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The Quality of Close Adolescent Friendships: Roles of Attachment, Adjustment, and Problem-Solving Ability

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Abstract of the Dissertation

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by
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This study examined the impact of long-standing individual factors (adjustment and working models of attachment) on friendship quality and change in friendship quality over time. Using mediational analyses, two friendship-specific factors (friendship attachment cognitions and interpersonal problem solving) were examined in turn as potential modulators of these effects. Twenty six mutually and anonymously nominated pairs of high school-age best friends completed self-report measures, engaged in videotaped problem-solving discussions, and completed an implicit measure of working models of attachment. While our main hypotheses were not supported, correlational and marginally significant results do suggest that attachment and adjustment impact friendship quality, and that preoccupied friendship cognitions modulate the impact of working models of attachment. Due to very low variability on observed problem solving, a self-report measure of problem solving was substituted and most of the hypotheses were modified accordingly. Using this measure, we found that problem solving moderates the impact of friendship attachment cognitions on friendship quality (both initially and over time). This suggests that it is important to *simultaneously* consider problem solving and attachment cognitions when examining their roles as modulators of long-standing individual factors on friendship quality. Problem solving was also found to moderate the relation between adjustment and friendship quality. Implications for research and clinical work are discussed.

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Introduction

Initial Considerations

The Importance of Close Friendships in Adolescence

Most North American adolescents report that same-sex friends are more important than parents as sources of support (Furman, 1993; Furman & Buhrmester, 1992; Langan, 2002). Much research has focused on the impact of such friendships. Having close friendships in adolescence has been shown to be crucial for future emotional and relational well-being (Sroufe, Duggal, Weinfield, & Carlson, 2000). The quality of close friendships has been related to and understood to impact many indices of adjustment, including both internalizing symptoms and externalizing symptoms (Bagwell et al., 2005; Burk & Laursen, 2005; Demir & Urberg, 2004; LaGreca & Harrison, 2005; Rubin et al., 2004). Close friendships may also provide valuable practice for future close relationships such as marriage.

The goal of the current research is to better understand factors that contribute to the quality of close friendships. We are particularly interested in the relevance of two characteristics that begin to develop early in life: working models of attachment and emotional and social adjustment. We are also interested in the roles that attachment cognitions (i.e., friends' expectations of getting support from each other) and friends' ability to resolve their disagreements play in modulating the impact of attachment and adjustment on the quality of friendships.

Spheres of Influence on Friendship Quality

Many interpersonal and individual factors are relevant to the ways that teens negotiate their friendships. Adolescents are at a crossroads of social influences as the role of

parents is still important and peers' role is becoming increasingly so. Past research suggests that the way teens act in their friendships replicates their own behavior in family interactions and their observations of the behavior of their parents (Kerns, Klepac, & Cole, 1996; Zimmermann, 2004). In addition, teens' explicit thoughts about close relationships in general or friendships in particular may be influenced by observing and being taught their parents' explicit relational views. For example, teens may internalize the value that they perceive their parents to place on their own friendships, as well as their perceptions of their parents' norms of specific aspects of close relationships (such as intimacy and conflict resolution). In addition, teens may be influenced by explicit statements that their parents make about the teens' relationships with family members and close friends. By adolescence, many of these influences are reflected in individual attributes and skills.

The attributes and family backgrounds of one's friends are also crucial in understanding friendships. Pairs of friends have been found to be concordant on their impressions of the friendship and on attachment security, as well as on deviant behavior and adjustment (Bagwell et al., 2005). This similarity must be kept in mind in any attempt to understand friendship quality. For example, the pattern of correlations between teens' scores on friendship quality and adjustment was altered by taking into account the scores of these teens' friends on the two variables (Burk & Laursen, 2005). For some variables, both members of a pair must have adaptive scores on individual variables in order for this to be reflected by higher friendship quality. For example, pairs where both friends self-report secure attachment to their parent have been found to be more successful in conflict resolution, while pairs with either one or two members with

insecure attachment do not do as well (Black & McCartney, 1997; Kerns et al., 1996; Weimer, Kerns, & Oldenburg, 2004). For other variables, it may be that only one member of a pair needs to have an adaptive score in order to achieve good friendship functioning.

Just as teens are part of their family system, the teen pair is its own system, where both the characteristics of the individual and those of their interaction play a role (Furman, 1993). The system of the friend pair is relatively new and is comprised of members who are still engaged in the more powerful family-of-origin systems. The present research focuses on this new pair system while also considering the influence of the participants' families. Although the teens' families will not be assessed directly, we will examine several of the participant characteristics that have been found to be relevant to friendship quality and are understood to be formed mainly within the family of origin. These include teens' implicit expectations of close others in stressful situations (E. Waters & Cummings, 2000) and their adjustment (Loeber & Dishion, 1985). Other less long-standing characteristics that contribute to friendship quality are probably influenced by both the pairs' family experiences and the nature of the friendship itself. These include the teens' explicit cognitions about the availability and responsiveness of their friends and the pairs' ability to resolve disagreements together. The current study aims to confirm the importance of these variables and, more importantly, begin to understand the mechanisms by which they impact friendship quality over time. To this end, based on a review of the literature we hypothesized five mediations that describe the ways in which friendship-specific variables modulate the impact of the long-standing characteristics of the participants on friendship quality. We also hoped to add to the existing work on

adolescent friendships by improving on the methodology of most previous work in three ways. These improvements, which will be discussed in greater detail below, include our inclusion of mutually-nominated best-friend dyads, our choice of measures (an implicit measure of attachment, an observational and detailed measure of interpersonal problem solving), and our inclusion of a follow-up assessment of friendship quality.

Main Variables

Adjustment

Teens' behavioral and emotional well-being is influenced by the family environments that have surrounded them since birth (Loeber & Dishion, 1985). Although the primary focus of this study is on the friend dyad, each friends' adjustment is understood to have been formed largely through their respective family. Studies of adolescent friendships have found adjustment to be related to friendship quality (Rubin et al., 2004; Sroufe et al., 2000), and this link appears to be stronger than the one between adjustment and popularity (Demir & Urberg, 2004). There is some evidence that negative aspects of friendship (e.g. conflict, inequality) are more strongly associated with symptomatology while positive aspects of friendships are more strongly associated with self esteem (Bagwell et al., 2005; LaGreca & Harrison, 2005). However, there is also evidence against a strong link between adjustment and friendship quality. Associations between participants' reports of friendship quality and adjustment have been found not to be corroborated by reports of friends and parents (Burk & Laursen, 2005). The use of pairs in the current study will allow us to confirm this link between adjustment and friendship quality without relying solely on self-report.

Social Problem Solving

Initiating and participating in newly important peer relationships presents many challenges. Many skills and abilities are necessary to develop and maintain a close friendship in adolescence, including the ability to seek out closeness, the ability to tolerate and embrace intense emotions that are part of intimacy, and the ability to selfdisclose and to be receptive to the other's self-disclosure (Collins & Sroufe, 1999). Another important skill for close friendships is conflict resolution (Furman, 1993). This ability is especially relevant to understanding adolescent friendships because of the egalitarian nature of these relationships (in contrast to the unequal nature of the main type of close relationships that teens have previously experienced – those with their parents). Recent studies have found that late adolescents' self-reported ability to resolve disagreements is related to their self-reported amount of conflict with peers but not to the amount of conflict with parents (Londahl, Tverskoy, & D'Zurilla, 2005; Tverskoy, Londahl-Shaller, & D'Zurilla, 2007). This suggests that adolescents' relationship skills, such as conflict resolution, are more influential in determining the nature of relationships with peers than relationships with parents, where parent skills may play a stronger role. Thus, as equals, adolescent friends are able to practice relational skills such as those necessary for conflict resolution, which will be crucial in future long-term romantic relationships. The ability to resolve conflicts with friends has important consequences for teens. Failing to address relationship disagreements has been found to be associated with an unsatisfying friendship or to friendship dissolution (Demir & Urberg, 2004). Selfreported negative aspects of conflict resolution (e.g. relationship impact, affective intensity, post-conflict interaction) have been related to self-reported negative attitudes about one's friendship (Burk & Laursen, 2005). Conversely, the experience of successful

conflict resolution may bring friends closer together and positively impact their expectations of close others. Since the ability to resolve disagreements also appears to be related to adjustment (Londahl et al., 2005; Tverskoy et al., 2007)), discussed further below), this type of ability may be an important modulator of the impact of adjustment on friendship quality.

A useful framework for understanding and categorizing the ways that people deal with interpersonal conflict is provided by social problem solving theory. Since the 1960s, social problem solving theory has been used to describe the ways that individuals of all ages deal with everyday problems, and to teach effective strategies for doing so in the context of psychological treatment (D'Zurilla & Nezu, 2007). Based on the model presented by D'Zurilla and his associates (D'Zurilla & Goldfried, 1971; D'Zurilla & Nezu, 2007), social problem-solving ability has been understood as consisting of two general components: problem orientation (one's general appraisals of problems and his or her own problem-solving ability) and specific problem-solving skills. Good social problem-solving ability has been associated with better family well-being and lower family conflict (Siu & Shek, 2005), as well as with friendship quality (Buhrmester, Furman, Wittenberg, & Reis, 1988; Tverskoy et al., 2007).

Since we were primarily interested in the unit of the friendship dyad, we focused on the way in which each pair works together to deal with the disagreements that are most important to them. To do this, we developed an observational measure of interpersonal conflict resolution based on social problem solving theory. While several studies have examined the way that teen friends interact using videotaped discussion tasks, most of these studies have not asked teens to resolve a disagreement. Rather, one study asked

them to plan a vacation (Bagwell et al., 2005), while the others asked participants to discuss a personal problem of one of the participants (Black & McCartney, 1997; Weimer et al., 2004). The only study that did ask friends to resolve a disagreement (Black, 2002) did not examine the implications of this ability on other variables. In addition, the coding system used in this study (Black, 2002) was not as in-depth as ours, and was not based any theory of problem solving. The current study uses a theory-based observational measure of interpersonal problem solving in order to assess the participants' ability to resolve interpersonal conflict and to determine whether this ability (or some aspect of it) relates to the quality of the friendship.

While the long-term impact of interpersonal conflict resolution has not been examined among teens, evidence for the longitudinal relation of problem solving and relationship quality has been found among married couples. Specifically, the couples' behavior during conflict interactions related to the rate of change in satisfaction over the course of the relationship (Karney & Bradbury, 1997). Close friendships are also likely to either decrease in quality or to dissolve after failure to resolve disagreements.

In line with the research described above, our first hypothesis was that initial friendship quality is positively related to observed interpersonal problem solving, which is in turn positively related to friendship quality four months later.

Poor social problem-solving ability has also been associated with many negative adjustment outcomes, including depression, aggression, and anxiety (Chang, D'Zurilla, & Sanna, 2004). Interpersonal problem-solving ability in particular has also been found to be associated with elevated levels of aggression and anxiety (Londahl et al., 2005; Tverskoy et al., 2007). Adjustment has also been associated with friendship quality (as

discussed in the adjustment section above), and studies that include all three variables have found them to be related in the expected direction (Buhrmester et al., 1988). It may be that part of the impact of adjustment on friendship quality occurs via observed problem solving. That is, it seems likely that teens with better adjustment develop better ability to resolve disagreements with their friends, and that this ability, in turn, contributes to better friendship quality. Therefore, our second hypothesis was that observed problem solving mediates the relationship between adjustment and friendship quality. To assess adjustment, we planned to measure both the presence of symptoms and the level of social competence. Emotional and behavioral difficulties were expected to be negatively related to observed problem solving, which was in turn expected to be positively related to friendship quality. In contrast, social competence was expected to be positively related to observed problem solving, which was in turn expected to be positively related to friendship quality. Aspects of friendship quality have been found to impact adjustment over time (Bagwell et al., 2005). We planned to test this hypothesis using both friendship quality at initial data collection (hypothesis 2a) and using change in friendship quality (hypothesis 2b).

Attachment

Another crucial variable in understanding the ways in which people function in close relationships throughout life, including close friendships, is by considering their pattern of attachment. Attachment to one's primary caregiver, which develops during young childhood, has been conceptualized in terms of three categories. Secure attachment is characterized by availability and responsiveness of the caregiver and a balance of proximity-seeking and exploratory behavior of the child. Preoccupied attachment is

characterized by inconsistent availability and responsiveness of the caregiver and a lack of exploration in favor of excessive proximity-seeking behavior of the child. Avoidant attachment is characterized by a chronic lack of availability and responsiveness of the caregiver and a lack of proximity-seeking behavior of the child, even in stressful situations. Similarity among relational styles in adults and attachment categories in infants was pointed out in the 1980's (Hazan & Shaver, 1987). Since that time, several longitudinal studies have demonstrated high rates of attachment stability form infancy to adolescence (Collins & Sroufe, 1999) and adulthood (E. Waters, Merrick, & Treboux, 2000). While other studies have failed to find such continuity, a recent meta-analysis concluded that the published data on the stability of attachment styles is most consistent with a continuous view of attachment (Fraley, 2002). Taken together, these data suggest that the relational styles identified by Hazan and Shaver (1987) and infant attachment classifications may not merely be topographically similar, but may be one and the same phenomenon.

Those who see these phenomena as one and the same have conceptualized attachment to primary caregivers as an important determinant of the way that people interpret and behave in all future close relationships. This is understood to occur through the influence of parental attachment on relationship schemas, or *working models*. For example, secure working models of attachment relate to increases in relationship quality and commitment in couples (Duemmler & Kobak, 2001), and to lower tendencies to remain in unhappy marriages (Davila & Bradbury, 2001). During mid-adolescence, high concordance has been found between working models of attachment in relationships with friends and parents (Furman, Simon, Shaffer, & Bouchet, 2002; E. Waters & Waters, 2003).

Although such models are understood to be initially formed in relationships with parents, they may strongly influence close adolescent friendships. The potential influence of these working models on peer relationships has only recently begun to be examined (Weimer et al., 2004; Zimmermann, 2004).

Compared to other domains of adolescent friendships, working models of attachment may be particularly relevant to friends' interpersonal problem-solving ability. First, discussing a disagreement can be a challenge to the relationship (Kobak, Rosenthal, & Serwik, 2005), and the way in which teens respond to this challenge may depend on their expectations of their friends' commitment to the relationship. Teens with secure working models of attachment may be more certain that their friends will stick by them despite a difficult disagreement and may therefore be more likely to engage in solving the disagreement. Second, navigating conflict interactions often involves managing strong feelings. Working models of attachment may impact both the initial degree of affect that teens experience during conflict, as well as they ways that they deal with such affect (Kobak & Sceery, 1988; Zimmermann, 2004).

In considering the research about attachment and adolescent friendship it is important to keep in mind the method used to assess attachment. Attachment has been assessed using both self-report and implicit measures. Most of the work on adolescent friendship has used self-report measures of attachment. In contrast to self-report measures, implicit measures of attachment are usually based on either interview or observation and do not primarily rely on the content of the participants' description of their attachment style. Although they are theoretically related, implicit measures of attachment and self-report measures have different patterns of correlations with other variables (Jacobvitz, Curran,

& Moller, 2002; E. Waters, Crowell, Elliot, Corcoran, & Treboux, 2002). This may be due to the effects of social desirability on participants' self-report, or to a tendency for insecure individuals to idealize both themselves and their relationships. Thus, implicit measures are thought to provide a more accurate assessment of attachment schemas. Yet, self-report measures of attachment provide direct access to the individuals' attachment-relevant ideas, which may be important in their own right.

One reason for this potential importance is that explicit attachment-relevant ideas may modulate the impact of implicit working models of attachment on the way that a person thinks about relationship-relevant issues. In this study, we chose to examine participants' implicit models of attachment with parents and their explicit ideas about attachment in relation to their friendship. We will now discuss these two aspects of attachment in turn.

Attachment Working Models. A body of research with preschool and elementary school age children suggests that there is a small but significant link between implicit measures of attachment and friendship quality (based on a meta-analysis of this literature, ES = .24, (Schneider, Atkinson, & Tardif, 2001). Two recent studies of friendship and attachment (measured using the Adult Attachment Interview(Main, 1996) confirmed that this link holds among teens (Furman et al., 2002; Zimmermann, 2004). One of these studies (Zimmermann, 2004) examined conflict resolution in particular, and found that teens with insecure working models of attachment report more negative affect during conflict resolution. This study did not assess conflict-resolution skills or attitudes about conflict resolution, and it relied on individual teens' report of their friendship. The current study aimed to confirm the previously found link between working models of

attachment and friendship quality. We also wanted to examine interpersonal problemsolving ability (assessed using a new measure designed to maximize ecological validity) as a potential modulator of this relationship.

Friendship Attachment Cognitions One way in which working models of attachment may impact friendship quality is through adolescents' explicit understanding of the degree of closeness and responsiveness that characterize their friendships. These thoughts, which have been referred to as attachment cognitions, have been understood to be related to but distinct from implicit schemas of sensitivity and responsiveness within close relationships. Furman et al. (2002) found teens' explicit attachment-relevant thoughts about close friends to be correlated to such thoughts in the context of relationships with their parents. Furman et al. (2002) hypothesizes attachment cognitions to be jointly determined by general working models of attachment (which have developed throughout childhood and are influenced by the family environment) and various aspects of the current relationship.

Because they are explicit and conscious (in contrast to the implicit and unconscious nature of working models of attachment), attachment cognitions may play an important role in situations where the core assumptions about the friendship are questioned. Conflict interactions are such situations. Adolescents' explicit ideas about their attachment relationships have been found to relate to their impressions of their friendship quality (Langan, 2001) and their self-reported interpersonal conflict resolution skills (Creasey & Hesson-McInnis, 2001; Creasey, Kershaw, & Boston, 1999; Kobak, Rogers, Holland, Ferenz-Gilies, & Fleming, 1993). Two observational studies of adolescent dyads also found self-reported secure attachment to parents to be associated with more positive

interactions (Black & McCartney, 1997; Weimer et al., 2004). Thus, there is ample evidence that explicit thoughts about attachment are relevant to behavior in conflict interactions with best friends. Moreover, these relations have been found to be mediated by differing conflict goals for individuals with different attachment styles (e.g. secure individuals tend to pursue intimacy as a goal, and this is related to better self-reported conflict resolution(Neufeld, Simon, & Baker, 2006). In our third hypothesis, we expected observed problem solving to mediate the relationship between participants' attachment cognitions and their friendship quality. Secure attachment cognitions were expected to be positively related to observed problem solving, which be positively related to friendship quality. Dismissing and preoccupied attachment cognitions were expected to be negatively related to observed problem solving, which was in turn expected to have a positive relationship with friendship quality. We planned to test this hypothesis using both friendship quality at initial data collection (hypothesis 3a) and using change in friendship quality (hypothesis 3b).

In attempting to understand the factors relevant to conflict resolution among friends, attachment cognitions are also a potentially important mediator. Attachment cognitions about a current friendship are partially determined by the more long-standing and general working models of attachment in close relationships. To the extent that attachment cognitions, in turn, impact participants' ability to resolve interpersonal disagreements, they may serve as a mediator between working models of attachment and observed problem solving. This mediation was postulated in our fourth hypothesis. We expected that secure working models of attachment would have a positive relationship with observed attachment cognitions, which would in turn have a positive relationship with observed

problem solving. We also expected that secure working models of attachment would have a *negative* relationship with both preoccupied attachment cognitions and dismissing attachment cognitions, and that both of these dysfunctional types of attachment cognitions would in turn have a *negative* relationship with observed problem solving.

