

Emotional and Behavioural Difficulties, (in press)

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authors - Final Revision - November 30, 2006

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Peer Relationships and Internalizing Problems in Adolescents:

Mediating Role of Self-Esteem

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Abstract

This study examined whether self-esteem mediated the association between peer relationships and internalizing problems (i.e., depression and social anxiety). A total of 7290 (3756 girls) adolescents (ages 13-18 years) completed self-report measures of peer relationships, including direct and indirect victimization, social isolation, friendship attachment (alienation and trust) and friendship quality (conflict and support), as well as self-esteem, social anxiety, and depression. Regression analyses indicated that self-esteem partially mediated the relations between social isolation, friendship attachment (alienation) and both depression and social anxiety, whereas friendship attachment (trust) was a partial mediator for depression only. Overall, linkages between peer relationships and depression were more strongly mediated by self-esteem than those between peer relationships and social anxiety. Theoretical and applied implications of these findings are discussed.

Key words: peer relationships, victimization, self-esteem, internalizing problems, adolescence

Peer Relationships and Internalizing Problems in Adolescents: Mediating Role of Self-Esteem

Recent research suggests internalizing problems (i.e., depression and anxiety) frequently occur in adolescents between the ages of 15 and 18 (Seroczynski, Jacquez, & Cole, 2003; Verhulst, van der Ende, Ferdinand & Kasius, 1997). Adolescent depression is associated with many serious behavioral and psychological outcomes, including loneliness, disordered eating, substance abuse and suicide (Birmaher et al., 1996; Swearer, Grills, Haye, & Tam Cary, 2004). With respect to anxiety, social anxiety is particularly common among youth and is associated with school avoidance or refusal, depression and suicidal ideation, substance abuse and conduct problems (Harrington, Rutter, & Fombonne, 1996; Levy & Deykin, 1989; Verhulst et al., 1997).

Given the high prevalence of depression and social anxiety among adolescents, and the severity of associated impairments, it is critical to understand the mechanisms or processes by which these difficulties emerge (Bukowski & Adams, 2005). Although there are multiple determinants of depression and social anxiety, the association between peer relationships and internalizing problems demonstrated in previous literature may be especially salient for adolescents (Kearney, Eisen, & Schaefer, 1995; LaGreca, & Harrison, 2005; Seroczynski et al., 2003; Moran & Dubois, 2002). For example, social anxiety and depression are related to direct (verbal and physical aggression) and indirect (e.g., covert, relational aggression) victimization (Craig, 1998; Crick & Bigbee, 1998; Crick & Grotpeter, 1995; Marini, Dane & Bosacki, 2005), friendship quality (Nangle, Erdley, Newman, Mason, & Carpenter, 2003; Parker & Asher, 1993), friendship attachment (Armsden & Greenberg, 1987), and social isolation (Nangle et al., 2003; Boivin, Hymel & Bukowski, 1995). Although the connection between peer relationships and internalizing problems is well established, there is a paucity of research on the mechanisms by which such peer relationship difficulties may contribute to depression and social anxiety. A few notable exceptions include studies indicating that global self-worth mediated the relation between peer victimization and anxiety in middle school girls (Grills & Ollendick, 2002), and that peer attachment was indirectly related to depression through its intermediate association with self-esteem (Wilkinson, 2004).

The purpose of the present study is to examine multiple dimensions of adolescent peer relationships, including friendship quality, friendship attachment, social isolation (i.e., perceived lack of friends, loneliness) and peer victimization, in connection to social anxiety and depression. Furthermore, we wanted to determine whether links between peer relationship difficulties and internalizing problems are mediated by self-esteem. The inclusion of multiple measures of peer relationships represents a crucial addition to existing research in view of conceptual and empirical literature suggesting that dyadic friendships and group-level peer relationships have differential effects on psychosocial adjustment (e.g., Brown & Klute, 2003; Rubin et al., 1998). For example, according to Sullivan's (1953) oft-cited theory, children and adolescents having difficulties relating to their peer group may be particularly vulnerable to social anxiety, whereas friendships were thought to play a particularly important role in shaping empathy, perspective-taking and self-perceptions. From an empirical perspective, Bagwell, Newcomb & Bukowski (1998) found having a friend in early adolescence predicted lower levels of depression and higher self-worth in young adulthood, whereas peer rejection was more frequently associated with aspects of life-status adjustment, such as school and job performance. Therefore, in the present study we will examine the unique relations between various peer relationships and internalizing problems.

