions of intimacy at the subsequent time point. When predicting

Table 4. Path coefficients for the final cross-lagged models examining friendship exclusion, intimacy, and attachment.

	Exclusion	Intimacy
Autoregressive effects (<i>a</i> paths)		
Avoidance → Avoidance	.38 (.04)**	.34 (.04)**
Anxiety → Anxiety	.33 (.04)**	.34 (.04)**
Experience → Experience	.20 (.05)**	.46 (.04)**
Second-order autoregressive effects (<i>b</i> paths)		
Avoidance → Avoidance	.22 (.05)**	.17 (.05)**
Anxiety → Anxiety	.15 (.05)**	.13 (.05)*
Experience → Experience	.14 (.06)*	.17 (.05)**
Cross-lagged effects (<i>c</i> paths)		
Avoidance → Experience	.27 (.05)**	-.45 (.09)**
Anxiety → Experience	-.05 (.05)	.24 (.07)**
Experience → Avoidance	.05 (.04)	-.08 (.03)**
Experience → Anxiety	.10 (.05)*	-.04 (.02)
Average Multiple R^2		
Avoidance	.22	.30
Anxiety	.16	.23
Experience	.25	.32

Note. Because the parameters were constrained to be equivalent across intervals, only one set of parameters are reported. For instance, the autoregressive effect of avoidance from Time 1 to Time 2 was equal to the autoregressive effect of avoidance from Time 2 to Time 3. Coefficients are unstandardized with standard errors in the parentheses. Average multiple R^2 was computed by averaging multiple R^2 's of Time 2, Time 3, and Time 4.

* $p < .05$; ** $p < .01$.

attachment security, cross-lagged effects showed that friendship intimacy was predictive of lower attachment avoidance but not attachment anxiety.

Discussion

This study utilized longitudinal data to examine the associations between friendship attachment security and perceptions of friendship experiences. Trivariate cross-lagged panel models shed light on the reciprocal interplays between these constructs throughout adolescence. This study also examined the possibility that associations between friendship experiences and friendship attachment security might vary across developmental stages. This study is the first to examine the development of friendship attachment security over the course of adolescence, contributing to a better understanding of stability and change in these constructs.

Based on the autoregressive effects of friendship attachment over time, it appears that there is moderate stability in attachment with friends during adolescence. However, these findings suggest that there is much room for change in friendship attachment during this time. Further, the overall study findings indicate that changes in friendship attachment are, in part, due to relationship experiences with friends. For instance, the findings for exclusion indicate that attachment avoidance predicts more friendship

exclusion, which predicts more attachment anxiety, in turn. Together, these findings raise important questions for future research. For instance, is it possible that attachment insecurity feeds on itself over time? Although some research indicates that attachment security increases over time during adolescence, it is possible that individuals with high levels of attachment insecurity may become even more insecure due to the negative social outcomes associated with insecurity (Allen, McElhaney, Kuperminc, & Jodl, 2004; Ruhl et al., 2014). Thus, future research should examine the extent to which attachment security with friends determines the stability of attachment with friends across adolescence.

Attachment security and friendship exclusion

According to Fraley and Shaver (2000), attachment security determines the extent to which individuals withdraw from their attachment figures. Consistent with this perspective and *Hypothesis 1*, adolescents who were high in attachment avoidance perceived more subsequent exclusion from their friends. It is important to note that although self-report assessments are the most direct and convenient way to assess attachment avoidance and friendship exclusion, such an approach made the interpretation of this finding somewhat ambiguous. Specifically, it is unclear whether self-reports of friendship exclusion truly reflect adolescents' experiences of exclusion from friends or whether they are simply a "by-product" of attachment avoidance (raters' biases). Based on this rationale, there are two primary explanations for the cross-lagged effects from attachment avoidance to friendship exclusion. First, avoidant adolescents' tendencies to distance themselves from others may lead friends to perceive that these adolescents are cold and unwelcoming, which may lead to exclusion from activities by friends. Second, because individuals tend to avoid seeing themselves negatively (i.e., self-serving bias), it is possible that avoidant adolescents believe their friends are engaging in exclusion in order to avoid uncomfortable thoughts that they may be responsible for their own feelings of loneliness and ostracism (D'Armentano & Van der Linden, 2008). This self-serving bias may be psychologically protective against harsh feelings toward oneself as distancing, unfriendly, or unlikable (Campbell & Sedikides, 1999). Because it is unclear whether the perception of friendship exclusion reflects actual experience or biases that avoidant adolescents hold, future studies should utilize a wider range of assessments such as sociometric measures or observations of interactions between friend dyads. Although attachment avoidance was predictive of subsequent friendship exclusion, *Hypothesis 1* was not fully supported. Specifically, exclusion was not predictive of attachment avoidance. When adolescents are excluded from activities by friends, there may not be a need to distance themselves further from friends, as this interpersonal distance is already occurring. Future research should examine adolescents' reactions toward social exclusion and the role of attachment security in impacting these behavioral reactions.