Based on the research discussed above (Furman et al., 2002), friendship attachment cognitions were also expected to have a direct impact on friendship quality. Therefore, our fifth hypothesis was that attachment cognitions would be found to mediate the relationship between working models of attachment and friendship quality. We expected that the secure working models of attachment would have a positive relationship with secure attachment cognitions, which would in turn have a positive relationship with friendship quality. We also expected that secure working models of attachment would have a *negative* relationship with both preoccupied attachment cognitions and dismissing attachment cognitions, and that both of these dysfunctional types of attachment cognitions would in turn have a *negative* relationship with friendship quality. We planned to test this hypothesis using both friendship quality at initial data collection (hypothesis 5a) and using change in friendship quality (hypothesis 5b).

Summary and Methodology

To summarize, the following five hypotheses were tested using observed and selfreported data from pairs of adolescent best friends.

1. Observed problem solving was expected to mediate the relationship between initial friendship quality and friendship quality at follow-up. Specifically, initial friendship quality was expected to be positively related to observed problem solving, and good observed problem solving, in turn, was expected to be

- positively related to friendship quality at follow-up.
- 2. (a) Observed problem solving was expected to mediate the relation between adjustment (including fewer symptoms and greater social competence) and initial friendship quality. Specifically, adjustment was expected to be negatively related to observed problem solving, and observed problem solving, in turn, was expected to be positively related to initial friendship quality. (b) Observed problem solving was expected to mediate the path between adjustment (including fewer symptoms and greater social competence) and change in friendship quality over time. Specifically, adjustment was expected to be negatively related to observed problem solving, and observed problem solving, in turn, was expected to be positively related to *change* in friendship quality.
- 3. (a) Observed problem solving was expected to mediate the link between attachment cognitions (including high scores on secure cognitions and low scores on preoccupied and dismissing cognitions) and initial friendship quality. Specifically, attachment cognitions were expected to be positively related to observed problem solving, and observed problem solving, in turn, was expected to be positively related to initial friendship quality. (b) Observed problem solving was expected to mediate the link between attachment cognitions (including high scores on secure cognitions and low scores on preoccupied and dismissing cognitions) and change in friendship quality. Specifically, attachment cognitions were expected to be positively related to observed problem solving, and observed problem solving, in turn, was expected to be positively related to change in friendship quality.

- 4. Attachment cognitions (including high secure attachment cognitions, low preoccupied attachment cognitions, and low dismissing attachment cognitions) were expected to mediate the relationship between secure working models of attachment and observed problem solving. Specifically, secure working models of attachment were expected to be positively related to attachment cognitions, and attachment cognitions, in turn, were expected to be positively related to observed problem solving.
- 5. (a) Attachment cognitions (including high secure attachment cognitions, low preoccupied attachment cognitions, and low dismissing attachment cognitions) were expected to mediate the relationship between secure working models of attachment and initial friendship quality. Specifically, secure working models of attachment were expected to be positively related to attachment cognitions, and attachment cognitions, in turn, were expected to be positively related to initial friendship quality. (b) Attachment cognitions (including high secure attachment cognitions, low preoccupied attachment cognitions, and low dismissing attachment cognitions) were expected to mediate the relationship between secure working models of attachment and positive change in friendship quality.
 Specifically, secure working models of attachment were expected to be positively related to attachment cognitions, and attachment cognitions, in turn, were expected to be positively related to change in friendship quality.

The model in Figure 1 is a summary of the main hypotheses, and was not tested as a whole. The light boxes represent factors that are partially or completely unique to the specific friendship. The dark boxes represent longstanding characteristics of the teens.

We expected these factors to covary strongly to the extent that the adolescent was raised in a nurturing and stimulating environment. In support of this expectation, insecure attachment style has been related to many indicators of poor adjustment in adolescence. including depression, anxiety, and aggression (Sroufe et al., 2000). Because we are interested in the differential effect of these two variables, we controlled for their covariance in all mediations that involve either one of them. Because the current study is fairly exploratory, we tested components of the model separately, rather than testing the entire model using Structural Equation Modeling (SEM). We did not plan to collect enough data to test the model as a whole using SEM for two reasons. Firstly, it is very difficult to obtain a large sample of adolescent pairs. In our experience, collecting data on high school students is logistically complicated. It is time consuming due to the need to travel to schools and the necessity to distribute and collect parent permission slips. Also, schools tend to be reluctant to commit too many student hours to research. In addition, both members of a pair and their parents need to agree to the study. Secondly, considering that this newly proposed model involves many factors (please see figure 1), it seemed more appropriate to test specific components of the model. This way, we hoped to find support for some components but not for others, allowing us to revise the model for future examination. Using the findings of this study, we hoped to revise and expand this model and to test it as a whole using SEM.

Bootstrapping methods (Shrout & Bolger, 2002) were used for the statistical analyses because they are more sensitive than the traditional methods for testing mediational relationships (Baron & Kenny, 1986). While we expected to confirm previously found direct associations between most of the study variables, we also expected that the small

sample size of this study would lead to some of these associations not qualifying for statistical significance. In contrast to traditional regression-based mediation analyses, bootstrapping methods do not require that the three relevant variables be significantly correlated. Due to the small sample size of this study, we expected that some pairs of variables may be part of a statistically significant indirect effect while not being correlated to a degree that would qualify for statistical significance.

The methodology that was used to test these hypotheses was based on considerations from the literature discussed above. Following prior studies, we planned to include pairs of friends in order to allow an ecologically valid assessment of the manner in which they discuss problems as well as to examine of the contribution of both teens' personal characteristics to friendship quality. The current study improves on previous research using friend pairs (Bagwell et al., 2005; Black, 2002; Black & McCartney, 1997; Weimer et al., 2004) in several ways. It is the first to use an implicit measure of attachment, which had been shown to differ greatly from self-reported attachment and to be associated with many important indices of family background and emotional well-being (Sroufe, 2005). This study is also the first study of friend pairs to use a detailed and theoretically-based observational measure of interpersonal problem-solving ability. Second, this is the first study with friend pairs of high-school age to include a follow-up assessment of friendship quality (Bagwell et al., 2005, included college age participants). Third, the manner of recruitment used in this study improves upon that used in recent work with pairs of adolescent friends. Based on previous research (Gonzaga, Keltner, Londahl, & Smith, 2001; Newcomb, Bukowski, & Patee, 1993), the pairs of friends will be recruited using mutual anonymous nominations from grade-wide sociometric surveys. This recruitment

method is preferable to approaching "target" teens and asking them to bring a close friend because the two groups of teens ("targets" and "friends") have been found to differ on attachment and interaction behavior (Black & McCartney, 1997). In addition, this latter recruitment method may not ensure participants are very close friends. While some studies that ask participants to bring in their friends have the friends rate their closeness (Weimer et al., 2004), these ratings may be impacted by the a teen's knowledge that she and her friend are participating in a study on close friendship. In the current study, potential participants list close friends during the sociometric phase of the study and are only later paired up with a close friend. Therefore, the rankings should be accurate indications of close friendship.

Alternate Hypotheses

We planned to examine the role of several additional variables that are relevant to our hypotheses. We expected these variables not to significantly alter our main findings.

These variables include self esteem, mood, and deviancy of friends.

Previous research (Davila, Hammen, Burge, S.E., & Paley, 1996) has found a complete mediation of the relations between attachment cognitions and interpersonal problem solving by self-worth in late adolescent girls. Davila et al. (1996) assessed general attachment cognitions with parents and peers using self-report questionnaires, and general interpersonal problem solving in a variety of situations using an interview format. Self-worth and general attachment cognitions are global factors that develop over time, while Davila et al.'s measure of interpersonal problem solving focuses on situations that were fairly new to the high school-age participants. Davila et al. (1996) found attachment not to mediate the relationship between self worth and interpersonal problem

solving, suggesting that attachment cognitions may developmentally precede self worth. Compared to relationship-specific attachment cognitions, general attachment cognitions and self worth are both early-developing characteristics. In this study, we looked at recently formed attachment cognitions specific to the current friendship and recently formed interpersonal problem-solving ability with the friend. Because both of these variables are relatively later-developing as compared to general attachment cognitions and self worth, and because both relate to a specific well-developed interpersonal relationship, we expected our main hypotheses to hold even after controlling for self esteem. We controlled for self-reported self-esteem and re-computed all analyses that yielded significant results. We expected the general pattern of findings to remain the same. In line with Davila et al. (1996), we reasoned that the mediations outlined in hypotheses 4 and 5 may be reduced in magnitude because some of the influence of working models of attachment may have occurred through self-esteem.

Similar to our treatment of self-esteem, we controlled for self-reported mood and recomputed all analyses with statistically significant results. Because we did not expect this factor to play a role in the hypothesized analyses, we expected the general pattern of findings to remain the same.

In addition, because friendships with deviant peers (teens who engage in a range of externalizing behaviors, including aggression, substance abuse, stealing, fire-setting) have been associated with poorer rather than better adjustment (Adams, Bukowski, & Bagwell, 2005; Brendgen, Vitaro, & Bukowski, 2000; Dishion & Owen, 2002; Sroufe, 2005), we planned to examine the possibility that the above hypothesized results vary for friend pairs that include deviant adolescents. Deviant adolescents were identified using a

subscale of the self-report measure of adjustment used for the main analyses.

Method

Participants and Recruitment

In a preliminary recruitment phase, announcements were made in 10th and 11th grade English and History classes inviting students to participate in a short in-class questionnaire about relationships. Two hundred and sixty seven students completed sociometric (friend-listing) forms in class. This represents about 35% percent of the students who were recruited for the study. Almost all of the other students failed to bring in signed consent forms. Based on the preliminary phase of the study, mutually anonymously nominated close friends were recruited over the phone to participate in the main phase of the study. The use of sociometric questionnaires to identify friends is important for two reasons. Because the proposed model applies only to well-developed peer relationships, it was important that the sample include only close friends. As many researchers who have used sociometric procedures to find friend pairs have assumed (Newcomb et al., 1993), pairs who mutually and anonymously nominate each other as best friends are likely to have a well developed relationship. In addition, we hoped that using sociometric techniques would prevent a situation where a teen might feel hurt by seeing the girl whom she considers to be her closest friend ask someone else to participate in the study with her.

In order to qualify for the main phase of the study, one of the friends was required to list the other as among the top three closest, and the other was required to list her as one of five closest. At least one of the participants listed the other as the first best friend in the majority of the study sample. Sixty pairs of participants met these criteria and were

invited to participate in the study. Twenty six pairs participated, while the rest either did not bring in parent consent forms or were not able to find time for participation. The closeness rank of the friends did not appear to relate to the pair's ability to participate. The ethnic breakdown of the sample is as follows: 2 African American, 10 Latina American, 21 Caucasian, 4 other. All participants were either 15 or 16 years of age. Because many differences have been found between girls' and boys' friendships (Berndt, 1982), only female friends were recruited for the main phase of the study. While it would be interesting to examine gender differences in findings, the expected size of the sample was insufficient for such comparison. Based on previous experience, we expected girls to be more willing to participate in research and to speak openly about themselves. We thus chose to focus on girls in the current study.

Participation in raffles for prizes was offered as an incentive for bringing in signed parent consent forms (even if parents disallow participation) in both the preliminary and main phases of the study. Students with difficulty reading or any other disabilities were encouraged to call to arrange any special accommodations that may be necessary in order for them to participate.

Participants were recruited from four schools in Suffolk County, Long Island, New York. Three of the schools are located in primarily working-class towns, while a fourth school serves towns with a higher socioeconomic status. However, only one pair from the latter school participated.

Procedure

Twenty six close friend pairs were invited to come in for a 90 minute appointment in an empty classroom. Participants were first asked to perform a 15 minute audio-taped

procedure designed to assess attachment to parents (described below). This procedure was conducted individually, with only a member of our research team and the participant present in the room.

In preparation for the problem-solving interaction, participants then completed two short measures of interpersonal conflict developed for a previous study in our lab in order to identify areas of disagreement within their friendship. The first of these questionnaires asks participants to rate the extent to which they currently agree or disagree about each other's attitudes and behavior across a range of topics or domains related to everyday living (e.g., physical appearance, support, trust, communication, togetherness, social behavior, etc.). One pair of participants indicated that they do not disagree in any of the included domains and were not asked to engage in the problem-solving interactions. On the second questionnaire, participants were instructed to list specific topics of disagreement for each of three domains of highest conflict (based on the first questionnaire). The experimenter used the second set of questionnaires to identify appropriate topics for the discussions, and asked the close friend pairs to discuss either two or three of these topics and attempt to come up with solutions. Each topic was discussed until the participants stated that they have reached a solution, with a maximum duration of 10 minutes per topic. The entire videotaped interactions lasted at most twenty minutes. The videotaped interaction were rated by trained coders using a previously developed observational coding system (described below). After the problem solving discussion, participants were also asked to discuss favorite aspects of the relationship. Similar procedures have been used in previous research to counteract any negative emotion from the problem-focused segment of the discussion (Gonzaga et al., 2001).

Finally, participants completed a battery of self-report questionnaires assessing mood, friendship quality, self esteem and adjustment, which took approximately 25 minutes.

The friends were placed at opposite ends of the room with their backs to each other to ensure confidentiality.

A short verbal and written debriefing emphasized the "normalcy" of interpersonal disagreement and made clear the objectives of the study. In the debriefing, participants were encouraged to contact their school psychologist for a psychological evaluation if any of the test questions made them upset or concerned about their well-being. Four months after participating in the study, participants were briefly interviewed by phone to assess friendship quality. This was measured for all relationships, including ones that had dissolved (the specific item content allows for this).

Measures.

Observed Problem Solving was assessed using the Interpersonal Problem Solving
Observational Measure (IPSOM, (Londahl, Tverskoy, & D'Zurilla, 2003). The IPSOM
was developed to assess problem-solving ability without being subject to the same biases
present in the use of self-report measures. This measure was based on a theoretically
guided self-report measure of social problem solving, the Social Problem Solving
Inventory-Revised (SPSI-R, (D'Zurilla, Nezu, & Maydeau-Olivares, 2002). The SPSI-R
assesses the ways that people approach different types of problems, including impersonal,
personal, and interpersonal problems. Empirical data supporting the structural,
convergent, discriminate, and predictive validity of the SPSI-R with both adults and teens
are presented in D'Zurilla et al. (2002). This evidence includes significant relationships
with measures of psychological distress (e.g., depression, anxiety), social adjustment

(e.g., social skills), and behavioral deviations (e.g., aggression).

The IPSOM items were created through a two-step process. First, the SPSI-R was revised through modified wording and the addition of items so that it would tap problemsolving attitudes and behavior only as they pertain to *interpersonal* problems (e.g. conflicts, disputes). The new SPSI-R: Interpersonal (SPSI-R:I) was administered to two separate undergraduate college student samples (N = 123, 124) and found to have acceptable reliability and validity (Londahl et al., 2005; Tverskoy et al., 2007). Next, the items from the SPSI-R:I were examined extensively and translated into behavioral indicants that could be coded by observers. Several items designed to tap communication and unique aspects of *interpersonal* problem solving were added (e.g. "encourages partner to be persistent"). A pilot study of the measure was conducted with 15 undergraduate college students and their friends or romantic partners. We discarded 2 items because of low inter-rater reliability and discarded 10 items due to low item-total correlations², yielding 17 items. The intra-class coefficients (ICCs) between raters for these 17 items ranged from .32 to .87, with an average ICC of .64. All but four of these 17 items had significant correlations with the Total score in the expected direction, ranging from .45 to .87, $p \le .05$. The coefficient alpha for the overall scale score was high, at .84. As a preliminary test of the validity of the IPSOM, we examined its correlation with the Social Problem Solving Inventory-Revised: Short (SPSI-R:S, D'Zurilla et al., 2002), a self-report measure that has been found to be highly correlated with the full-length SPSI-R. The full scale scores of the two problem-solving measures correlated moderately well, (r = .34, p < .05). The magnitude of the correlation is appropriate given the method variance of these two measures, and the fact that the selfreport measure assesses how one solves problems *in general*, while the observational measure assesses problem-solving performance for only two or three *interpersonal* problems. Our pilot work also indicated that the IPSOM can be broken down into two subscales: *problem-solving orientation* (behavior indicating one's attitude toward problem-solving) and *solution-focused behavior* (adaptive or maladaptive attempts to resolve the problem). However, the coefficient alphas for these two subscales are not as high as that for the scale as a whole. Therefore, we decided to use these two subscales only when examining within-pair problem solving behavior, and to use the total score on the IPSOM for our main analyses.

Ten minutes of each participant pairs' interaction were coded using the IPSOM.

Because interpersonal problem-solving ability is most crucial when resolving issues that are truly important to the pair, efforts were made to choose the conflict discussion that is most important to the couple for coding. We chose among the two or three conflict discussions for each pair using the participants' own ratings of the importance of the issue (on the pre-interaction questionnaire), and the experimenter's observations of the emotional intensity of the discussion (the latter criterion in necessary because couples do not usually agree on which disagreement is most important). In pilot testing, perfect reliability was achieved in choosing the appropriate interaction for coding (Londahl et al., 2005). For pairs that had short discussions, five minute segments of the two most salient discussions were used.

Friendship Quality was assessed using the Assessment of Friendship Features (Berndt & Keefe, 1995). This 26-item measure assesses several aspects of the friendship, including equity, instrumental support, intimate self-disclosure, emotional support, and

time spent together. Scale items ask respondents to rate how often certain interactions with their friend took place on a five point Likert-type scale, from 1("never") to 5("very often"). This measure was found to have good internal consistency and to be related to behavioral adjustment (Berndt & Keefe, 1995).

Adjustment was assessed using the Child Behavior Checklist Youth Self-Report for ages 11-18 (YSR, (Achenbach, 1991; Achenbach, Dumenci, & Rescorla, 2002). The YSR has been found to have good internal and external validity. It has also been found to have very high stability over 10 years, and to have moderate correlations with the Achenbach parent report form. All mediational analyses were conducted four times using the Externalizing scales totals, the Internalizing scales totals, the Total Problems score (which is a combination of the Internalizing and Externalizing scales as well as other symptom-focused items), and the Competence score (a summary of academic, social, and activities competence). Because the previously discussed studies have linked attachment and problem solving to a wide variety of indices of adjustment (e.g. depression, aggression, anxiety, as described in D'Zurilla et al., 2002; Sroufe et al., 2000), we did not make specific hypotheses about distinctions between these four sets of analyses. Deviant behavior was assessed using the Rule Breaking subscale of the Externalizing Scale.

Working Models of Attachment were assessed using the Narrative Assessment Scripts (H. S. Waters & Rodrigues, 2001). In this 15-minute procedure, participants were instructed to create six stories based on lists of words (2 stories each about "Mom and I," "Dad and I," and adult couples). The stories were audio-recorded, and rated for the presence of secure base content on a scale of 1 to 7 by trained coders. Moderate correlations have been found between adults' attachment classification based on this

procedure and on the well-accepted but lengthy Adult Attachment Interview (Dykas, Woodhouse, & Cassidy, 2006). The Narrative Scripts seem to yield similar rates of secure attachment among different cultures (E. Waters & Waters, 2003), falling in line with the theoretical understanding and initial empirical work on the cross-cultural existence of secure base relationships (E. Waters & Cummings, 2000). In a study of 11th graders, strong correlations were found among the secure base content of different stories produced by the same participant, supporting the idea that they are all tapping general working models of attachment (Steiner, Arjomand, & Waters, 2003). We expected to find similarly high correlations among the six stories in this study. However, because our correlations were not as high as expected³, the three types of stories were examined separately.