In view of previous research, self-esteem may be central to the process linking peer relationships to depression and social anxiety. Self-esteem is a well-established correlate of

depression and social anxiety (e.g., Dubois & Tevendale, 1999; Harter, 1999; Petersen et al., 1991; Shirk et al., 2003), consistent with clinical models that emphasize the role of negative self-perceptions in the emergence of mood and anxiety disorders (e.g., Beck, 1987; Gotlib & Abramson, 1999; Salkovskis, 1996). In addition, peer relationships have been shown to be related to self-perceptions and self-esteem, as friends mutually validate each other's self-worth, and experiences of victimization or social isolation appear to adversely affect one's self-perceptions (Adler & Adler, 1998; Andreou, 2004; Hartup, 1996; Lopez, 2002; Marini et al., 2005; Prinstein, Boergers, & Vernberg, 2001; Salmavalli & Nieminen, 2002).

Another contribution of the present research is that we studied the potential mediating role of self-esteem in the association between peer relationships and internalizing problems in an age group that has been investigated infrequently, adolescents ages 13 to 18. One aspect of adolescence that could contribute to internalizing problems is the challenge of adapting to numerous changes in peer relationships during this developmental period (Lopez, 2002; Sameroff, 1975). For example, adolescents become increasingly reliant on friends for emotional and instrumental support and the mutual validation of self-esteem, and may need to make and maintain new friendships in the transition from elementary to high school (Rubin, Bukowski, & Parker, 1998). Problems with peer relationships during this period may affect self-esteem differently than in children, given the increased importance of peer relationships in adolescence, adolescents' emerging ability to think abstractly, hypothetically and idealistically (Case, 1992; Marini & Case, 1994), and the focus on identity formation (Brown & Klute, 2003). Thus, self-esteem may be an especially crucial mediator of the link between peer relationships and internalizing problems in adolescence.

We also examined gender differences to determine whether the mediator model differed for males and females. Several previous findings suggested this was likely to be the case. Adolescent females are more likely than males to experience internalizing problems such as depression and anxiety (Maccoby, 1998; Petersen et al., 1991), and appear to undergo a decline in self-worth, beginning around 11 or 12 years of age (e.g., Harter, 1999; Simmons, Rosenberg, & Rosenberg, 1973). Furthermore, previous empirical research and theoretical models suggest that female adolescents' self-perceptions are more likely than those of males to be influenced by their social relationships, given the high value that they place on close relationships (Brown, 2003; Harter, 1999; Lopez & Dubois, 2005; Maccoby, 1998).

In addition, Hankin and Abramson (2001) posited that female adolescents may be more vulnerable to depression than males because they experience more negative interpersonal events, and tend to ruminate and make pessimistic attributions, including self-blame, about these peer relationship difficulties. Such findings suggest that negative peer experiences may be especially detrimental to the self-esteem of female adolescents, which may have implications for the development of internalizing problems. Accordingly, peer relationship difficulties may have a more detrimental impact on females' self-esteem than that of males, and may mediate the link between peer relationships and internalizing difficulties more strongly.

Method

Participants

Students from 25 Canadian high schools participated in the study. Consent was obtained through a passive parental consent procedure. Prior to the survey administration, parents were sent written notification to inform them of their child's participation. Parents were notified that they could request that their child not participate in the study. In addition, students assent was obtained. Overall, 3% of the parents, and 4% of students chose to not participate.

The overall participation rate was 76% of students enrolled in participating schools ($N = 7430$). Non-participation was due to student absenteeism (17%), student refusal (4%), and parental refusal (3%). After screening 2% ($n = 140$) of the participants due to acquiescent rating styles, the potential sample consisted of 7290 (3756 girls) adolescents (ages 13-18 years; $M = 15$ years, 7 months, $SD = 1$ year, 4 months). In terms of demographics, 93% of the adolescents were born in Canada and the most common ethnic backgrounds reported other than Canadian were British (18.1%), German (15.0%), French (12.7%), and Italian (10.5%), consistent with the broader Canadian population (Statistics Canada, 2001). Data on parental education status indicated mean levels of education for mothers and fathers falling between “some college, university or apprenticeship program” and “a college/apprenticeship/technical diploma.” About 69% of participants were living in two-parent households (57% with both birth parents, 12% with one birth parent and one step-parent), 15% reported living with a single parent (usually mother), and the remaining adolescents reported living with relatives, foster parents, guardians, adoptive parents, in group homes, or on their own.