It was hypothesized that attachment anxiety would be related to more subsequent friendship exclusion (*Hypothesis 1*). However, results indicated that attachment anxiety did not significantly predict later perceptions of exclusion. As mentioned earlier, adolescents with anxious attachment are characterized by their intense desires to be involved

and affiliated with their friends (Furman et al., 2002). On one hand, such desires may elicit more affiliative behaviors from friends. On the other hand, their desire to be affiliated with friends could be too intense to bear, driving their friends to withdraw from the relationship. This paradoxical nature of anxious attachment may explain the apparent null relationship between attachment anxiety and subsequent friendship exclusion.

Although attachment anxiety did not predict subsequent perceptions of exclusion, results support *Hypothesis 1* that adolescents who perceive greater friendship exclusion subsequently report more anxious attachment with friends. This finding is consistent with a previous study on peer rejection and rejection sensitivity (London et al., 2007). Because attachment theory posits that relationship experiences are directly related to attachment outcomes, it is not surprising that perceptions of exclusion from friends lead to fears of rejection and desires for more closeness from friends (Bowlby, 1982). Although it was hypothesized that friendship exclusion would have stronger effects on early adolescent attachment security than later attachment security (*Hypothesis 3*), the results revealed no developmental differences in the relationship between exclusion and subsequent attachment anxiety. Rather, the results indicate that being excluded by friends has a consistent effect on the emergence of attachment anxiety over the course of adolescence. These findings echo an empirical study suggesting that companionship (e.g., inclusion in shared activities) is central to friendships during adolescence, and even young adulthood, until a stable romantic relationship is established (Carbery & Buhrmester, 1998). Due to the enduring importance of inclusion over the course of adolescence, it is not surprising that the current study failed to detect temporal differences in the association between friendship exclusion and anxious attachment. Nevertheless, future research should consider examining a wider age range to further investigate developmental differences in the association between friendship exclusion and anxious attachment in late adolescence and young adulthood.

Attachment security and friendship intimacy

Consistent with previous studies on romantic relationships and friendships (e.g., Bauminger et al., 2008) and *Hypothesis 2*, findings from this study suggest that avoidant attachment is consistently related to less subsequent friendship intimacy. In other words, adolescents who are higher in attachment avoidance perceive that their friendships are less supportive and intimate over time. Because attachment theory suggests that individuals high in attachment avoidance tend to devalue interpersonal closeness and emphasize independence, it is not surprising that avoidant attachment with friends is related to lower subsequent intimacy with friends (Bartholomew, 1990; Cassidy, 2001). An interesting question that follows, however, is the extent to which lower perceptions of friendship intimacy negatively impact individuals high in attachment avoidance. Although less friendship support and disclosure are likely brought about by desires for independence and distance from individuals high in attachment avoidance, it is possible that these individuals may still suffer from a lack of positive interactions with friends during

adolescence. Thus, future research should examine how friendship intimacy and attachment security interact to determine psychological and social outcomes for individuals during adolescence.