Attachment Cognitions were assessed using the Behavioral Systems Questionnaire, Attachment Subscale (Furman et al., 2002). This 15 item Likert-type scale assesses self-perceptions of the relational style within the friendship (including the perceived closeness, commitment, and provision of support of both parties). This measure has been found to have high internal and external validity (Furman et al., 2002).

Self Esteem was assesses using the Rosenberg Self Esteem Scale (Rosenberg, 1965). This 10 item scale of self esteem has been widely used, and has been shown to have good validity and reliability with adolescents and adults (Whiteside-Mansell & Corwyn, 2003). The Rosenberg Self Esteem scale has been found to correlate at r = .76 and above with the Global Self-Worth Scale of Harter's Self Perception Profile in adolescent samples (Gonzaga et al., 2001; Hagborg, 1993), the measure used by Davila et al. (1996).

Mood. To assess mood, respondents were asked to rate how they feel on a Likert-type

scale from -5 ("very bad") to 5("very good").

Results

Data Screening and Missing Data

All questionnaires were reviewed for completeness immediately upon collection.

Despite this effort to minimize missing data, a few blank items were identified during data entry. In all cases, there was at most one missing item per questionnaire. The mean of the relevant scale or subscale was substituted for such items.

In addition to omission of single items, data on several scales and subscales was missing for some subjects as follows. Due to difficulties with the audio-taping equipment, two subjects' (one pair's) adult-adult attachment script stories were not recorded. Five subjects did not complete the follow-up telephone interview assessing friendship quality. Two pairs' (four participants') problem-solving discussions were too short to be coded, and one pair did not engage in a problem-solving discussion. Subject with missing data were excluded from analyses involving relevant scales or subscales.

The data were checked for variable values outside of the expected range and unusual data points, and none were found. Several of the variables are characterized by significant skewness: Preoccupied attachment cognitions (positive skewness), Negative Friendship Features (positive, driven by the Inequality subscale), Positive Friendship Features (negative, driven by the Intimacy subscale). Others show slight skewness: Internalizing symptoms, Secure friendship cognitions. The following variables showed kurtosis: Preoccupied friendship cognitions (2.34), Internalizing symptoms (1.28), Negative Problem Orientation (-1.22), Adult/Adult attachment (1.16), Negative Friendship Features (1.55, driven by Inequality, 2.39), and Positive Friendship Features (1.52; driven

by Intimacy (1.55) and Instrumental Support (1.45)). Pair averages were mostly normally distributed, with averages on Preoccupied friendship cognitions being the only pair-wise variable to show high kurtosis and skewness. Since we used bootstrapping analyses, which do not assume normal distributions of variance of the variables, to test the main hypotheses, this non-normality does not present a problem. Because we did use parametric statistics to test our supplemental analyses (described in the Supplemental Results section below), we performed a natural log transformation of pair scores on Preoccupied friendship cognitions. The resulting variable was characterized by normal kurtosis and skewness.

Descriptive Statistics

Table 1a shows the means, standard deviations, and coefficient alphas for all study measures. Coefficient alphas for most scales and subscales were medium to high, ranging from .66 to .92. These scores indicate adequate to good internal reliability. Lower internal consistency was found for the Instrumental Support subscale of the Assessment of Friendship Features (α = .50 at Time 1 and .46 at follow-up). This scale asks about specific behaviors that are relevant to instrumental support (e.g. "how often do you borrow things from each other"). Although participants generally reported higher or lower occurrences of all of the relevant behaviors, there was more variability than on the other scales of friendship quality that inquire more about generalizations or impressions of the friendship. Lower internal consistency scores were also found on the IPSOM. These may be due to the low variance and possible floor effects that we encountered with this measure (these difficulties are discussed further below). Finally, moderate internal consistency scores on the Attachment Scripts (.52 for "Mom and I" Scripts, .44 for "Dad

and I" Scripts, and .49 for Adult/Adult Scripts) are largely due to the presence of only two stories for each script type.

Correlations between participants' initial and follow-up scores on the subscales of Friendship Features were high to moderate (for Positive Friendship Features and Negative Friendship Features, r = .72; for the minor subscales, rs ranged from .60 to .77) and statistically significant ($p \le .01$). Time 1 scores and change scores (Time 2 – Time 1) were used in subsequent analyses.

While most mean scores and SDs on the Assessment of Friendship Features scale were comparable to previous research (Berndt & Keefe, 1995), mean scores on Negative Friendship Features were much lower in our study. This may be due to the fact that our sample was three years older than that of Berndt and Keefe (1995).

Good inter-rater reliability was found for the IPSOM (average ICC = .76) and the Attachment Scripts (average ICC = .80). The popularity of the various categories of discussion topics are presented in Figure 10. Togetherness and Romantic Preferences and Behavior were the two most popular categories of discussion, and the former was most endorsed as the most important area of disagreement.

Non-Independence

Before beginning analyses, a series of ANOVAs with the grouping factor, friendship, as the independent variable, were conducted to test for non-independence within friendship pairs. The pairs were found to be non-independent on many variables. These include overall YSR indices of Total Problems (F = 2.88, $p \le .01$), Internalizing Symptoms (F = 2.12, $p \le .04$), and Externalizing Symptoms (F = 3.28, $p \le .01$). The non-independence on Internalizing Symptoms appears to be driven by the Anxious/Depressed subscale (F =

2.20, $p \le .03$). Both of the subscales of Externalizing Symptoms showed non-independence within pairs (Rule Breaking F = 2.46, $p \le .02$; Aggressive Behavior (F = 2.92, $p \le .01$).

Using the IPSOM, solution-focused behavior, but not problem-solving orientation, was found to be similar among members of pairs (F = 5.62, $p \le .001$). It may be that within-pair similarity on interpersonal problem-solving orientation also exists (based on the self-reported results) but is difficult to detect using an observational measure.

Pairs appear to be similar in their report of the quality of the friendship based on the overall scores and subscale scores, both at initial data collection and follow-up (at Time 1: Interaction Frequency Scale F = 14.96, $p \le .001$; Positive Friendship Features Scale F = 2.75, p < .01; Intimacy Subscale F = 2.13, p < .04; Instrumental Support Subscale F = 2.14, p < .04; Emotional Support Subscale F = 3.20, p < 01; Negative Friendship Features Scale F = 5.37, p <; Conflicts Subscale F = 3.34, p < .01; Inequality Subscale F = 5.42, $p \le .001$; follow up: Interaction Frequency Scale F = 5.89, $p \le .001$; Positive Friendship Features Scale F = 2.13, $p \le .05$; Intimacy Subscale F = 2.14, $p \le .04$; Instrumental Support Subscale F = 2.22, p < .04; Emotional Support Subscale F = 2.20, p = 0.04; Emotional Support Subscale P = 0.04; Emotional Subsca < .04; Negative Friendship Features Scale F = 2.91, p < .01; Conflicts Subscale F = 2.34, p < .03; Inequality Subscale F = 2.44, p < .03). The great similarity between friends' responses on the measure of friendship quality suggests that these responses accurately reflect the nature of the friendship. Self Esteem, Competence (from the YSR), Script Attachment, and Self-reported Friend Attachment were not found to differ significantly based on friend pair. Table 11 reports within-pair correlations for all study measures.⁴

Because all of the hypothesized mediations involve at least one variable that is non-

independent based on friend pair, analyses testing the hypotheses were done using pairwise scores. Since close friends were very similar to each other on many variables, pair averages were used to represent the pairs' scores on most variables. Surprisingly, a significant negative correlation was found between friends on working models of attachment to mother (i.e., "Mom and I" scripts). It was therefore not possible to use pair averages on this variable, and necessary to find a better way to describe the pair-wise scores on mother attachment. A close examination of the data showed that the friends' scores on this variable followed one of two patterns. Some pairs could be characterized as having "High/Low" attachment, with one girl exhibiting a high score and the other a low score. In the other group, the 2 girls had similar and moderate scores. Thus, the pairs' average scores on "Mom and I" scripts were recoded in a dichotomous variable called "High/Low Mom Attachment." When examining the main hypotheses, this new dichotomous variable yielded about the same result as a similar continuous one (specifically, the absolute power of the difference between friends' mother attachment scores). We chose to use the dichotomous High/Low mother attachment variable because it reflects the bimodal distribution of the two types of pairs more accurately. The members of each of these pairs do not differ from each other on most variables any more than do other pairs. However, they did have much lower within-pair correlations on Internalizing symptoms (.46, not significant) and Externalizing Symptoms (-.24, n.s.). When testing our hypotheses, we used a dichotomous variable to characterize pairs as High/Low or not High/Low to describe the pairs' patterns of working models of attachment to their mothers. The little prior research that has focused on friend pairs differs in its conclusions about the friendship quality of pairs of friends with differing

degrees of attachment security (Black & McCartney, 1997; Weimer et al, 2004).

Therefore, we did not hypothesize whether High/Low pairs would report higher or lower friendship quality, as compared to other pairs.

The decision to use pair scores was made after considering several other approaches to pair data. We were not able to include each member of the pair separately in our model (Griffin & Gonzalez, 2002)due to an insufficient sample size. Another approach to analyzing pair data was not appropriate because it is designed primarily for bivariate analyses(Kashy & Kenny, 2000). The use of pair averages is another approach to pair data that has been used in the literature(Kashy & Kenny, 2000).

The use of pair scores is theoretically meaningful. We understand many of our variables to be dyad-specific (including observed problem solving, friendship attachment cognitions, and friendship quality), developing in a give-and take throughout the pairs' friendships. For example, we understand friendship attachment cognitions to be strongly influenced by the pair's experiences of relying on each other during stressful times. For the other study variables, that are understood to be more long-standing and specific to the individual (working models of attachment, adjustment), the use of pair scores is consistent with the idea that it is the pair's pattern of scores rather than one individual's score that should impact friendship quality. For example, given that adjustment is highly correlated within pairs, a high-average score on adjustment seems to be a good representation of a pair where one members has an average score and one member has a high score. For working models of attachment, the High/Low categorization appears to be the best way to represent the pattern of pair scores (discussed in detail above).

In addition to considering non-independent within pairs, we also examined the

possibility of non-independence between participants in different schools. Two subjects came from a school in a much wealthier area than the other three schools and were excluded from this analysis. Participants from the remaining three schools appear to differ on several measures of friendship quality. The friendship quality variables with significant non-independence during the initial phase of the study are the Interaction Frequency Scale (F = 4.02, p < .03), the Emotional Support Subscale (F = 3.77, p < .04), the Negative Friendship Features Scale (F = 6.93, p < .01), the Conflict Subscale (F = 3.72, p < .04), and the Inequality Subscale (F = 9.41, p < .001). At the four months follow-up, the non-independent variables include the Interaction Frequency Scale (F = 3.86, $p \le .03$), the Instrumental Support Subscale (F = 3.38, $p \le .05$), the Emotional Support Subscale (F = 4.62, p < .02), the Negative Friendship Features Scale (F = 4.16, p< .03), and the Inequality Subscale (F = 7.46, p < .01). Change in Positive Friendship Features and Negative Friendship Features was not found to be non-independent by school, but Interaction Frequency was found to be non-independent (F = 4.68, p < .05). Non-independence by school was accounted for in analyses involving all dimensions of friendship quality, and in all analyses involving *change* in the Interaction Frequency dimension of friendship quality.

Correlations

Introduction. Tables 2-5 display correlations among the major study variables. The significance level was adjusted to $p \le .01$ in order to account for the large number of analyses. Because many of the subscales of friendship quality were non-independent based on school, participants' school was controlled for, and partial correlations computed, for all correlations involving measures of friendship quality. Due to the great

amount of similarity that was found between friends, the correlations between pair scores (averages or High/Low attachment scores) on all study variables were computed.

Observed Problem Solving and Adjustment. There are no significant or marginally significant correlations between pair scores on observed problem solving and pair scores on any of the subscales of adjustment (including Internalizing, Externalizing, Total Problems, and Competence).

Observed Problem Solving and Working Models of Attachment. There are no significant or marginally significant correlations between pair scores on observed problem solving and pair scores on any of the subscales of working models of attachment (including High/Low "Mom and I" scripts, "Dad and I" scripts, and Adult/Adult scripts).

Observed Problem Solving and Friendship Attachment Cognitions. There are no significant or marginally significant correlations between pair scores on total observed problem solving and pair scores on any of the subscales of friendship attachment cognitions (including Secure, Preoccupied, and Dismissing).

Attachment and Adjustment. The correlations between attachment and adjustment are reported in Table 2a. Pair scores on working models of attachment are not related to pair averages on adjustment. We will now turn to the association of adjustment with self-reported friendship attachment cognitions. Pair averages on Dismissing friendship cognitions are significantly negatively correlated with pair averages on Total Problems. This correlation coefficient may not be meaningful because friends' scores on Dismissing friendship cognitions are not significantly correlated.

In addition, two dimensions of friendship attachment cognitions, Secure and

Dismissing are also marginally significantly correlated with Competence in the expected

direction.

Working models of attachment were not found to be significantly correlated with friendship attachment cognitions (Table 2b).

Observed Problem Solving, Friendship Quality and Change in Friendship Quality.

There are no significant or marginally significant correlations between pair scores on total observed problem solving and pair scores on the subscales of friendship quality (including Interaction Frequency, Positive Friendship Features, and Negative Friendship Features). Pair averages on observed problem solving are also not related to pairs' change scores on friendship quality.

Adjustment, Friendship Quality and Change in Friendship Quality. As can be seen is Table 3, no significant pair-wise correlations were found, but pair-wise correlation coefficients are sizable and in the expected direction.

Working Models of Attachment, Friendship Quality, and Change in Friendship
Quality. Overall, these correlations (displayed in Table 4) indicate that the friendships of
High/Low pairs are characterized by lower levels of Positive Friendship Features than
those of other pairs at Time 1, as well as by further decreases in Positive Friendship
Features over time. Most of these correlations are consistent with the fourth and fifth
hypotheses.

As can be seen in Table 4, there are no significant correlations between pair scores on working models of attachment and friendship quality at Time 1. Although they did not qualify as significant with the small pair-wise sample size, there is a striking pattern of negative correlations between all of the subscales of Positive Friendship Features and the High/Low pattern of working models of attachment with mother. That is, pairs where one

girl evidenced a well-developed model of secure behavior with her mother and the other evidenced a very poor or absent secure base model had lower *average* scores on Positive Friendship Features as compared to the other friend pairs. Girls within High/Low attachment pairs provided very consistent reports of the relevant indices of friendship quality.

We will now turn to correlations between working models of attachment and change in friendship quality. Friend pairs with the High/Low pattern of working models of attachment to mother demonstrated a significant decrease in Positive Friendship Features over four months. This effect seems to be driven by the Intimacy and Instrumental Support subscales of the Positive Friendship Features Scale. Although the correlation coefficient was not significant, it is interesting to note that such pairs also reported an increase in conflict. An examination of group means reveals that these girls reported a decrease in friendship quality, while other friend pairs reported fairly consistent friendship quality.

Friendship Attachment Cognitions, Friendship Quality, and Change in Friendship Quality. There are a number of significant correlations between Time 1 Friendship Features (including both positive and negative) and friendship attachment cognitions (please see Table 5). As can be seen in Table 5, pair averages on Positive Friendship Features are significantly correlated with Secure friendship attachment cognitions. Pair scores on Preoccupied friendship cognitions are correlated with Negative Friendship Features. The correlation with conflicts is strongest and is statistically significant, while the correlations with inequality and with overall scores on Negative Friendship Features are marginally significant.

These correlations are consistent with the third and fifth hypotheses. However, the correlations with change in friendship quality are marginally significant and non-significant, and did not lend support to these hypotheses.

Mediations

Bootstrapping methods (Shrout & Bolger, 2002) were used to test the hypotheses because they are more sensitive than the traditional methods for testing mediational relationships (Baron & Kenny, 1986). In addition, bootstrapping methods seemed appropriate because they do not assume normality of the variables. Not all of the measures in this study yield results that are normally distributed. Finally, in contrast to traditional regression-based mediation analyses, bootstrapping methods do not require that the three relevant variables be significantly correlated. Due to the small sample size of this study, we expected that some pairs of variables may be part of a statistically significant indirect effect while not being correlated to a degree that would qualify for statistical significance.

For all hypothesized mediations, the major subscales of the relevant variables were tested in turn. If a significant or marginally significant indirect effect was found, the components of the subscale were also tested. When there were several significant correlations between minor subscales of relevant variables, we tested mediations involving these minor subscales even if the major subscales did not yield promising results.

In order to test for the hypothesized mediations, a model of the hypothesized relations between the three variables was set up using AMOS 5. Following Shrout & Bolger (2002), standardized estimates of all three direct effects and the indirect effects between

the IV and the DV were obtained. Two-tailed 95% confidence intervals of the sizes of these effects were also obtained using up to 1000 iterations of bootstrapping for each effect. The direction of the direct and indirect effect between the IV and DV was expected to be the same, indicating that suppression is not involved in the model. When this was indeed the case, the strength of the indirect effect was assessed by considering the 95% confidence interval of the dimension of the effect. An interval that is entirely above zero was considered to provide evidence of a mediation effect. If significant indirect effects were found, we planned to distinguish between partial and complete mediation.

Because working models of attachment and scores on adjustment were expected to be correlated to the extent that girls experienced generally good parenting, each of these was included as an exogenous variable when the mediation being tested included the other. Specifically, a double-headed arrow was included between the variables being controlled for and the IV of the mediation, and one-directional arrows were drawn from the variable being controlled for to the other two variables. Pair averages of girls' Total Problems scores were used when controlling for adjustment. When controlling for working models of attachment, we had originally planned to use scores on working models of attachment to mother. Because pairs' status on this variable was best described by the High/Low pattern, pairs' High/Low score was used when controlling for attachment.

It was also necessary to control for school in analyses involving friendship quality, as scores on this variable differed among students from the participating high schools.

School was thus included as another exogenous variable.

Hypothesis 1. Support was not found for the first hypothesis. Controlling for school,

observed problem solving was not found to mediate the relation of initial friendship quality and friendship quality at follow-up. The examined scales of friendship quality included Positive Friendship Features, Negative Friendship Features, and Interaction Frequency.

Hypothesis 2. Support was not found for either component of the second hypothesis. Controlling for working models of attachment and school, observed problem solving was not found to mediate the relation of adjustment and friendship quality at Time 1. Controlling for attachment in all analyses and for school in analyses involving change in interaction frequency, observed problem solving was not found to mediate the relation of adjustment and change in friendship quality. The examined measures included Total Problem Solving; the Internalizing, Externalizing, Total, and Competence scores for adjustment; and the Positive Friendship Features, Negative Friendship Features, and Interaction Frequency scores for friendship quality (including Time 1 scores for the first component of the hypothesis and change scores for the second).

Hypothesis 3. Support was not found for the third hypothesis. Observed problem solving was not found to mediate the relation of friendship attachment cognitions and friendship quality at Time 1, nor did it mediate the relation of friendship attachment cognitions and change in friendship quality. We controlled for school in all analyses involving initial friendship quality or the interaction frequency dimension of change in friendship quality. The examined measures included Total Problem Solving; the Secure, Dismissing, and Preoccupied scores for friendship attachment cognitions; and the Positive Friendship Features, Negative Friendship Features, and Interaction Frequency scores for friendship quality (including Time 1 scores for the first component of the

hypothesis and change scores for the second).

Hypothesis 4. Support was not found for the fourth hypothesis. Controlling for adjustment, attachment cognitions were not found to mediate the relation of working models of attachment and observed problem solving. The examined measures included High/Low "Mom and I" scripts, "Dad and I" scripts, and Adult/Adult scripts for working models of attachment; the Secure, Preoccupied, and Dismissing for friendship attachment cognitions.

Hypothesis 5. Several marginally significant and significant mediations were found for the first part of the fifth hypothesis. We began by testing only the major subscales of the relevant variables. While controlling for adjustment and school, we examined friendship attachment cognitions (including Secure, Preoccupied, and Dismissing scores) as a potential mediator of working models of attachment (including High/Low "Mom and I" scripts, "Dad and I" scripts, Adult/Adult attachment) and friendship quality (including Positive Friendship Features, Negative Friendship Features, and Interaction Frequency).

One unexpected significant mediation was found, indicating that pairs with more secure working models of Adult/Adult attachment have higher Dismissing friendship cognitions and lower Positive Friendship Features (standardized bootstrap estimate of indirect effect = -3.44 to -.04; p = .04). This represents a suppression of the positive direct effect between pair scores on Adult/Adult attachment and pair scores on Positive Friendship Features (standardized bootstrap estimate of direct effect = -1.14 to 4.94, p = .22). We examined the minor subscales of Positive Friendship Features and found that this mediation is driven primarily by the Intimacy subscale (standardized bootstrap estimate of indirect effect = -1.16 to -.10, p < .05). Because this mediation involved

suppression, we did not examine for complete or partial mediation.

Both the main mediation and the mediation involving the Intimacy subscale of Positive Friendship Features were not significantly impacted by controlling for Self Esteem (main mediation: standardized bootstrap estimate of indirect effect = .01 to .28, p = .02; mediation involving the Intimacy subscale: standardized bootstrap estimate of indirect effect = .01 to .10, p = .01). Similarly, the two mediations were not significantly altered by controlling for mood (main mediation: standardized bootstrap estimate of indirect effect = .01 to .26, p = .02; mediation involving the Intimacy subscale: standardized bootstrap estimate of indirect effect = .01 to .10, p = .02).

One set of marginally significant mediations involving the High/Low pattern of attachment to mother was also found. These mediations are in line with our hypotheses. Pair averages on Preoccupied friendship cognitions is a marginally significant mediator of High/Low pair status and Negative Friendship Features (standardized bootstrap estimate = -.23 to 6.29, p = .09). When we substituted the Negative Friendship Features subscale with both of its minor subscales in turn, the resulting mediations were also marginally significant (standardized bootstrap estimate = -.17 to 3.27, p = .11 with Conflicts; standardized bootstrap estimate = -.10 to 3.49, p = .09 with Inequality). Thus, both subscales appear to play a role in this effect. Because the direct effect between High/Low status and Negative Friendship Features is not statistically significant, (standardized bootstrap estimate = -5.85 to 3.31, p = .70), we did not examine for complete or partial mediation.

We visually examined the data for the six High/Low pairs for differences between the "High" and "Low" girls. In four of these pairs, the two friends received similar and

average scores on friendship cognitions. In the other two pairs, the "Low" mother attachment girls reported much higher levels of Preoccupied friendship cognitions (by about 2 SDs) and received much lower scores on Total friendship cognitions (by about 3 SDs).

When controlling for self esteem, the mediation was somewhat reduced (standardized bootstrap estimate = -.63 to 6.27, p = .14). The mediating role of both of the subscales of Negative Friendship Features is similarly reduced by controlling for self esteem (Conflict subscale: standardized bootstrap estimate = -.29 to 3.15, p = .14; Inequality subscale: standardized bootstrap estimate = -.27 to 3.28, p = .14).

The mediation increased in significance when mood was included in the model (standardized bootstrap estimate = .03 to 7.63, p < .05). The mediations involving the Conflict subscale of Negative Friendship Features also became statistically significant after controlling for mood (standardized bootstrap estimate = .02 to 4.17, p = .05). There appears to be a suppression effect in the connection of the IV (High/Low pair status) and the mediator (Preoccupied friendship cognitions) in the original mediation. While High/Low status is bivariately associated with higher Preoccupied friendship cognitions (r = .31, n.s.), High/Low status is associated with *lower* Preoccupied friendship cognitions through mood (more specifically, there is a non-significant negative correlation between High/Low status and mood and a non-significant positive correlation between mood and Preoccupied attachment cognitions). Therefore, the original relation between High/Low status and Preoccupied friendship cognitions is increased in magnitude when mood is included in the model, as is the entire original mediation. The mediation involving the Inequality subscale of Negative Friendship Features was not

altered by controlling for mood (standardized bootstrap estimate = -.18 to 3.69, p = .08).

No significant or marginally significant results were found for the second set of hypothesized mediations, which were concerned with change in friendship quality. Specifically, we examined attachment cognitions (including Secure, Preoccupied, and Dismissing) as a mediator of parent attachment (including High/Low, Father, and Adult/Adult) and change in friendship quality (including Positive Friendship Features, Negative Friendship Features, and Interaction Frequency). We controlled for adjustment and school in all analyses, and for school in all analyses involving change in Interaction Frequency.

Analysis of Potential Alternate Explanations

Self Esteem and Mood. The results of controlling for these two variables are described along with the results for Hypothesis 5, the only hypothesis where we found significant results.

Deviant vs. Non-deviant Friends. It is important to consider the possibility that the relations among the variables examined here are different among girls who engage in deviant behavior and/or their friends. Using the Rule Breaking subscale of the YSR, none of the participant fell within the clinical range, and one fell within the borderline clinical range. Thus, there is not a sufficient subsample of girls who engage in deviant behavior to examine them separately.

Supplemental Results

Compared to the college student population that we used to develop the IPSOM, we observed very low occurrences of the targeted problem-solving behaviors among teens,⁶ as well as low variance on most items and summary scores. The developmental

difference that these results suggest is in line with our qualitative impressions of the problem-solving interactions. In general, the teens showed little or no problem solving during the observational problem-solving task. Rather, they often avoided discussing the problem altogether, minimized the importance of the problem to them, or changed the topic of conversation away from the problem. Whenever they did focus on the problem, they tended to express their thoughts and feelings about it rather than trying to solve it. Any solutions that were mentioned were either dismissed or accepted immediately, without evaluating these solutions or comparing them to other potential ones.

Because of the low variability on the IPSOM, it is not surprising that all of our main hypotheses that include this measure were not supported. The low variability on the observational measure may be due to a combination of teens' high reactivity to the experimental situation and a relatively low rate of interpersonal problem solving among teens. Higher variability in teen samples has been found in *self-reported* social problem solving using the Social Problem-Solving Inventory - Revised (SPSI-R, D'Zurilla et al., 2002), although the level of problem-solving ability on this measure is still lower than that of adults (Jaffee & D'Zurilla, 2002). Although scores on self-reported problem-solving ability do not tap the way that a particular pair resolves disagreements as directly as do scores on observed problem solving, the self-reported problem-solving ability of both members of a pair may still be a valid indicator of that pairs' ability to resolve disagreements. Moreover, the validity of a self-report measure may not be affected by the reaction that may occur in an experimental problem-solving situation with teens.

The moderate but significant correlation that was found between the IPSOM and selfreported social problem solving (Londahl et al., 2003) suggests that the two types of measures have important similarities as well as important differences. In terms of similarities, both types of measures are based on social problem solving theory (D'Zurilla et al., 2002), which focuses on specific important aspects of individuals' problem-solving attitudes and problem-solving skills. In the present study, we used the short form of the SPSI-R (SPSI-R:S, D'Zurilla et al., 2002). This measure assesses how teens approach and attempt to solve problems in general, including but not limited to interpersonal problems or conflicts. The SPSI-R:S consists of five scales that assess five different dimensions of social problem-solving ability. The Positive Problem Orientation (PPO) scale taps a constructive, problem-solving cognitive set that involves the general disposition to (a) appraise a problem as a "challenge" (i.e., opportunity for benefit), (b) believe that problems are solvable, (c) believe in one's own personal ability to solve problems effectively, and (d) believe that successful problem solving takes time, effort, and persistence. The Negative Problem Orientation (NPO) scale measures a dysfunctional or inhibitive cognitive-emotional set that involves the general tendency to (a) view a problem as a significant threat to well-being, (b) doubt one's own ability to solve problems successfully, and (c) easily become upset and frustrated when confronted with problems. Rational Problem Solving (RPS) assesses a constructive cognitive-behavioral pattern involving the deliberate and systematic application of effective problem-solving skills (i.e., problem definition and formulation, generation of alternative solutions, decision making, & solution implementation and verification). Impulsivity/Carelessness Style (ICS) assesses a dysfunctional problem-solving pattern characterized by problemsolving attempts that are narrow, impulsive, hurried, and incomplete. Avoidance Style (AS) taps another defective behavioral pattern characterized by procrastination, passivity,

inaction, and attempts to shift the responsibility for problem solving to others. "Good" problem-solving ability is indicated by higher scores on PPO and RPS and lower scores on NPO, AS, and ICS, whereas the reverse is true for "poor" problem-solving ability. These five factors have been found to apply in both adolescent and adult samples (D'Zurilla et al., 2002)

Similar to observed problem solving, self-reported social-problem-solving ability has been found to be related to many aspects of adjustment, including psychological distress, social adjustment, and behavioral deviations (for a review, see Chang, D'Zurilla, & Sanna, 2004). Among adolescents in particular, social problem solving as indicated by the SPSI-R:S has been shown to relate to externalizing behavior and to positive psychological well-being (D'Zurilla et al., 2002). Furthermore, self-reported problem-solving ability has been found to serve as a moderator of relationship quality and adjustment, including both internalizing and externalizing symptoms (Londahl et al., 2005; Tverskoy et al., 2007). As discussed in the Introduction section, self-reported conflict resolution ability has also been found to relate to attachment cognitions (Creasey & Hesson-McInnis, 2001; Creasey et al., 1999).

Due to the differences between the SPSI:R-S and observed problem solving, it was necessary to re-formulate some of the hypotheses. The SPSI:R-S is a more general measure of social problem solving and is more oriented toward the individual rather than the relationship as compared to our measure of observed problem solving. The former is also more long-standing, developing throughout childhood largely under the influence of parents and other important adults. Please see Figure 1 for a summary of the original hypotheses and Figure 2 for a summary of the new hypotheses.

The SPSI-R:S was not part of the initial study battery, but was added after the first six pairs of participants were observed to engage in little interpersonal problem solving. All analyses involving the SPSI-R:S excluded the first six pairs and were based on the latter 20 study pairs.

Modified Hypothesis 1. In its original version, the first hypothesized mediation speculated that initial friendship quality would impact friends' ability to resolve their disagreements, which would in turn impact friendship quality four months later. However, general social problem solving should not be affected by a specific friendship in the same way as interpersonal problem solving between the friends would be. Yet, previous research has shown that self-reported problem-solving ability does relate to relationship quality (Londahl et al., 2005; Tverskoy et al., 2007). Therefore, the first hypothesis was modified to a moderation, as explained below.

Moderators are conceptually different from mediators and different statistical methods are required to test their effects (Baron & Kenny, 1986; Holmbeck, 1997). A moderator is an independent variable that affects the relationship between two other variables, such that the magnitude of the relation between the predictor and the criterion varies according to the level of the moderator. A mediator, in contrast, is an intervening variable that occupies a position in a causal chain linking an antecedent variable with some criterion or outcome variable (see the Introduction section fur further discussion of mediation). Statistically speaking, a moderator effect is indicated by a significant interaction in a multiple regression analysis between the moderator variable and another independent variable when predicting the criterion variable. For our modification of Hypothesis 1, we expected that the magnitude of the relationship between initial

friendship quality and final friendship quality would differ based on the presence of poor vs. good problem-solving ability. Based on previous findings of the relation between good problem-solving ability and good relationship quality (Londahl et al., 2005; Tverskoy et al., 2007), we expected that the positive relation of initial friendship quality and friendship quality at follow-up would be stronger when social problem-solving ability is high.

Modified Hypothesis 2. In its original version, the second hypothesis posited that observed problem solving would mediate the relation of adjustment and friendship quality. Due to the developmental differences between friendship-specific observed problem solving and general social problem solving discussed above, we expected social problem solving to serve as a moderator rather than a mediator in modulating the relation of adjustment and friendship quality. This hypothesis is in line with previous findings of the moderation of adjustment and relationship quality by social problem solving (Londahl et al., 2005; Tverskoy et al., 2007). Based on the findings of this previous work, we expected that the relation of adjustment and relationship quality would be stronger in the presence of poor vs. good problem-solving ability. More specifically, we expected that the negative relation of reported symptoms (including Internalizing, Externalizing, and Total) and friendship quality (both initially and over time) would be stronger when problem-solving ability is low. We also expected that the positive relation of Competence (which includes Social, Academic, and Activities competence) and friendship quality (both initially and over time) would be stronger when problem-solving ability is low. As originally planned, we controlled working models of attachment in these analyses.

Modified Hypothesis 3. In its original version, the third hypothesis posited that

observed interpersonal problem solving would mediate the link between friendship attachment cognitions and friendship quality. While there is evidence that both measures are relevant to relationship quality, we did not expect general social problem solving to serve as a mediator in the same way that we thought pair-specific interpersonal problem solving would. Just as we did not expect friendship quality to have a significant impact on general problem solving (as discussed under *Hypothesis 1* above), we did not expect friendship attachment cognitions to have a significant effect on general problem solving. Rather, (a) girls' pre-existing ability to problem-solve was expected to serve as a moderator of their friendship attachment cognitions and initial friendship quality, and (b) problem-solving ability was expected to moderate the relation of friendship attachment cognitions and change in friendship quality. Based on the existing findings of the relation of both attachment cognitions and conflict resolution ability to friendship quality (Creasey & Hesson-McInnis, 2001; Creasey et al., 1999; Langan, 2001), we expected that dysfunctional dimensions of friendship cognitions (Preoccupied and Dismissing) would be negatively related to friendship quality (both initially and over time) more strongly in the case of poor vs. good problem-solving ability. We expected that the Secure dimension of attachment cognitions would be positively related to friendship quality (both initially and over time) more strongly in the case of poor vs. good problem-solving ability.

Modified Hypothesis 4. In its original version, the fourth hypothesis postulated that attachment cognitions would mediate the relation between working models of attachment and observed problem solving. In contrast to the originally hypothesized effect of friendship attachment cognitions on *interpersonal* problem solving between the friends, it seemed more appropriate to expect that *general* social problem solving would impact

friendship cognitions. Girls' pre-existing ability to resolve disagreements may impact the development of a new friendship, including the expectations of support that are formed in that friendship. Past research suggests that general problem-solving ability (in contrast to interpersonal friend-specific problem solving) may not be related to working models of attachment (Richard, 2002). Thus, it appears that working models of attachment and social problem-solving ability may be separate influences on friendship attachment cognitions. These influences may interact in important ways. Pairs who lack secure working models of attachment were expected to have lesser expectations of the availability and responsiveness of their friends (attachment cognitions). This relation was expected to be stronger in the case of poor problem-solving ability. We expected that pairs with both poor working models of attachment and difficulty problem-solving would be unlikely to find effective ways to get through individual and relationship difficulties. So, both based on their implicit expectations stemming from working models of attachment and based on their real-life experience of not being able to use their friends for support at stressful times, such pairs were expected to lack secure attachment cognitions, and to have higher dismissing and preoccupied attachment cognitions. In sum, we hypothesized that the relation of secure working models of attachment to secure attachment cognitions would be stronger in the case of poor vs. good problem-solving ability. We also expected that the negative relation of secure working models of attachment to dysfunctional attachment cognitions (including both preoccupied and dismissing attachment cognitions) would be stronger in the case of poor vs. good problem-solving ability. As originally planned, we controlled for adjustment in this analysis.

Descriptive Statistics

Table 1b shows the means, standard deviations, and coefficient alphas for scores on the SPSI:S. Coefficient alphas for all subscales were high, ranging from .76 to .87. These scores indicate good internal reliability.

Non-Independence

A high level of non-independence within pairs was found on self-reported Total Problem Solving (F = 3.93, $p \le .01$). This appears to be driven by the Negative Problem Orientation subscale (F = 5.65, $p \le .001$) and Avoidance Style subscale (F = 2.73, $p \le .02$). Pair averages were used for all analyses.

Correlations

Social Problem Solving and Adjustment. As can be seen in Table 6, many relations between social problem solving and symptom-based indices of adjustment were found. These are consistent with the second hypothesis. Pair averages on both Internalizing Symptoms and Externalizing Symptoms are associated in the expected direction with all dimensions of social problem solving. Most of these correlations are significant. All but one of the non-significant correlations involved dimensions of problem solving that are not correlated among friends (Rational Problem Solving and Impulsivity Carelessness Style), and are therefore not as meaningful. Total symptoms scores and scores on Competence are not significantly related to social problem solving.

Social Problem Solving and Working Models of Attachment. Using pair-based scores (pair averages and pair attachment High/Low scores), there are no significant or marginally significant correlations between social problem solving and working models of attachment (see Table 7).

Social Problem Solving and Friendship Attachment Cognitions. Various dimensions of dysfunctional pair-wise friendship attachment cognitions are significantly and marginally significantly correlated with dimensions of dysfunctional problem solving (see Table 8). These correlations are in line with the link between problem solving and attachment cognitions that is posited in the third and fourth hypotheses.

There is also an unexpected significant positive correlation between pairs' report of higher Negative Problem Orientation and their report of more Secure friendship cognitions.

Social Problem Solving and Friendship Quality at Time 1. In these and all of the below correlations involving friendship quality, we controlled for school. As can be seen in Table 9, pair averages on Social Problem Solving are not associated with pair averages on Positive Friendship Features. Pair scores on Negative Friendship Features are with those on Impulsivity/Carelessness Style (a dimension of problem-solving skills, please see Table 9). These correlations are consistent with the first three hypotheses.

Social Problem Solving and Change in Friendship Quality. As can be seen in Table 10, change in pairs' report of friendship quality is not significantly correlated with pairs averages on social problem solving.

Modified Hypotheses

As we did in testing the original hypothesis, we controlled for school in all analyses involving all dimensions of initial friendship quality and change in Interaction Frequency. We controlled for working models of attachment in all analyses involving adjustment, and controlled for adjustment in all analyses involving working models of attachment.

Modified Hypothesis 1. The first modified hypothesis posited that self-reported

problem-solving ability moderates the relation between initial friendship quality and friendship quality at follow-up. We controlled for school in all analyses. The examined scales of friendship quality included Positive Friendship Features, Negative Friendship Features, and Interaction Frequency. The examined scales of problem solving included Positive Problem Orientation, Negative Problem Orientation, Rational Problem Solving, Impulsivity/Carelessness Style and Avoidance Style. Pair averages on self-reported social problem solving were not found to significantly moderate the relation of initial friendship quality and friendship quality at follow-up.

Modified Hypothesis 2. The second modified hypothesis posited that self-reported problem solving moderates the relation of adjustment and friendship quality (including both initial friendship quality and change in friendship quality). The examined scales of friendship quality included Positive Friendship Features, Negative Friendship Features, and Interaction Frequency. The examined scales of problem solving included Positive Problem Orientation, Negative Problem Orientation, Rational Problem Solving, Impulsivity/Carelessness Style and Avoidance Style. The examined subscales of adjustment included the Internalizing Scale, Externalizing Scale, the Total Problems Scale, and the Competence Scale. We controlled for working models of attachment in all analyses and controlled for school in all analyses involving initial friendship quality and change in Interaction Frequency.