Findings from this study also support *Hypothesis 2* that friendship intimacy would predict less subsequent attachment avoidance. This study is the first to find that friendship intimacy is related to subsequent attachment avoidance with friends during adolescence. Because positive interactions between friends, such as support and disclosure, are related to psychological well-being, it follows that intimacy in friendships would be related to more attachment security with friends (Almquist et al., 2014). When friendships are characterized by healthy interactions among dyads, adolescents may feel more trusting and more willing to seek out comfort and closeness from friends. Although it was hypothesized that friendship intimacy would have stronger effects on early adolescent attachment security than later attachment security (*Hypothesis 3*), the results revealed no developmental differences in the relationship between intimacy and subsequent attachment avoidance. Rather, the results indicate that perceived support and disclosure from friends consistently predict less attachment avoidance over the course of adolescence. Because intimacy begins to play an important role in same-sex friendships during preadolescence (9–12 years), it is possible that this study did not include a wide enough age range to detect temporal differences in the effects of intimacy on friendship attachment (Buhrmester & Furman, 1986). Thus, future research should examine the possibility that the role of intimate friend behaviors in friendship attachment changes from childhood to adolescence.

Although it was hypothesized that attachment anxiety would be predictive of less friendship intimacy in adolescence (*Hypothesis 2*), the opposite was found to be true in this study. Specifically, more attachment anxiety with friends was related to more subsequent friendship intimacy. It is possible that needs for closeness derived from attachment anxiety prompt adolescents to seek out, and find, more friendship intimacy. Interestingly, the bivariate correlations shown in Table 2 indicate that attachment anxiety is, in general, related to less friendship intimacy during adolescence. This is not the first study to note inconsistencies in the effects of attachment anxiety on relational outcomes during adolescence and young adulthood (Joel, MacDonald, & Shimotomai, 2011; Chow & Tan, 2013). Consistent with research on infant attachment, individuals high in attachment anxiety often show ambivalence toward attachment figures when they do not receive their desired levels of closeness and comfort (Cassidy, 1994). These individuals may have difficulty regulating their attempts at closeness, sometimes seeking out excessive proximity to attachment figures and other times appearing distant when their needs for closeness are not met. Because the distancing aspect of anxious attachment is likely related to the distancing component of avoidant attachment, controlling for avoidant attachment in the cross-lagged models would partial out the withdrawal component of anxious attachment. Therefore, it is not surprising that attachment anxiety was found related to higher friendship intimacy when attachment avoidance was considered simultaneously.

It was hypothesized that friendship intimacy would be predictive of less subsequent attachment anxiety (*Hypothesis 2*). However, results indicated that friendship

intimacy did not significantly predict later attachment anxiety. One possible explanation is that friendship intimacy in this study was defined by behavioral exchanges between adolescents, rather than subjective feelings of emotional closeness and intimacy. Because attachment avoidance is linked to behavioral closeness (e.g., self-disclosure), whereas attachment anxiety is linked to emotional closeness in close relationships (Fraley & Shaver, 2000), it is possible that *feelings* of intimacy, as opposed to *behavioral* intimacy, are more powerful in reducing adolescents' attachment anxiety. Consistent with this theory, the current findings demonstrate that behavioral intimacy in friendships is predictive of lower attachment avoidance.

Limitations and future directions

Although this study provides insight into the reciprocal relationships between friendship attachment security and friendship experiences, nonexperimental data do not allow for strong causal inferences. For instance, although the findings suggest that friendship exclusion functions as a "predictor" of anxious attachment, other unmeasured variables might play a role in mediating this link, such as low self-esteem. Previous studies have demonstrated that exclusion and ostracism from friends is closely linked to reduced self-esteem; other studies have shown that self-esteem is related to attachment anxiety (Mannarini & Boffo, 2014; Nezlek, Wesselmann, Wheeler, & Williams, 2012; Stanley & Arora, 1998). Thus, it is possible that the relationship between exclusion and attachment anxiety is explained by adolescents' feelings of self-worth and self-esteem. Thus, echoing Donnellan, Burt, Levendosky, and Klump's (2008) recommendation, future research should consider including other psychological and personality variables to clarify the associations among relationship experiences and attachment security.