As can be seen in Table 12, several moderations of the relation between adjustment and the Positive Friendship Features dimension of friendship quality were found. These moderations are not in line with our second hypothesis. All three of the dysfunctional dimensions of problem solving were found to serve as moderators of the relation between

the Total Problems Scale of adjustment and Positive Friendship Features. Of these three, only Avoidance Style (AS, $\Delta R^2 = 28\%$) was found to be a significant moderator at the $p \le .01$ level. The moderations involving Negative Problem Orientation (NPO, $\Delta R^2 = 15\%$) and Impulsivity /Carelessness Style (ICS, $\Delta R^2 = 14\%$) were marginally significant ($p \le .05$). The pattern of the moderation involving AS can be seen in Figure 3. The pattern of the association between adjustment and Positive Friendship Features varied depending on scores on dysfunctional problem solving. When scores on dysfunctional problem solving (including AS, NPO and ICS) were high, higher scores on Total Problems were associated with higher scores on Positive Friendship Features. While it appears in Figure 3 that for lower scores on dysfunctional problem solving, higher scores on Total Problems were associated with *lower* scores on Positive Friendship Features, this effect is not significant (p = .06; Aiken & West, 1991).

There are also two marginally significant moderations ($p \le .05$) of the relation between the Competence dimension of adjustment and Positive Friendship Features (also displayed in Table 12). These moderations involve the two adaptive scales of problem solving: Positive Problem Orientation (PPO, $\Delta R^2 = 15\%$) and Rational Problem Solving (RPS, $\Delta R^2 = 19\%$). The pattern of these moderations was in the expected direction. Specifically, the relation between Competence and Positive Friendship Features is stronger for pairs with poor problem-solving ability than it is for pairs with good problem-solving ability.

As can be seen in Table 13, we also found several marginally significant ($p \le .05$) moderations involving the Interaction Frequency scale of friendship quality. Both the moderation involving Internalizing symptoms and the one involving Externalizing

symptoms follow the same pattern. In both cases, the negative association of reported symptomatology and Interaction Frequency becomes stronger as ICS decreases. The pattern of these interactions is not in line with our modified hypothesis.

Only one marginally significant moderation ($p \le .05$) involving change in friendship quality was found (see Table 13). The ICS dimension of problem solving was found to moderate the relation of the Internalizing scale of adjustment and change in Interaction Frequency ($\Delta R^2 = 28\%$). As can be seen in Figure 4, the negative relation of Internalizing Symptoms and Interaction Frequency is stronger for high vs. low ICS. This is consistent with our modified hypothesis.

Modified Hypothesis 3. The modified third hypothesis posited that self-reported problem-solving ability moderates the negative relation between poor friendship attachment cognitions (including low Secure attachment cognitions and high Preoccupied and Dismissing attachment cognitions) and friendship quality. We controlled for school in all analyses that include initial friendship quality scores and change in Interaction Frequency scores. The examined scales of friendship quality included Positive Friendship Features, Negative Friendship Features, and Interaction Frequency. The examined scales of problem solving included Positive Problem Orientation, Negative Problem Orientation, Rational Problem Solving, Impulsivity/Carelessness Style and Avoidance Style. The examined scales of friendship attachment cognitions included the Secure, Preoccupied, and Dismissing scales. To meet normality assumptions, we used a natural log transformation of the Preoccupied friendship cognitions scale.

Several dimensions of problem solving were found to be significant moderators (p<01) of the relation of Dismissing friendship cognitions and Positive Friendship

Features (see Table 14). These include Positive Problem Orientation (PPO, $\Delta R^2 = 40\%$) and Avoidance Style (AS, $\Delta R^2 = 39\%$). As can be seen in Figures 5 and 6, good problem-solving ability appears to serve as a buffer, so that the negative association between Dismissing friendship cognitions and Positive Friendship Features is stronger for pairs that have lower problem-solving ability (lower PPO and higher AS). This pattern is in line with our modified hypothesis. There is also a marginally significant ($p \le .05$) moderation by RPS that is similar to the above two moderations. Two subscales of problem solving were also found to be marginally significant ($p \le .05$) moderators of the relation between Secure friendship cognitions and Positive Friendship Features (see Table 14). These include PPO ($\Delta R^2 = 12\%$) and RPS ($\Delta R^2 = 12\%$). That the patterns of these moderations indicated that the negative relation between low Secure friendship cognitions and Positive Friendship Features is stronger for poor vs. good problem-solving ability. This is in line with our modified hypothesis.

Similarly to the results for Positive Friendship Features, problem solving was found to be a significant ($p \le .01$) moderator of the relation between Dismissing friendship cognitions and Negative Friendship Features (see Table 15). Specifically, the two adaptive dimensions of problem-solving ability were found to serve as moderators (PPO, $\Delta R^2 = 24\%$; PRS, $\Delta R^2 = 24\%$). As can be seen in Figures 7 and 8, the relation of Dismissing friendship cognitions to higher Negative Friendship Features increased with poor vs. good problem-solving ability. In line with the results for Positive Friendship Features and with our modified hypothesis, problem solving was found to be a marginally significant moderator ($p \le .05$) of the relation between Secure friendship cognitions and Negative Friendship Features (see Table 15). The relevant dimensions of problem solving

are PPO ($\Delta R^2 = 17\%$) and RPS ($\Delta R^2 = 20$). As we expected, the negative relationship between Secure friendship cognitions and Negative Friendship Features is stronger with lower problem-solving ability. Surprisingly, for pairs with higher problem-solving ability, Secure friendship cognitions are positively associated with Negative Friendship Features (these effects are marginally significant: $p \le .05$ for low PPO and $p \le .03$ for low RPS).

Problem solving was not found to moderate the relations of Friendship Cognitions and the Interaction Frequency subscale of friendship quality.

Four marginally significant moderations ($p \le .05$) of the change in friendship quality were found (please see Table 16). Specifically, NPO was found to moderate the relation of Secure Friendship Cognitions and Change in Negative Friendship Features ($\Delta R^2 = 19\%$). The pattern of the moderation (summarized in Figure 9) indicates that secure friendship cognitions are associated with a decrease in Negative Friendship Features, but only in the case of good problem-solving ability. Three moderations of the relation of friendship cognitions and change in Interaction Frequency follow a similar pattern to the one described above (see equations 2-4 in Table 16). These moderations are not in line with our modified hypothesis that low Secure Friendship cognitions would be associated with a decrease in friendship quality when problem-solving ability is low. Rather, there seems to be relation between Secure friendship cognitions and *improvement* in friendship quality when problem-solving ability is high. No moderations involving change scores on the other subscales of Positive Friendship Features were found.

Modified Hypothesis 4. The modified fourth hypothesis posited that self-reported problem-solving ability moderates the relation between working models of attachment and friendship attachment cognitions. We controlled for adjustment in this analysis. The

examined scales of problem solving included Positive Problem Orientation, Negative Problem Orientation, Rational Problem Solving, Impulsivity/Carelessness Style and Avoidance Style. The examined scales of friendship attachment cognitions included the Secure, Preoccupied, and Dismissing scales. The examined scales of working models of attachment included High/Low "Mom and I" scripts, pair averages on "Dad and I" scripts, and pair averages on Adult/Adult scripts. To meet normality assumptions, we used a natural log transformation of the Preoccupied friendship cognitions scale. No significant moderations were found.

Analyses of Potential Alternate Explanations

Self Esteem. Self esteem is significantly correlated with pair averages on many indices of social problem solving and adjustment (including all five scales of problem solving and the Internalizing and Externalizing subscales of adjustment). Both of the hypotheses where we found significant results include one or both of these two variables.

For the second modified hypothesis, controlling for self esteem resulted in one marginally significant moderation being reduced so that it was no longer significant. This was the moderation of the relation between Competence and Positive Friendship Features by PPO (Table 12, Equation #4).

Turning to the third modified hypothesis, none of the significant moderations were reduced to being non-significant by controlling for self esteem. One marginally significant moderation was reduced (original moderation depicted in Table 14, Equation #3), and three moderations were significantly *increased* (either from $p \le .01$ to $p \le .001$, or from $p \le .05$ to $p \le .01$; original moderations depicted in Table 14, Equations #1 and #3, Table 16, Equation #1).

Mood. Several of the moderations for the second modified hypothesis were reduced by controlling for mood. The role of AS as a moderator of Total Problems and Positive Friendship Features (see Table 12, equation #1) was reduced from significant ($p \le .01$) to marginally significant ($p \le .02$). A moderation involving another dysfunctional dimension of problem solving (NPO), Total Problems and Positive Friendship Features (see Table 12, Equation #2) was reduced from marginally significant ($p \le .05$) to non-significant (p = .26). There are no significant bivariate correlations between mood and either problem solving or adjustment.

Turning to the modified third hypothesis, none of the significant moderations were reduced to being non-significant by controlling for mood. The role of adaptive problem-solving ability as a moderator of Secure friendship cognitions and Positive Friendship Features was increased from marginally significant to significant (from $p \le .05$ to $p \le .01$; original moderations depicted in Table 14, Equations #4 and #5).

Deviant Friends. As discussed above, we were not able to test for the potential influence of having a deviant best friend because our sample did not include a sufficient number of girls who reported deviant behavior.

Discussion

The results of our bivariate analyses, which were conducted using pair-based scores, replicated some of the previously found bivariate associations between variables. This previous work was done using mostly individual rather than pair scores. Significant support was not found for any of the main hypotheses. As discussed in the supplemental results section, support was found for some of the modified hypotheses.

Correlations with Observed Problem Solving. Using pair scores, observed problem

solving was not correlated with any of the other major variables (including working models of attachment, friendship attachment cognitions, adjustment, friendship quality, and change in friendship quality). This may be due to the small sample variance on the measure of observed problem solving used in this study (please see the supplemental discussion section for a review of our results using a self-report measure of social problem solving).

Correlations among Measures of Attachment. There were no significant or marginally significant correlations between pair-wise friendship attachment cognitions and working models of attachment. This indicates that girls' thoughts about seeking support from their friends are not significantly related to their implicit working models of close relationships. Our finding of a lack of a significant correlation between these two variables is consistent with the differences between implicit and explicit measures of attachment that has been discussed in the literature (Jacobvitz et al., 2002; E. Waters et al., 2002). It seems that it is this difference in methodology rather than a lack of association between attachment to parents and attachment to friends is responsible for this lack of findings. Previous studies have found associations between attachment to parents and attachment to close friends using both implicit and self-report measures (Furman et al., 2002). It is important to note that these findings are not due to the use of "High/Low" pair scores in the analyses. As can be seen in Appendix A, an estimate of the individual-level correlation between the two variables (Griffin & Gonzalez, 1995) also failed to yield significant results. However, it is possible that significant correlations would've been found with a larger sample.

Correlations with Adjustment. Pair scores on working models of attachment were not

correlated with pair scores on adjustment. This may be due to the use of our dichotomous "High/Low" variable to represent the pairs' patterns of attachment to their mothers. As can be seen in Appendix A, estimates of individual-level correlations indicate that girls with less secure working models of attachment to their mothers report more externalizing symptoms. This is consistent with previous findings (Sroufe et al., 2000).

Our results did not indicate that pair scores on emotional and behavioral difficulties are associated with friendship attachment cognitions. Friendship cognitions were associated with the social and academic competence subscales of adjustment in the expected direction. This indicates that friend pairs who report high levels of participation and skill in social activities, academics, and hobbies tend to have friendships that are characterized by expectation of emotional openness and support and by a lack of expectation of emotional needs being dismissed. It is interesting to note that social and academic competence seems to be related to friendship-specific attachment cognitions more strongly than it is related to general working models of attachment. It may be that pairs who lack social competence may not be able to effectively support one another. Surprisingly, pairs' reports of Dismissing friendship cognitions were associated with lower reports of emotional and behavioral difficulties. This association may not be meaningful because friends' scores on Dismissing friendship cognitions are not significantly correlated. Alternately, the association could be explained by some of girls having a tendency to minimize both the need for support from friends and to minimize emotional and behavioral difficulties.

Pairs' emotional and behavioral difficulties are not significantly associated with friendship quality or change in friendship quality. Since both adjustment and friendship quality are strongly associated within pairs, and because previous work has found relations between these two variables (Rubin et al., 2004; Sroufe et al., 2000), it is surprising that significant correlations between adjustment and friendship quality were not found. Many of the correlation coefficients between the symptom scales of adjustment and friendship quality were small to moderate, and would meet criteria for significance if replicated with a larger sample. One of these is a marginally significant correlation between greater intimacy over time and lower internalizing symptoms. Thus, girls with lower internalizing symptoms seem to share more and more with their friends over time. Each of these two variables was strongly associated among pair members. This suggests that it is appropriate to use pair scores when examining the relation of these variables in friend pairs.

Correlations between Friendship Quality and Attachment. Although they did not qualify as statistically significant based on our small pair-wise sample size, there is a striking pattern of negative correlations between positive aspects of friendship (including intimacy, emotional support, and tangible support) and the "High/Low" pattern of working models of attachment with mother. That is, pairs where one girl evidenced a well-developed model of secure behavior with her mother and the other evidenced a very poor or absent secure base model reported lower levels of intimacy and support, as compared to the other friend pairs. The two members of "High/Low" attachment pairs provided very consistent reports of the relevant indices of friendship quality. Thus, it seems that these correlations really are indicative of lower friendship quality among the "High/Low" pairs. These results are consistent with previously found correlations between implicitly measured attachment (using the AAI) and interview-based scores of

pattern of working models of attachment to mother demonstrated a significant decrease in friendship intimacy and support over four months. ⁹ Although the correlation coefficient was not significant, it is interesting to note that such pairs also reported an increase in conflict. An examination of group means reveals that these girls reported a decrease in friendship quality, while other friend pairs reported fairly consistent friendship quality. Thus, it appears that pairs with this pattern of attachment have difficulty sustaining their friendships over time. To our knowledge, this is the first study to demonstrate a connection between working models of attachment and change in friendship quality over time among teens.

Turning to the relation of friendship quality and pair-wise friendship attachment cognitions, we see several significant correlations with both positive and negative aspects of friendships. This is in line with previous research (e.g. Langan, 2001). Pairs' reports of their friendship intimacy and support are significantly associated with secure friendship attachment cognitions. There is some overlap between the two subscales of these measures. Both measures inquire about girls' tendencies to go to their friends in times of need, including both instrumental help and emotional support. But unlike the measure of attachment cognitions, the measure of friendship quality also asks directly about the friends' behavior in such situations, as well as about the friends' tendencies to disclose intimate information to each other. The high correlations between these two measures suggest that girls' observations of their friends' behavior during stressful times translate to the girls' own behavioral tendencies to seek out their friends' support during such times.

Pair scores on preoccupied friendship cognitions are correlated with pairs' reports of friendship conflict and inequality (the correlation with the conflict subscale is strongest). This suggests that girls who feel dissatisfied with the emotional reliability and responsiveness of their friends tend to feel more negatively about their friendship and to express this dissatisfaction during conflict. Such girls may also have difficulty resolving such conflict, leading them to remain in a dissatisfying relationship.

Main Hypotheses

Support was not found for the first four hypotheses. Specifically, (1) observed problem solving was not found to mediate the link between initial friendship quality and friendship quality at follow-up; (2) observed problem solving was not found to mediate the relation between adjustment and friendship quality (including both initial friendship quality and change in friendship quality over time); (3) observed problem solving was not found to mediate the link between attachment cognitions and friendship quality (including both initial friendship quality and change in friendship quality over time); and (4) attachment cognitions were not found to mediate the relation between working models of attachment and observed problem solving. All of these hypotheses involve observed interpersonal problem solving. Our participants' scores on this variable are characterized by very low variance and were not significantly correlated with any of the other variables. Therefore, it is difficult to draw any conclusions about the first four hypotheses based on the failure of the results to support them.

The fifth hypothesis postulated that (a) attachment cognitions would mediate the relation of the working model of attachment and initial friendship quality, and that (b) controlling for initial friendship quality, attachment cognitions would mediate the relation

of working models of attachment and friendship quality at follow-up. We controlled for adjustment in both of these analyses. Significant and marginally significant mediations were found only for the first part on the hypothesis.

Specifically, we found an unexpected mediation indicating that higher pair scores on dismissing friendship cognitions mediate the relation of secure working models of attachment between adults and lower pair reports of friendship intimacy and support. We believe that this finding is based on a spurious correlation between pair averages on working models of attachment between adults and pair averages on dismissing friendship cognitions. Friend pairs were only slightly similar to each other on both Adult/Adult scripts and Dismissing friendship cognitions. Neither mood nor self esteem significantly altered these results.

One set of marginally significant mediations involving the "High/Low" pattern of attachment to mother was also found. Higher pair averages on preoccupied friendship cognitions is a marginally significant mediator of "High/Low" pair status and higher reports of friendship conflict and inequality. In order to better understand this finding, we visually examined the data for the six "High/Low" pairs for differences between the "High" and "Low" girls. In four of these pairs, the two friends reported similar and average preoccupied friendship cognitions. In the other two pairs, the "Low" mother attachment girls reported very high preoccupied friendship cognitions (by about 2 SDs). These two "Low" girls are probably best characterized as preoccupied both in their attachment to their mothers (this is consistent with their low scores on secure working models of attachment) ¹⁰ and in their attachment with their friends (as indicated by their scores on preoccupied friendship attachment cognitions). Their excessive requests for

support and reassurance probably take a toll on the friendship, leading to higher friendship conflict and inequality. For example, one of the "High" girls in these pairs said to her "Low" partner:

"You always ask me 'what's wrong? Is it me?' It gets annoying . . . You always try to get close because you are scared of loosing me, but that's not gonna happen . . . but it makes me push back."

Thus, the less secure friend seems to be chronically dissatisfied and concerned about the relationship, while her more secure partner seems overwhelmed by this behavior. It is not surprising that both girls report that their friendship is characterized by high conflict, as well as by somewhat high inequality.

The indirect effect in this set of mediations was slightly reduced by including self esteem in the model. This is in line with our expectation that some of the influence of working models of attachment on both attachment cognitions and friendship quality may have occurred through self esteem. The above mediation results were slightly increased by including mood in the model, so that the indirect effect became significant rather than marginally significant. This small increase appears to be due to a suppression effect in the relation of "High/Low" pair status and preoccupied attachment cognitions. Accounting for mood increased the strength of the relation of "High/Low" status and Preoccupied attachment cognitions, which then increased the strength of the mediation as a whole. The above suppression appears to be due to an unexpected positive relationship between mood and Preoccupied attachment cognitions (it is important to note that this correlation is not statistically significant). Mood was measured after the problem-solving discussion.

It may be that pairs with higher preoccupied attachment cognitions enjoyed the problem-solving discussion because it provided an opportunity to spend time focusing on the friendship. Interestingly, "High/Low" pairs reported *lower* mood as compared to other pairs, indicating that they did not tend to find the discussion enjoyable (this correlation was also non-significant).

Summary. The results fail to support any of our main hypotheses, but they provide some support for the theoretical underpinnings of our model. We hypothesized that long-standing individual factors (adjustment and working models of attachment) would impact the quality of close friendships, and that friendship-specific factors (problem-solving ability and friendship attachment cognitions) would modulate these effects.

Based on both the results of the mediation analyses and on the correlational results, pair averages on adjustment were not found to impact pair reports of friendship quality. However, there were many sizable correlations of adjustment and friendship quality (including both initial scores and change scores) that would be considered significant if found with a larger sample.

There is some correlational evidence that "High/Low" pairs experience lower levels of positive friendship features (including intimacy and instrumental support) over time. None of the hypothesized mediations involving working models of attachment were significantly supported, but one was supported with marginal significance. No statistically significant bivariate relation between pair reports of negative friendship features (conflict and inequality) and "High/Low" pair status was found. However, pairwise preoccupied friendship attachment cognitions were found to be a marginally significant mediator of "High/Low" pair status on working models of attachment and

negative aspects of friendship. This mediation became fully significant when mood was also included in the model.

Supplemental Discussion

Due to the low variance in pairs' scores on observed problem solving, self-reported scores on social problem solving were substituted in the relevant correlations. Several of the study hypotheses were modified from mediations involving observed interpersonal problem solving to moderations involving self-reported social problem solving. Please see the Results section for a detailed discussion of these modifications (pages 48-54). Several of the expected bivariate relations with pair-wise social problem solving were found. These include correlations with friendship attachment cognitions and with friendship quality. Support was found for two of the four modified hypotheses.

Correlations. In line with previous research (Chang et al., 2004), pair scores on social problem solving were significantly correlated with both internalizing and externalizing symptoms. Pair averages on total symptoms and on social and academic competence were not found to be significantly related to social problem solving. Total symptom scores may mask differing effects between problem solving and internalizing symptoms on one hand, and problem solving and externalizing symptoms on the other hand.

Using pair-based scores (pair averages and pair attachment "High/Low" scores), there are no significant or marginally significant correlations between social problem solving and working models of attachment. This is not surprising for several reasons. It is not surprising that the presence or absence of the "High/Low" pattern in a particular pair is not associated with the girls' average problem-solving ability. Girls in "High/Low" pairs scored similarly to those in other pairs and to each other on social problem solving. This

lack of significant correlations is consistent with the view that problem solving and attachment represent distinct influences on friendship. This view is evident in the lack of a direct effect in either direction between these two variables in the revised model of the study hypotheses (please see Figure 2). The within-pair correlations for working models of attachment to father and working models of attachment between adults are very low. Thus, it is also possible that the pair-level correlations may be masking individual-level relations between attachment and problem solving.

Using pair scores, dysfunctional friendship attachment cognitions appear to be related to dysfunctional dimensions of problem solving (including both problem orientation and problem-solving style). There is also a surprising positive association between pairs' report of negative problem orientation and their report of Secure friendship cognitions. It may be that girls high on negative problem orientation, who have little confidence in their ability to resolve problems, may instead rely on their friends to resolve problems for them.

Pair that reported a problem-solving style that is characterized by impulsivity and carelessness also reported friendship conflicts and inequality. It is not surprising that the impulsivity/careless style subscale of social problem solving was the only one to be related to friendship quality. In contrast to pairs who use adaptive problem-solving skills, pairs that endorse an impulsive and carelessness problem-solving style are probably less effective in resolving disagreements, leading to greater inequality. They are also more likely to experience disagreements as "fights," leading to higher perceptions of conflict. Another reason that this finding is not surprising is that impulsivity/carelessness style is the most underdeveloped aspect of problem solving among teens, as compared to adults

(Jaffee & D'Zurilla, 2002). The reader may wonder why an avoidant problem solving style was not similarly associated with poorer friendships. Pairs who are avoidant may be less likely to experience conflict, as they tend to avoid it. The low levels of friendship conflict and inequality reported by pairs with an avoidant problem-solving style may be influenced by a positive bias, as such a bias is conducive to continued avoidance of problems.

It is important to note that general rather than exclusively interpersonal social problem was assessed by the self-report measure. A measure that is specific to interpersonal problem solving may have had more associations with aspects of the friendship than the general social problem-solving measure does.

Change in pairs' report of friendship quality is was not found to be significantly correlated with pairs averages on social problem solving. However, all of the sizable correlations are in the expected direction. It is important to keep in mind that the small sample size of this study required a very high correlation coefficient to meet the standard for statistical significance. If replicated with a medium-size sample, many of the current correlations would be large enough to be considered statistically significant.

Modified Hypotheses

As with the original hypotheses, pair scores were used for all analyses. Of the four modified hypotheses, support was found only for the second and third modified hypotheses. Three of the significant moderations for Hypothesis 2 are difficult to interpret. These involve dysfunctional problem-solving ability, overall emotional and behavioral symptoms, and friendship intimacy and support. Our results indicate that the direction of the relation between pair averages on symptomatology and friendship

intimacy and support changes based on a pair's level of dysfunctional problem solving (including the avoidance style, negative problem orientation, and impulsivity/carelessness style dimensions). Unexpectedly, pairs with higher dysfunctional problem solving evidenced a positive association of emotional and behavioral symptoms and friendship intimacy and support (see Figure 3). One possible explanation for these results is a positive reporting bias among pairs with high dysfunctional problem solving – they scored highly on all three of the relevant variables. Or, the present findings may be spurious for another reason. Alternately, it may be that girls who have low problemsolving ability are more likely to pursue intimacy and support from friends during times of distress. Regardless of the explanation of this interaction, it is notable that two of the three moderations involved were significantly reduced by controlling for mood. This suggests that these results should be interpreted with caution.

There are also two marginally significant moderations of the relation between pair averages on social and academic competence with pair reports of friendship intimacy and support. The pattern of these moderations is consistent with our modified second hypothesis. Using pair scores, the relation of competence and friendship intimacy and support increases with lower scores on adaptive problem solving (including the positive problem orientation and rational problem solving style dimensions). When pairs have good problem-solving ability, their friendship quality is high regardless of their level of social and academic competence. The moderation with the positive problem orientation dimension is reduced by controlling for self esteem. This reduction is probably due to an overlap between the concepts of social and academic competence with the concept of self esteem. It is interesting that only the adaptive dimensions of the three relevant variables

are included in these moderations. This is consistent with previous findings that positive aspects of friendships are associated with positive dimensions of adjustment (in particular, self esteem), while negative aspects of friendships are associated with clinical symptoms (Bagwell et al., 2005).

In a marginally significant moderation (see Figure 4), higher pair averages on internalizing symptoms were associated with a decrease in pairs' reported interaction frequency over time to a greater extent when pairs' problem-solving style was characterized by impulsivity and carelessness (as compared to pairs who did not report impulsive and careless problem solving). This is consistent with our modified hypothesis. Pairs where one or both girls reported internalizing symptoms were probably experiencing a number of both personal difficulties and difficulties in the friendship. Pairs with more highly impulsive social problem solving were more likely to be impulsive rather than systematic in understanding and resolving these difficulties. If they were in fact unable to resolve the difficulties, these pairs were probably more likely to give up on the friendship. As in some of the findings described above, these results are consistent with the understanding that good problem solving serves as a buffer of the impact of poor adjustment on friendship quality.

In line with the modified third hypothesis, pair averages on self-reported problem-solving ability were found moderate both (a) the relation between pair-wise friendship attachment cognitions and pair reports of friendship quality, and (b) the relation between pair-wise friendship attachment cognitions and *change* in pair reports of friendship quality. None of the significant result were altered by controlling for self esteem or mood. The pattern of the moderations differs for the two components of this hypothesis. When

predicting the levels of friendship quality, pairs' average problem-solving ability seems to serve as a buffer, so that poor pair scores on attachment cognitions are more weakly associated with poor friendship quality when pairs report good problem-solving ability (see Figures 5-8). This pattern is in line with our modified hypotheses. When predicting *change* in pair reports of friendship quality over time, it appears that both good pair-wise problem solving and adaptive pair-wise friendship attachment cognitions are needed in order for friendship quality to improve¹¹ (see Figure 9). This pattern differs from our hypotheses that a stronger effect of attachment cognitions on change in friendship quality would be found when problem-solving ability is poor vs. good. However, the results do not theoretically contradict our modified hypotheses (this will be discussed further below). We will now describe these moderations in greater detail.

In line with the first part of our modified third hypothesis, our overall results indicate that the impact of pair-wise friendship attachment cognitions on friendship quality is stronger among pairs with poorer problem-solving ability. However, there are also some marginally significant moderation effects where pair-wise attachment cognitions are negatively associated with pair-wise friendship quality in the presence of *good* problem-solving ability (this will be discussed below). Based on the overall results, good problem-solving ability appears to serve as a buffer that blocks the effect of pair-wise dysfunctional friendship attachment cognitions on friendship quality. Among the three dimensions of friendship attachment cognitions, the dismissing dimension was the most present in these moderations. The secure dimension was also involved in many marginally significant moderations. It is interesting to note that there are not significant bivariate correlations between pair-wise dismissing friendship cognitions and pair reports

of friendship quality. Thus, it seems that the relation of these two variables is better understood when also considering pairs' problem-solving ability. Among pairs who score highly on dismissing friendship cognitions, one or both members state that they do not tend to turn to each other for help and support.

Both pairs' problem-solving orientation and their problem-solving skills were found to play important roles in these moderations. As we hypothesized, it appears that a positive problem-solving orientation serves as a buffer of the impact of dysfunctional attachment cognitions on friendship quality. The idea of positive problem orientation refers to one's attitude that problems are normal, and that they are solvable with effort. It may be that pairs with good problem-solving ability expect to resolve relationship difficulties even when they do not expect to receive emotional support from their friends. The expectation of being able to resolve difficulties may make them more engaged in the relationship, including being more open to intimacy and providing support, and resulting in a friendship with higher intimacy and support. Such pairs are also likely to actually be able to resolve relationship disagreements, leading to lower conflicts and less inequality.

Although the avoidance style and rational problem-solving style dimensions of problem-solving skills are both important in understanding the relation of pairs' attachment cognitions and friendship quality, our data suggest that the presence of an avoidant problem-solving style is more relevant to friendship intimacy and support, while the presence of adaptive problem-solving skills is more relevant to friendship conflict and inequality. The pattern of these moderations is consistent with our hypotheses. Pairs that report dismissing friendship cognitions as well as an avoidant problem-solving style tend not to turn to each other for support and to take any actions necessary to avoid conflict.

Both of these tendencies might lead to keeping the friendship at a superficial level, and to prevent intimacy and emotional support from developing in the friendship. In contrast, pairs who lack adaptive problem-solving skills may be less avoidant, but may be unable to effectively resolve personal problems and/or disagreements within the friendship. The strong association of attachment cognitions with friendship conflict and inequality among pairs that lack effective problem-solving skills is probably bi-directional. Without the ability to resolve problems, feelings of conflict and inequality that arise are more likely to lead to a lower perception of the attachment value of the friendship. Any attempts that these pairs may make to address elevations in conflict are likely to be ineffective, further decreasing the friends' sense that they can count on each other for support. At the same time, pairs who both lack an ability to resolve problems and have low expectations of being understood and supported by each other are likely to experience increases in conflict and inequality during periods of difficulty. Such everyday difficulties may include both relationship-specific challenges (e.g. misunderstandings) and personal difficulties of either member of the pair (e.g. school stress, difficulties at home).

Two of the above moderations included a true interaction, where the direction of the relation of pair-wise friendship attachment cognitions and friendship quality (specifically, negative friendship features of conflict and inequality) was reversed for good vs. poor problem-solving ability (including the adaptive scales of problem-solving orientation and problem-solving skills). These effects were marginally significant. In the case of good problem solving ability, we found a marginally significant negative effect for the relation of pair-wise dismissing friendship cognitions and pair reports of negative friendship

features (in contrast to the positive relation between these variables in the case of poor problem-solving ability that is described above). One explanation for this finding has to do with what may be a tendency of people with secure attachment to be more willing to recognize negative aspects of their relationships, as compared to those with less secure attachment. More specifically, it may be that because secure individuals have faith in the commitment of their close others to maintaining their relationship, they may be more open to examining and addressing relationship difficulties. Similarly, it may be the case that having a positive attitude toward resolving problems and having good problemsolving skills also enable individuals to more accurately report difficulties in their relationships. Turning back to the current results, it may be that the combination of low dismissing friendship cognitions and good problem-solving ability allow pairs to more accurately report rather than to minimize the negative aspects of their friendships.

Problem solving was also found to be a moderator of *change* in friendship quality, but marginally significant results were only found for negative aspects of friendship (conflict and inequality) and pairs' frequency of interaction (see Figure 9).¹² While the negative relation of poor attachment cognitions and increase in friendship quality is in line with our modified hypotheses, the role of problem-solving ability in this relation is not as we expected. The relation of poor pair-wise attachment cognitions and increase in friendship quality is stronger when problem-solving ability is good, not when it is poor (as we hypothesized). When problem-solving ability is poor, friendship quality was not found to improve regardless of pairs' scores on friendship cognitions. Our understanding of these results is that both good problem-solving ability and adaptive friendship attachment cognitions are needed to affect an improvement in friendship quality over time. It is

interesting to try to understand why problem-solving ability appears to serve as a buffer of the effects of friendship attachment cognitions on the level of friendship quality, while problem solving sharpens the impact of attachment cognitions on *change* in friendship quality. In trying to understand this pattern of data, we need to also consider the relevant dimensions of problem solving.

Most of our results pertaining to initial friendship quality involve adaptive subscales of problem solving, while the results pertaining to change in friendship quality involved dysfunctional subscales of problem solving. This pattern is particularly striking for problem-solving orientation (i.e., attitudes about problem solving): the positive problem orientation subscale is only involved in moderations of initial friendship quality, while negative problem orientation is only involved in moderations of change in friendship quality. Previous work has shown that adaptive and maladaptive dimensions of both problem-solving orientation and problem-solving skills are truly separate dimensions rather than negative reflections of one another (D'Zurilla et al., 2002). It may be that a perception that they are able to solve problems is especially important in determining a pairs' degree of optimism that a friendship will work out, and therefore the willingness of girls to engage in and develop a friendship. But even in the absence of good problem solving, other factors such as adaptive friendship attachment cognitions (i.e., expectations that the friend will be supportive) could also lead to girls engaging in and developing an intimate and supportive friendship. This would explain why problem serving serves as a buffer of the impact of dysfunctional attachment cognitions on friendship quality. In contrast, negative attitudes about problem-solving and maladaptive problem-solving skills might be especially influential when it comes to resolving conflicts that arise over

time. In this case, dysfunctional problem solving may be damaging regardless of the presence of positive friendship cognitions. It seems that both adaptive problem solving and adaptive friendship cognitions are needed in order for pairs to successfully resolve conflicts.

Support was not found for the other two modified hypotheses (hypotheses 1 and 4). Firstly, pairs' reports of their problem-solving ability were not found to moderate the relation between initial friendship quality and friendship quality at follow-up. Although the an impulsive and careless problem-solving style was associated with initial friendship conflict and inequality, it appears that participants' tendency to engage in impulsive problem solving does not relate to the nature of change in negative aspects of friendship over time.

Secondly, pairs' reports of their problem-solving ability were not found to moderate the relation between working models of attachment and friendship attachment cognitions. This is not surprising since neither the Dependent Variable nor the moderator in this hypothesized moderation are significantly correlated with the Independent Variable (namely, working models of attachment) in our sample.

Summary. Before summarizing the main points of this Supplemental Discussion section, we'd like to remind the reader of the main goals of the study. As described in the main Discussion section above, the results failed to support any of our original five hypotheses, but did lend some support to the idea that two long-standing individual characteristics (adjustment and working models of attachment) have an important impact on friendship quality. In terms of the second part of the task of this study, to better understand the modulating role of friendship-specific factors (problem-solving ability and

friendship attachment cognitions), one marginally significant result was found. Namely, preoccupied friendship attachment cognitions were found to be marginally significant mediator of the relation between pairs' patterns of working models of attachment and friendship quality. Pair-wise observed problem solving was not found to modulate the main study variables.

We believed that the low variance on observed problem solving was responsible for the lack of findings involving this variable, and wanted to find an alternate way to examine the potentially important role of problem-solving ability in modulating the impact of our other variables on friendship quality. We decided to use a self-report measure of social problem-solving ability, and changed some of our hypotheses in line with this change.

The results support some of our modified hypotheses, but do not support others.

There is some evidence that good pair-wise problem-solving ability buffers the impact of poor adjustment on both friendship quality and change in friendship quality (specifically, change in interaction frequency). It is important to mention that this subset of results should be interpreted with caution because there is reason to think that some of them may be spurious.

While we did not expect pairs' problem-solving ability to directly modulate the impact of working models of attachment on friendship quality, we thought that it might modulate the impact of friendship attachment cognitions. One of our hypotheses that gets at the interplay of our two potential modulators (problem solving and friendship attachment cognitions) was supported. Differing patterns of interaction were found when predicting the impact of these two modulators on the level of friendship quality and on

change in friendship quality. For initial friendship quality, pair-wise problem solving appears to serve as a buffer, so that the association of poor attachment cognitions and poor friendship quality is greater for poor vs. good problem-solving ability. For *change* in friendship quality, it appears that both good problem-solving ability and adaptive friendship attachment cognitions are needed to affect an improvement in pairs' friendship quality over time. The presence of a positive problem-solving attitude seems to be important for initial friendship quality, while the presence of a negative problem solving attitude was only found to moderate change in friendship quality. In terms of problem-solving skills, the presence of adaptive problem-solving skills was found to moderate relationship conflict and inequality, while avoidant skills seem to be more relevant to the development of intimacy and support.

Many of the dimensions of pairs' problem solving, adjustment, and attachment cognitions that were involved in the above results are not related to friendship quality in bivariate analyses. In other words, only when *both* the moderator (problem solving) and the IV (adjustment and attachment cognitions) in the above results are considered does their relation to friendship quality become apparent.

There are several ways in which the supplemental results add to our initial results in addressing the main goals of the study. Including pair's ability to problem-solve as a moderator highlights the contribution of pair-wise adjustment to friendship quality (specifically, initial intimacy and support, as well as change in interaction frequency). In terms of the second study goal, many interactions were found between attachment cognitions and problem solving. This suggests that it is important to consider these modulators together rather than separately. In order to do this, it would be necessary to

test our overall model as a whole rather than in three-variable hypotheses. It may be that the reason that modified hypotheses 1 and 4 and the original hypothesis 5 were not supported is that they included only one of the two modulators.

Concluding Remarks

This study has both strengths and limitations. It improves on the methodology of similar prior research in four ways: (1) the use of mutually nominated friends pairs to ensure that all pairs are truly close friends, (2) the use of an implicit measure of attachment rather than only relying on participants' self-report, (3) the use of a follow-up measure of friendship quality, and (4) the use of pair scores rather than individual scores to reflect the many similarities among pair members. Another strength is the relative diversity of our sample in terms of socioeconomic status and race.

The main limitation of this work is the small sample size, and therefore low statistical power. This makes it difficult to interpret the failure of our results to support many of the study hypotheses. The sample size was even smaller for our follow-up, and this may have contributed to the absence of significant results involving change scores on friendship quality. The sample is also geographically limited to Long Island and is limited to girls. Finally, our sample is limited to girls who are able to develop close friendships, even if those friendships are of poor quality or are short-lived. A different methodological approach is necessary to study teens who are not able to form such relationships. In terms of methodology, this study is limited by the inadequate variability on the Interpersonal Problem Solving Observational Measure. The measure that we used instead, the Social Problem Solving Inventory-Revised: Short, was also relevant to our study goals. However, this measure relies on teens' self-report and is general rather than specific to a

particular pairs' interpersonal problem solving. Another limitation is our inability to test the model as whole (due to both sample size and inadequate prior work). Some of the above-described results suggest that testing a model such as ours in pieces may be problematic because it involves doing analyses with only one of two inter-related modulators (namely, problem solving and attachment cognitions).

Our results have implications for several methodological and theoretical issues in the literature. These include issues of the study of dyads, studies of attachment, understanding of problem solving among teens, and recruitment of teens.