Another limitation of this study is that friendship stability was not considered in the analyses. Attachment theory is mainly concerned with stable and enduring relationships (Ainsworth, 1989), and it is possible that stable and long-lasting friendships could have a stronger influence on the emergence of anxious and avoidant attachment. Similarly, friendship attachment might have a stronger influence on more stable friendships than less stable friendships. Thus, future research should consider this in order to examine differences between adolescents who have enduring versus short-term friendships in terms of the associations between friendship experiences and attachment security. It is important to note, however, that despite the possibility that participants experienced a change in best friend during the course of the study, the findings did not vary over time, suggesting that perceptions of intimacy and exclusion in friendships may not be unique to a specific partner, but that they may be characteristic of an individual's friendships in general. It is also possible that these perceptions are, in part, the product of the individual, rather than the friendship.

A third limitation of the study is that friendship attachment security and experiences were based on self-reports from adolescents. Because these constructs were all measured with questionnaires, shared-method variance should be considered when interpreting these results. However, much research exists to suggest that perceptions of relationship experiences (e.g., availability of support) are shaped not

only by an individual's internal characteristics (e.g., attachment security) but by actual experiences within a relationship as well (Reis, Clark, & Holmes, 2004). This research also emphasizes the importance of examining perceptions of relationship experiences, as perceptions may be important determinants of psychological outcomes. For instance, perceptions of support from close others have been shown to be reliably predictive of health and well-being (Reis et al., 2004; Stroebe & Stroebe, 1996). Thus, although shared-method variance should be considered in this research, the importance of examining perceptions of relationship experiences during adolescence is believed to overshadow the costs of using self-report questionnaires.

Finally, because friendship attachment security was assessed through adolescents' perceptions of their general friendships, partner-specific friendship attachment was ignored. In contrast, adolescents' friendship experiences (intimacy and exclusion) were based on experiences with a specific best friend, rather than with friends in general. Thus, it is important for future research to consider adolescents' experiences with multiple friendships simultaneously. For instance, a latent variable might be formed to capture the commonality of multiple friendships. This latent variable would allow for an investigation of the possibility that experiences from different friends might impact the development of attachment security with friends in general, and conversely that friendship attachment security in general might impact experiences with multiple friends. Nevertheless, this study provides insight into the reciprocal linkages between general friendship attachment security and friend-specific relational experiences.

Conclusion

The overall findings from this study suggest that although attachment with friends is moderately stable during adolescence, there is some malleability in friendship attachment security. This study suggests that this malleability is partially due to relationship experiences with friends. Indeed, the findings indicate that attachment avoidance is related to subsequent perceptions of friendship exclusion, which are related to subsequent attachment anxiety. Further, attachment avoidance and friendship intimacy are reciprocally related over time, with attachment avoidance predicting less subsequent friendship intimacy, and friendship intimacy predicting less subsequent attachment avoidance over time. Lastly, attachment anxiety is predictive of more friendship intimacy over time. It is also noteworthy that the role of relationship experiences in impacting attachment security is consistently important throughout adolescence. Thus, research on peer relations should not underestimate the importance of relational experiences in determining attachment outcomes with friends from early to late adolescence. Furthermore, interventions focused on improving attachment security during adolescence should consider the specific relationship experiences that play a role in determining attachment outcomes. Specifically, interventions focused on decreasing attachment anxiety should attempt to reduce perceptions of exclusion in friendships, whereas interventions focused on decreasing attachment avoidance should attempt to increase perceptions of intimacy among friend dyads.

Appendix I

Collins and Read (1990) Attachment Items

Dependence

- I am comfortable depending on my friends and having them depend on me. (R)
- I know that my friends will be there when I need them. (R)
- My friends are not always there when I need them.
- I find it difficult to allow myself to depend on my friends.
- I am not sure that I can always depend on my friends to be there when I need them.

Closeness

- I find it relatively easy to get close to my friends. (R)
- I do not worry about my friends getting too close to me. (R)
- I get nervous when my friends get too close.
- I am somewhat uncomfortable being close to my friends.
- My friends want to be closer to me than I feel comfortable being.

Anxiety

- My friends do not seem to want to get as close as I would like.
- I worry that my friends do not really care for me.
- I worry that my friends will not want to stay with me.
- My strong desire to get really close sometimes scares my friends away.
- **I do not worry about being deserted or disliked by my friends. (R)

Note. (R) indicates item was reverse coded to assess attachment avoidance/anxiety. The dependence and closeness subscales were combined to form an attachment avoidance subscale.

**This item was dropped from the anxiety subscale due to low reliability.

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