In studying pairs of friends, one important consideration is whether both friends need to have a certain skill or characteristic in order to achieve good friendship quality, or whether it is enough for only one of the friends to have this skill or characteristic. Our results suggest that in the case of working models of attachment, the answer is both. "High/Low" pairs, in which one friend had low attachment scores and the other had high scores had lower friendship quality and a greater decrease in friendship quality over time, as compared to pairs where both friends had moderately secure working models of attachment. However, it is important to note that none of the pairs in our sample included two girls who both evidence an absence of secure base scripts. It may be the case that such girls are not usually able to form friendships with each other, but can only do so with more secure girls (resulting in the "High/Low" pairs that we found). Thus, while pairs who both evidence secure base scripts report higher friendship quality than "High/Low" pairs, a "High/Low" pair may have a better chance of developing a friendship than two girls who both lack secure base scripts. Although "High/Low" pairs may be likely to have a difficult and unstable friendship, this may still be an important

opportunity for girls who lack a secure base script to get support and learn relationship skills.

Another important issue in the literature is the appropriateness of considering close friends to be attachment figures for one another. Our results suggest that working models of attachment to their mothers influence the quality of girls' friendships both initially and over time, and that some of this influence is mediated by friends' preoccupied attachment cognitions toward each other. Although they are only marginally significant, the mediation results suggest that insecure working models of attachment to mother do in fact lead to insecure attachment cognitions in the friendship. In sum, while our findings cannot answer the question of whether friendships can alter one's working models of attachment they do suggest that attachment plays a role in close friendships.

The results of our observational measure confirm the limited ability of teens to engage in problem solving (D'Zurilla et al., 2002; Jaffee & D'Zurilla, 2002). Although it is normative for this age group, teens' poor problem-solving ability may make them more vulnerable to adjustment and relationship difficulties.

The current study also has several clinical implications. Some support was found for the impact of adjustment and attachment on friendship quality. Teens who present for clinical treatment are often characterized by difficulties in one or both of these core areas. Our findings suggest that it is important to make relationship skills a component of treatment with this population. In some cases, such teens may be unable to form friendships altogether, and intervention should be provided to assist with this. For those teens who are able to engage in friendships, it is important to consider whether these friendships are characterized by the "High/Low" pattern of attachment. If so, clinicians

should be aware of the possibility that a patient's "High" attachment security friend may become overwhelmed or frustrated with the relationship.

While it is very difficult to alter one's overall level of adjustment or one's working models of attachment, research has shown that problem-solving ability can be taught fairly easily (D'Zurilla & Nezu, 2007). The role of problem solving as a moderator in some of out results suggests that problem-solving training may improve friendships. When applying problem-solving training to close friendships, it may be helpful to consider friends' expectation of support, as this was found to interact with problem-solving ability.

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Endnotes

- 1. Popular and socially skilled teens may have several high quality friendships, with each of her friends considering the popular teen to be her closest friend.
- 2. In retrospect, it is clear that most of these items are not appropriate for behavioral coding.
- 3. This may be because our sample was younger than that of Steiner, Arjoman & Waters (2003).
- 4. Following Griffin and Gonzalez (1995), we controlled for pair order in the correlation analyses. This was done by (1) switching the order of the "left partner" and "right partner" columns, (2) pasting them under the data with the columns in their original order, and (3) computing the correlations using this "doubled" data. The statistical significance of the correlations was determined using the original N, not the "doubled" one.
- 5. In contrast to their consistent reports of friendship quality, girls in High/Low pairs gave differing reports of change in friendship quality. There is no distinguishable pattern of either the high or the low girls reporting more of a decrease (although in the one pair that differed by more than one SD, the High security girl reported much greater decrease).
- 6. The mean Total scores reported in Table 1 include many reverse-scored items. Teens had low rates of both adaptive and maladaptive (reverse-scored) observed behaviors.
- 7. These studies used the SPSI:R-Interpersonal, a questionnaire that is focused on interpersonal problem solving. In the current study, we chose to use the

- SPSI-R:S, a shorter, and more extensively validated measure than the SPSI-R:I. The SPSI-R:S is amore general measure, asking participants to rate their ability to solve interpersonal as well as non-interpersonal problems.
- 8. This type of adjusted correlations estimate the individual-level effects between two variables, while controlling for dyad-level effects (specifically, the covariance on the two variables and on the relation among the two variables, see Griffin & Gonzales, 1995).
- 9. In contrast to their consistent reports of friendship quality, girls in High/Low pairs gave differing reports of change in friendship quality. There is no distinguishable pattern of either the high or the low girls reporting more of a decrease (although in the one pair that differed by more than one SD, the High security girl reported much greater decrease).
- 10. Our measure of working models of attachment only assessed Security, and does not differentiate between Preoccupied and Avoidant styles.
- 11. The results for change in friendship quality are only marginally significant ($p \le .05$). However, we believe that they are notable given the small sample size for the change analyses and the stringent significance threshold that we used.
- 12. The results for NFF became fully significant at the p \leq .01 level after controlling for self esteem.

Table 1a

Means, Standard Deviations, and Coefficient Alphas for All Study Measures

Measures (n)	Mean	SD	α
Self Esteem Scale	30.88	5.85	.88
Mood	3.12	1.18	n/a
YSR Total Problems(52)	55.00	20.32	.92
Internalizing	16.31	7.79	.84
Externalizing	11.65	6.12	.82
Competence	22.72	4.73	.71
IPSOM Total (46)	42.00	4.91	.68
Solution Focused	10.33	2.54	.59
PS Orientation	20.48	2.86	.50
High/Low "Mom and I" Script	3.77	1.34	.52
(52)			
"Dad and I" Script (52)	4.06	.98	.44
"Adult/Adult" Script (50)	3.20	1.05	.49
BSQ Total (52)	31.90	8.21	.80
Secure	20.79	3.75	.82
Dismissing	9.63	3.71	.72
Preoccupied	9.25	3.92	.73
Time 1 Friendship Quality (52)			
Interaction	15.40	5.51	.89
Frequency			

Measures (n)	Mean	SD	α
Positive Features	39.73	5.85	.85
Intimacy	13.62	2.55	.78
Instrumental	12.96	2.05	.50
Support			
Emotional Support	13.15	2.30	.75
Negative Features	4.85	4.31	.83
Conflicts	3.00	2.33	.72
Inequality	1.85	2.26	.66
Follow-Up Friendship Quality			
(47)			
Interaction	14.39	5.98	.88
Frequency			
Positive Features	38.54	7.24	.86
Intimacy	12.70	3.26	.84
Instrumental	12.52	2.41	.46
Support			
Emotional Support	13.32	2.64	.72
Negative Features	5.80	5.22	.83
Conflicts	3.72	2.86	.67
Inequality	2.09	2.85	.79

Change in Friendship Quality

Measures (n)	Mean	SD	α
(47)			
Interaction	54	3.97	n/a
Frequency			
Positive Features	89	5.16	n/a
Intimacy	87	2.67	n/a
Instrumental	28	1.95	n/a
Support			
Emotional Support	.26	2.13	n/a
Negative Features	.98	3.73	n/a
Conflicts	.78	2.39	n/a
Inequality	.20	1.96	n/a

Notes. YSR = Youth Self Report; IPSOM = Interpersonal Problem Solving Observational Measure; BSQ = Behavioral Systems Questionnaire.

Table 1b

Means, Standard Deviations, and Coefficient Alphas for SPSI:S

Measures (n)	Mean	SD	α
SPSI:R-S Total (40)	12.23	2.82	.87
PPO	11.90	4.17	.81
NPO	8.68	4.79	.83
RPS	11.65	3.91	.78
ICS	7.24	4.34	.78
AS	6.50	3.93	.76

Notes. SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style...

Table 2a

Correlations Between Adjustment, Script Attachment, and Attachment to Friend – Pair Averages

Measures (n of	YSR	YSR	YSR	YSR
pairs)	Total	Internalizing	Externalizing	Competence
	Problems			
High/Low "Mom	02	.08	.14	11
and I" Script (26)				
"Dad and I"	17	.08	06	00
Script (26)				
"Adult/Adult"	.19	.17	.01	.01
Script (25)				
BSQ Total (26)	.34	.02	12	.48^
Secure	.28	.25	.04	.40^
Dismissing	51 [*]	04	.14	41^
Preoccupied	.06	.24	.16	21

Notes. YSR = Youth Self Report; BSQ = Behavioral systems Questionnaire.

^{**}p < .001, *p < .01, p < .05

Table 2b

Correlations Between Script Attachment, and Attachment to Friend – Pair Averages

Measures (n of	BSQ Total	BSQ Secure	BSQ	BSQ
pairs)			Dismissing	Preoccupied
High/Low "Mom	06	.12	08	.31
and I" Script (26)				
"Dad and I" Script	04	.04	.05	07
(26)				
"Adult/Adult" Script	18	.06	.23	.20
(25)				

Notes. YSR = Youth Self Report; BSQ = Behavioral systems Questionnaire.

^{**}p < .001, *p < .01, p < .05

Table 3

Correlations Between Adjustment, Friendship Quality, and Change in Friendship Quality

- Pair Averages

— Pair Averages Measures (n of pairs)	YSR Total	YSR	YSR	YSR
	Problems	Internalizing	Externalizing	Competence
Friendship Quality (26)				
Interaction Frequency	.17	27	13	.08
Positive Features	.22	.05	.09	.27
Intimacy	.13	.24	.22	.33
Instrumental Support	.20	29	.07	.23
Emotional Support	.24	.16	05	.14
Negative Features	.05	.05	.29	21
Conflicts	.08	.16	.28	18
Inequality	.02	07	.28	24
Change in Friendship				
Quality (23)				
Interaction Frequency	18	.18	06	13
Positive Features	04	32	22	.02
Intimacy	12	45^	27	.10
Instrumental	.16	.16	17	03
Support				
Emotional Support	08	33	06	05
Negative Features	22	.34	.19	13
Conflicts	31	.30	.23	13

The Quality of Close Adolescent Friendships

Measures (n of pairs)	YSR Total	YSR	YSR	YSR
	Problems	Internalizing	Externalizing	Competence
Inequality	06	.30	.10	09

Notes. YSR = Youth Self Report

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

Table 4

Correlations Between Script Attachment and Friendship Quality, and Change in

Friendship Quality – Pair Averages

Measures (n of pairs)	High/Low	"Dad and I"	"Adult/Adult
	"Mom and I"	Script	" Script
	Script		
Friendship Quality (26)			
Interaction Frequency	25	.22	.12
Positive Features	32	.08	.08
Intimacy	24	.15	.08
Instrumental Support	25	.09	.00
Emotional Support	33	03	.12
Negative Features	.14	.10	.00
Conflicts	.12	.12	.09
Inequality	.14	.07	10
Change in Friendship Quality (23)			
Interaction Frequency	05	.00	19
Positive Features	50*	22	.00
Intimacy	44^	21	23
Instrumental Support	49 [^]	04	.38
Emotional Support	24	24	03
Negative Features	.21	.21	22
Conflicts	.26	01	31

The Quality of Close Adolescent Friendships

Measures (n of pairs)	High/Low	"Dad and I"	"Adult/Adult
	"Mom and I"	Script	" Script
	Script		
Inequality	.11	.41	06

^{**}p < .001, *p < .01, p < .05

Table 5

Correlations Between Friend Attachment, Friendship Quality, and Change in Friendship Quality – Pair Averages

Measures (n of pairs)	BSQ Total	BSQ Secure	BSQ	BSQ
			Dismissing	Preoccupied
Friendship Quality (26)				
Interaction Frequency	.25	.41	27	.14
Positive Features	.43^	.73**	41^	.21
Intimacy	.48^	.76**	39	.12
Instrumental Support	-22	.49*	33	.33
Emotional Support	.39	.61**	35	.12
Negative Features	23	01	02	.48^
Conflicts	17	.08	07	.51*
Inequality	27	11	.03	.41^
Change in Friendship Quality				
(23)				
Interaction Frequency	.00	.13	.11	.01
Positive Features	12	12	.22	08
Intimacy	12	12	.13	02
Instrumental Support	.00	04	.12	16
Emotional Support	15	11	.24	03

The Quality of Close Adolescent Friendships

Measures (n of pairs)	BSQ Total	BSQ Secure	BSQ	BSQ
			Dismissing	Preoccupied
Negative Features	09	06	.12	.01
Conflicts	10	01	.18	.04
Inequality	05	11	.02	02

Notes. BSQ = Behavioral Systems Questionnaire.

^{**}p < .001, *p < .01, p < .05

Table 6

Correlations Between Social Problem Solving and Adjustment – Pair Averages

Measures (n of pairs	SPSI:S	PPO	NPO	RPS	ICS	AS
= 20)	Total					
YSR Total Problems	.16	.17	.01	.03	35	11
Internalizing	77**	59 [*]	.83**	43	.16	.69**
Externalizing	61*	42	.48^	34	.50^	.49^
YSR Competence	.21	.04	05	.06	25	25

Notes. YSR = Youth Self Report; PPO = Positive Problem Orientation; NPO = Negative

Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness

Style; AS = Avoidance Style.

^{**}p < .001, *p < .01, p < .05

Table 7

Correlations Between Social Problem Solving and Script Attachment – Pair Averages and Difference

Measures (<i>n of pairs</i> =	High/Low	"Dad and I"	"Adult/Adult"
20)	"Mom and I"	Script	Script
	Script		
SPSI:S Total	24	14	21
PPO	.04	15	08
NPO	.10	03	.12
RPS	10	25	14
ICS	.35	.13	.18
AS	.40	.08	.25

Notes. SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive

Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem

Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style.

^{**}p < .001, *p < .01, p < .05

Table 8

Correlations Between Social Problem Solving and Attachment to Friend- Pair Averages

Measures (n of	BSQ Total	BSQ Secure	BSQ	BSQ
pairs = 20)			Dismissing	Preoccupied
SPSI:R-S Total	.22	14	24	32
PPO	11	.01	05	.26
NPO	.01	.46^	.03	.36
RPS	.05	.16	.05	.09
ICS	57*	.00	.45^	.69**
AS	36	.07	.34	.45^

Notes. BSQ = Behavioral Systems Questionnaire; SPSI:R-S = Social Problem Solving

Inventory: Revised-Short; PPO = Positive Problem Orientation; NPO = Negative

Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness

Style; AS = Avoidance Style.

^{**}p < .001, *p < .01, p < .05

Table 9

Correlations Between Social Problem Solving and Friendship Quality at Time 1 – Pair Averages

Measures (n of pairs =	SPSI:R-	PPO	NPO	RPS	ICS	AS
20)	S Total					
Friendship Quality						
Interaction	.14	.37	.04	.35	.20	11
Frequency						
Positive Features	.04	.21	.20	.30	.06	02
Intimacy	20	08	.39	.14	.13	.14
Instrumental	.25	.44	09	.37	.15	21
Support						
Emotional	.10	.23	.17	.31	12	02
Support						
Negative Features	27	.07	.16	18	.61*	.08
Conflicts	31	02	.25	21	.56*	.12
Inequality	20	.06	.07	14	.62*	.04

Notes. SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive

Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem

Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style.

 $p^{**} < .001, p^{*} < .01, p^{*} < .05$

Table 10

Correlations Between Social Problem Solving and Change in Friendship Quality – Pair Averages

Measures ($n ext{ of pairs} = 20$)	SPSI:S	PPO	NPO	RPS	ICS	AS
	Total					
Interaction Frequency	.02	23	03	06	15	17
Positive Features	.19	.01	26	.05	23	09
Intimacy	.39	.30	37	.34	20	22
Instrumental Support	06	20	.18	04	37	.09
Emotional Support	.00	16	29	25	.01	02
Negative Features	14	.00	.33	.13	.05	.15
Conflicts	17	01	.35	.17	.09	.24
Inequality	07	.01	.24	.06	01	.03

Notes. SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style.

^{**}p < .001, *p < .01, p < .05

Table 11

Concordance Correlations Of Major Variables

Measures	Concordance r
Self Esteem	.03
YSR Total Problems	.47*
YSR: Internalizing	.34
Anxious/Depressed	.39^
Withdrawn/Depressed	.21
Somatisizing	14
YSR: Externalizing	.52**
Rule-Breaking Behavior	.43^
Aggressive Behavior	.50**
YSR Competence	.22
Social Problem Solving (Total)	.58**
Positive Problem Orientation	.24
Negative Problem Orientation	.69**
Rational Problem Solving	.01

Measures	Concordance r
Impulsivity Carelessness Style	.03
Avoidance Style	.44^
IPSOM Total	.30
Attachment to Friend (BSQ Total Score)	.15
BSQ_Secure	.20
BSQ_Preoccupied	.18
BSQ_Dismissing	.24
Script Attachment "Mom and I" "Dad and I" "Adult/Adult"	52** .03 .12
Friendship Quality	
Interaction Frequency	.85**
Intimacy	.34
Instrumental Support	.35
Emotional Support	.51**
Conflicts	.53**
Inequality	.68**

Measures	Concordance r
Negative Features	.68**
Positive Features	.56**

Notes. YSR = Youth Self Report; IPSOM = Interpersonal Problem Solving Observational Measure; BSQ = Behavioral Systems Questionnaire; SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style.

^{**}p < .001, *p < .01, p < .05

Table 12
Summary of Hierarchical Regression Analyses Predicting Friendship Quality from Adjustment and Social Problem Solving (Page 1 of 2)

Dependent Variable	R^2	ΔR^2	Df	ΔF
Predicting Positive				
Friendship Features				
Equation #1				
School	.01	.01	18	.13
High/Low Attachment	.30	.29	17	6.96^
Total Problems	.35	.06	16	1.36
AS	.42	.06	15	1.63
Total Problems x AS	.69	.28	14	12.70*
Equation #2				
School	.01	.01	18	.13
High/Low Attachment	.30	.29	17	6.96^
Total Problems	.35	.06	16	1.36
NPO	.42	.07	15	1.71
Total Problems x NPO	.57	.15	14	5.03^
Equation #3				
School	.01	.01	18	.13
High/Low Attachment	.30	.29	17	6.96^

The Quality of Close Adolescent Friendships

Dependent Variable	R^2	ΔR^2	Df	ΔF
Total Problems	.35	.06	16	1.36
ICS	.48	.13	15	3.79
Total Problems x ICS	.63	.14	14	5.34^
Equation #4				
School	.01	.01	18	.13
High/Low Attachment	.30	.29	17	6.96^
Competence	.34	.05	16	1.12
PPO	.39	.04	15	1.08
Competence x PPO	.54	.15	14	4.68^
Equation #5				
School	.01	.01	18	.13
High/Low Attachment	.30	.29	17	$6.96^{^{\wedge}}$
Competence	.34	.05	16	1.12
RPS	.39	.05	15	1.29
Competence x RPS	.58	.19	14	6.25^

Notes. The following five subscales are the components of the Social Problem Solving

Inventory: Revised-Short. PPO = Positive Problem Orientation; NPO = Negative

Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness

Style; AS = Avoidance Style. Total Problems and Competence are the major subscales of the Youth Self Report.

$$p \le .05$$
 $p \le .01$ $p \le .001$

Table 13
Summary of Hierarchical Regression Analyses Predicting Friendship Quality from Adjustment and Social Problem Solving (Cont'd)

Dependent Variable	R^2	ΔR^2	Df	ΔF
Predicting Interaction				
Frequency				
Equation #6				
School	.38	.38	18	10.42*
High/Low Attach.	.43	.05	17	1.47
Internalizing	.44	.01	16	.17
ICS	.58	.14	15	4.71^
Internalizing x ICS	.70	.12	14	5.22^
Equation #7				
School	.38	.38	18	10.42*
High/Low Attach.	.43	.05	17	1.47
Externalizing	.44	.01	16	.16
ICS	.55	.11	15	3.55
Externalizing x ICS	.72	.16	14	7.50^

Dependent Variable	R^2	ΔR^2	Df	ΔF
Predicting Change in				
Interaction Frequency				
Equation #8				
School	.18	.18	17	3.72
High/Low Attach.	.19	.01	16	.11
Internalizing	.19	.01	15	.13
ICS	.20	.01	14	.12
Internalizing x ICS	.47	.28	13	$6.80^{^{\wedge}}$

Notes. ICS = Impulsivity/Carelessness Style subscale of the Social Problem Solving

Inventory: Revised-Short. Total Problems and Competence are the major subscales of the

Youth Self Report. Attach. = Attachment.

$$p \le .05$$
 * $p \le .01$ ** $p \le .001$

Table 14
Summary of Hierarchical Regression Analyses Predicting Positive Friendship Features from Friendship Attachment Cognitions and Social Problem Solving

Dependent Variable	R^2	ΔR^2	Df	ΔF
Equation #1				
School	.01	.01	18	.13
BSQ: D	.12	.11	17	2.19
PPO	.17	.04	16	.84
BSQ: D x PPO	.56	.40	15	13.46*
Equation #2				
School	.01	.01	18	.13
BSQ: D	.12	.11	17	2.19
AS	.13	.01	16	.16
BSQ: D x AS	.52	.39	15	12.40*
Equation #3				
School	.01	.01	18	.13
BSQ: D	.12	.11	17	2.19
RPS	.21	.09	16	1.76
BSQ:D x RPS	.39	.19	15	4.56^

R^2	ΔR^2	Df	ΔF
.01	.01	18	.13
.50	.50	17	16.91**
.54	.04	16	1.31
.66	.12	15	5.47^
.01	.01	18	.13
.50	.50	17	16.91**
.53	.03	16	1.08
.65	.12	15	4.91^
	.01 .50 .54 .66	.01 .01 .50 .50 .54 .04 .66 .12	.01 .01 18 .50 .50 17 .54 .04 16 .66 .12 15

Notes. BSQ:D = Behavioral Systems Questionnaire, Dismissing subscale; BSQ:Secure = Behavioral Systems Questionnaire, Secure subscale. The following three subscales are the components of the Social Problem Solving Inventory: Revised-Short. PPO = Positive Problem Orientation; RPS = Rational Problem Solving; AS = Avoidance Style.

$$p \le .05 p \le .01 p \le .01$$

Table 15
Summary of Hierarchical Regression Analyses Predicting Negative Friendship Features from Friendship Attachment Cognitions and Social Problem Solving

Dependent Variable	R^2	ΔR^2	Df	$\Delta \mathrm{F}$
Equation #1				
School	.30	.30	18	7.78*
BSQ: D	.30	.00	17	.03
PPO	.31	.01	16	.13
BSQ:D x PPO	.54	.24	15	7.76*
Equation #2				
School	.30	.30	18	7.78*
BSQ: D	.30	.00	17	.03
RPS	.34	.04	16	.95
BSQ:D x RPS	.58	.24	15	8.70^*
Equation #3				
School	.30	.30	18	7.78*
BSQ:Secure	.32	.02	17	.57
PPO	.33	.01	16	.15
	.50	.17	15	5.14^

The Quality of Close Adolescent Friendships

Dependent Variable	R^2	ΔR^2	Df	$\Delta \mathrm{F}$
BSQ:Secure x PPO				
Equation #4				
School	.30	.30	18	7.78*
BSQ:Secure	.32	.02	17	.57
RPS	.38	.05	16	1.36
BSQ:Secure x	.59	.20	15	7.16
RPS				

Notes. BSQ:D = Behavioral Systems Questionnaire, Dismissing subscale; BSQ:Secure = Behavioral Systems Questionnaire, Secure subscale. The following three subscales are the components of the Social Problem Solving Inventory: Revised-Short. PPO = Positive Problem Orientation; RPS = Rational Problem Solving.

$$p \le .05$$
 * $p \le .01$ ** $p \le .001$

Table 16
Summary of Hierarchical Regression Analyses Predicting Change in Friendship Quality from Friendship Attachment Cognitions and Social Problem Solving

Dependent Variable	R^2	ΔR^2	Df	F
Change in Negative				
Friendship Features				
Equation #1				
BSQ: Secure	.02	.02	17	.42
NPO	.22	.20	16	4.07
BSQ: Secure x	.41	.19	15	4.92^
NPO				
Change in Interaction				
Frequency				
Equation #2				
School	.18	.18	17	3.72
BSQ: Secure	.18	.00	16	.04
AS	.22	.04	15	.80
BSQ: Secure x AS	.44	.22	14	5.52^
Equation #3				
School	.18	.18	17	3.72

The Quality of Close Adolescent Friendships

Dependent Variable	R^2	ΔR^2	Df	F
BSQ: P	.23	.05	16	1.07
NPO	.26	.03	15	.54
BSQ:P x NPO	.44	.18	14	4.60^
Equation #4				
School	.18	.18	17	3.72
BSQ: P	.23	.05	16	1.07
AS	.34	.11	15	2.41
BSQ:P x AS	.52	.18	14	5.31^

Notes. BSQ:P = Behavioral Systems Questionnaire, Preoccupied subscale; BSQ:Secure = Behavioral Systems Questionnaire, Secure subscale. The following three subscales are the components of the Social Problem Solving Inventory: Revised-Short. NPO = Negative Problem Orientation; AS = Avoidance Style.

$$p \le .05$$
 * $p \le .01$ ** $p \le .001$

Figure Captions

Figure 1. Hypothesized mediations among the major variables.

Note for Figure 1. Dark boxes indicate characteristics that have formed throughout the teens' development. Light boxes indicate characteristics of each teen that are specific to the current friendship. Solid lines indicate hypothesized relations that will be examined. Dashed lines indicate hypothesized relations that will be controlled for.

Figure 2. Revised model of hypothesized mediations and moderations among the major variables.

Note for Figure .2: Dark boxes indicate characteristics that have formed throughout the teens' development. Light boxes indicate characteristics of each teen that are specific to the current friendship. Solid lines indicate hypothesized relations that will be examined. Dashed lines indicate hypothesized relations that will be controlled for.

Figure 3. Avoidance Style as a moderator of the relation between Total Problems and Positive Friendship Features.

Figure 4. Impulsivity/Carelessness Style as a moderator of the relation between Internalizing symptoms and increase in Interaction Frequency.

Figure 5. Positive Problem Orientation as a moderator of the relation between Dismissing friendship cognitions and Positive Friendship Features.

Figure 6. Avoidance Style as a moderator of the relation between Dismissing friendship cognitions and Positive Friendship Features.

Figure 7. Positive Problem Orientation as a moderator of the relation between Dismissing friendship cognitions and Negative Friendship Features.

Figure 8. Rational Problem Solving as a moderator of the relation between Dismissing

friendship cognitions and Negative Friendship Features.

Figure 9. Negative Problem Orientation as a moderator of the relation between Secure friendship cognitions and decrease in Negative Friendship Features.

Figure 1

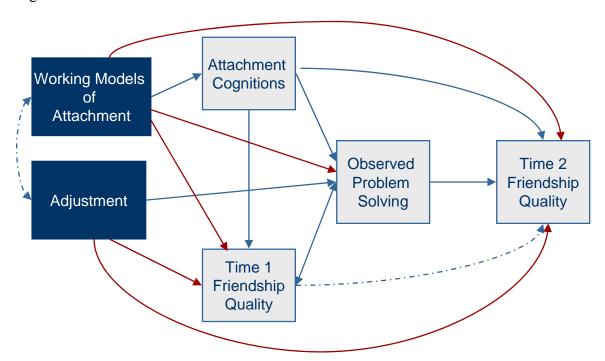


Figure 2

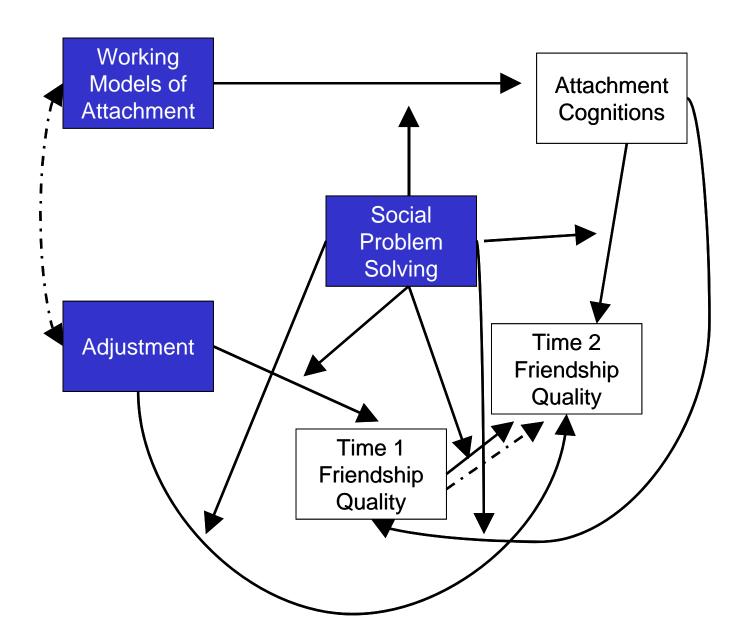


Figure 3

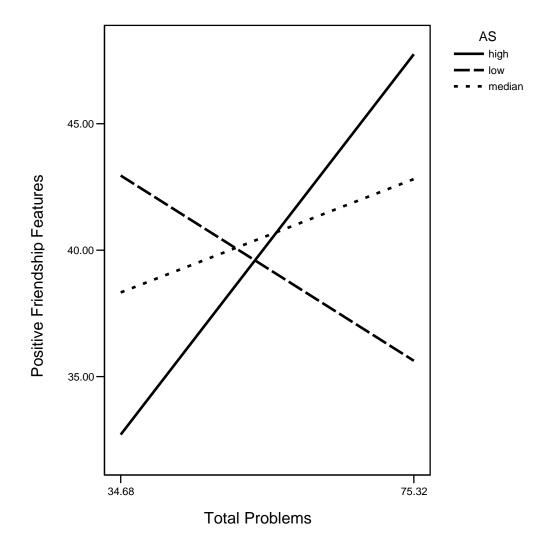


Figure 4

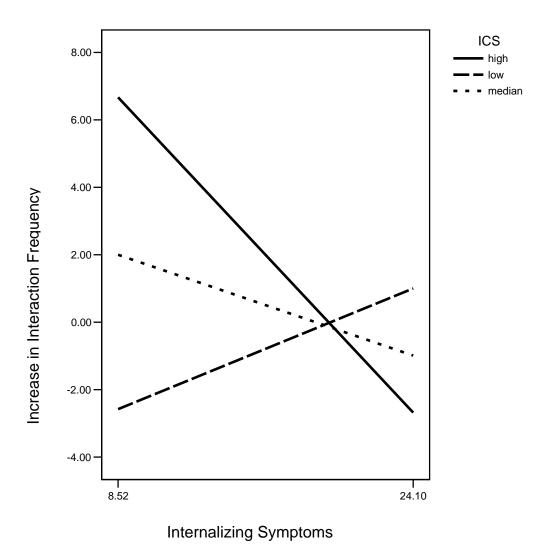


Figure 5

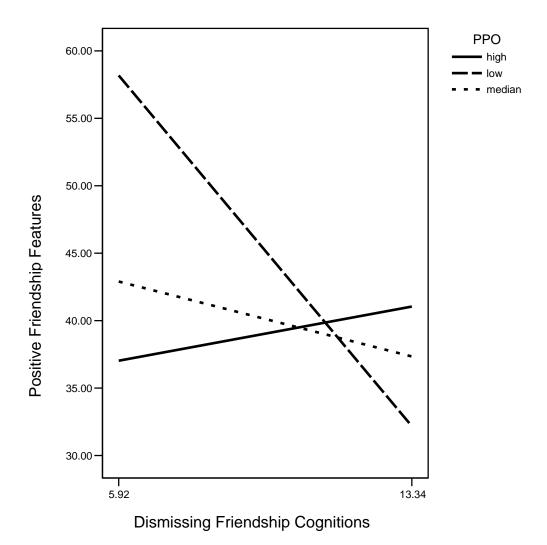


Figure 6

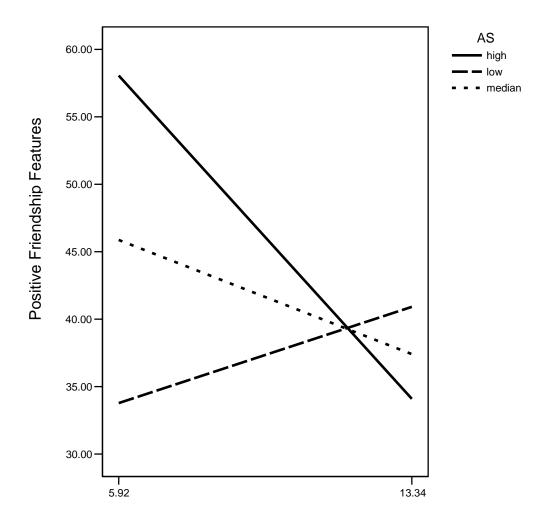


Figure 7

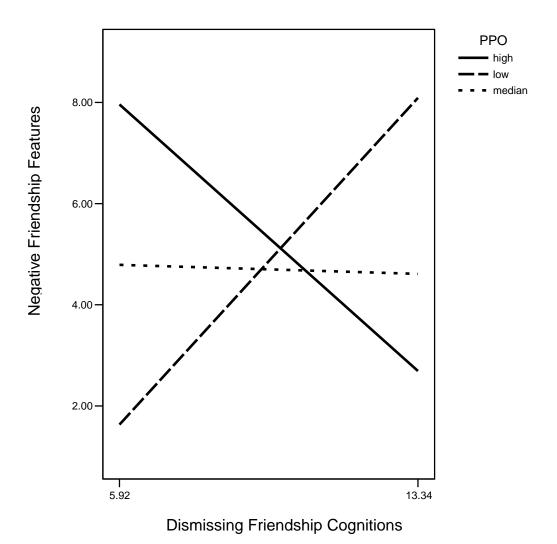
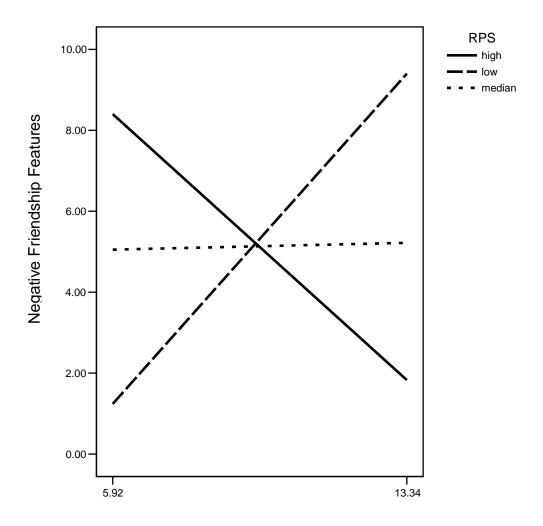


Figure 8



Dismissing Friendship Cognitions

Figure 9

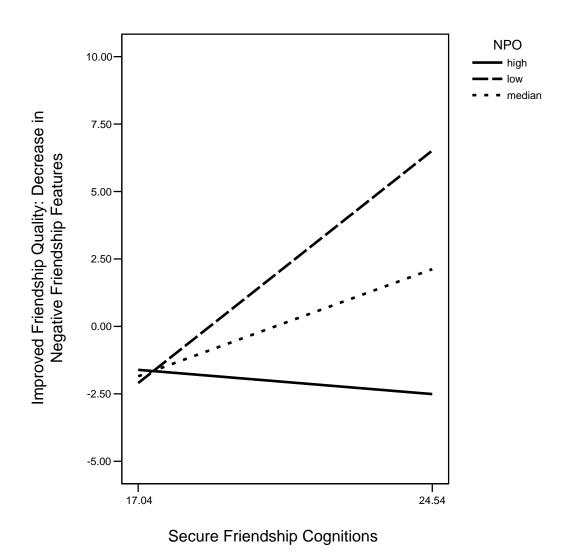
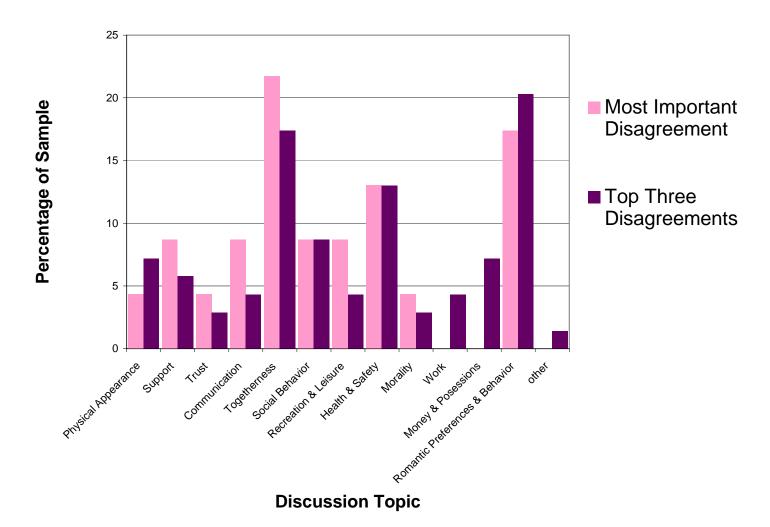


Figure 10



Supplemental Table 1

Adjusted Individual-level Correlations Between Adjustment and Script Attachment

Appendix A

Measures (n)	YSR Total	YSR	YSR	YSR
	Problems	Internalizing	Externalizing	Competence
"Mom and I" Script (52)	21	03	36*	.08
"Dad and I" Script	28^	24	12	.27
"Adult/Adult" Script	14	08	20	.21

Notes. YSR = Youth Self Report

^{**}p < .001, *p < .01, p < .05

Supplemental Table 2

Adjusted Individual-level Correlations Between Script Attachment, Friendship Quality,
and Change in Friendship Quality

Measures (n)	"Mom and I"	"Dad and I"	"Adult/Adult
	Script	Script	" Script
Friendship Quality (52)			
Interaction Frequency	30^	09	.20
Positive Features	.04	05	.02
Intimacy	12	13	10
Instrumental	02	.03	.14
Support			
Emotional Support	.28^	.00	.05
Negative Features	.13	.11	.04
Conflicts	.19	.20	.10
Inequality	.01	05	05
Change in Friendship Quality			
Interaction Frequency	.04	.27	.18
Positive Features	.09	07	01
Intimacy	.15	.14	08
Instrumental Support	.08	30	.02
Emotional Support	06	07	.09

The Quality of Close Adolescent Friendships

Measures (n)	"Mom and I"	"Dad and I"	"Adult/Adult
	Script	Script	" Script
Negative Features	11	.28	.38*
Conflicts	16	.10	.21
Inequality	.00	.39*	.44**

^{**}p < .001, *p < .01, p < .05

Supplemental Table 3

Adjusted Individual-Level Correlations Between Social Problem Solving and Script

Attachment

Measures (n)	"Mom and I"	"Dad and I"	"Adult/Adult"
	Script	Script	Script
SPSI:R-S Total (40)	.12	.04	.40**
PPO	21	.10	.48**
NPO	18	09	28
RPS	01	20	.25
ICS	32^	05	.06
AS	.00	10	16

Notes. SPSI:R-S = Social Problem Solving Inventory: Revised-Short; PPO = Positive Problem Orientation; NPO = Negative Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style.**p < .001, *p < .001, *p < .001