Measures

The questionnaire used in this study was part of a larger study examining adolescent resilience and risk behaviors in relation to community, interpersonal, and intrapersonal factors. The present study focused on self-report measures of direct and indirect victimization, friendship attachment, friendship quality, social isolation, social anxiety, depression, and self-esteem.

Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998). This questionnaire was adapted from a measure originally created by La Greca and Lopez (1998) which taps the degree to which students feel anxious or uncomfortable in social situations (Ginsburg, LaGreca, & Silverman, 1998; Inderbitzen-Nolan & Walters, 2000). Consistent with the original measure, we identified a factor that accounted 53% of the variance using a Principal Components Analysis with varimax rotation, which pertained to fear of negative evaluation; this factor was the focus of the present research ($\alpha = .91$). This scale comprised seven items with a 4-point Likert scale, including questions such as “I’m afraid other people my age will not like me,” and “I worry about what other people my age think of me.”

CES-D (Centre for Epidemiological Studies Depression Scale; National Institute of Mental Health, USA, 1972). This measure consisted of a 20-item questionnaire (5-point Likert scale) asking students to respond to questions that assess the degree of depressive symptoms they may have experienced over the past two weeks, such as “I thought my life had been a failure” (CES-D; Centre for Epidemiological Studies Depression Scale, National Institute of Mental Health, USA, 1972). The scale proved to have a high internal consistency ($\alpha = .92$).

Rosenberg Self-Esteem Scale (Rosenberg, 1965). Self-esteem was assessed using the Rosenberg (1965) Scale, a self-report measure consisting of 10 items (5-point Likert scale) designed to measure feelings of personal worthiness and social competence, such as “I feel I do not have much to be proud of” ($\alpha = .90$).

The School Life Questionnaire (Marini, 1998). Students reported how often during the last school year they experienced direct and indirect victimization (Marini et al., 2006). Possible responses on a 5-point Likert scale ranged from never (1), to few times a year (2), few times a month (3), few times a week (4), to few times a day (5). A Principal Components Factor Analysis with varimax rotation revealed two major factors. One factor, which explained 25% of the variance, comprised 4 questions ($\alpha = .83$) that focused on direct victimization, such as “how often have you been pushed and shoved by someone”, and “teased and ridiculed by someone.” The second factor,

accounting for 33% of the variance, comprised four items dealing with indirect victimization ($\alpha = .77$), such as how often have you “spread false rumours” and “excluded someone from a group.”

Inventory of Parent and Peer Attachment. We used an 18-item (4-point Likert scale) scale that assessed trust, communication, and alienation in friendships, adapted from a measure developed by Armsden and Greensberg (1987). Differing somewhat from analyses by the original authors of the scale, we identified an 11-item trust-communication factor (Friendship attachment-trust; $\alpha = .94$) using Principal Components Analysis with varimax rotation, which included items such as “I trust my friends” and “I can tell my friends about my problems and troubles,” and explained 38% of the variance. We also found a seven-item alienation factor (Friendship attachment-alienation; $\alpha = .78$), involving questions such as “I feel angry with my friends,” which accounted for an additional 21% of the variance. We examined the factors separately because the negative affect tapped in the alienation factor appeared conceptually distinct from the items in the trust/communication factor, and was likely to have important implications for the development of internalizing problems.

Friendship Qualities Scale (Bukowski, Boivin, & Hoza, 1994). We used an 18-item short-version of the Friendship Qualities Scale, that was revised by Gauze, Bukowski, Aquan-Assee and Sippola (1996). Participants reported perceptions of companionship, help/support, security, closeness and conflict in their best friendships. Consistent with previous research (e.g., Furman, 1996), we used Principal Components Analysis with varimax rotation to identify a 12-item factor tapping supportive or positive qualities (Friendship quality-support; $\alpha = .93$), which explained 37% of the variance. A second factor, which accounted for 13% of the variance, consisted of three items tapping conflict ($\alpha = .76$; Friendship quality-conflict). Scale items include “If I have a problem at school or at home, I can talk to my best friend about it” (supportive), and “I get into fights with my best friend” (conflict).

Social Isolation. This variable is a subscale of a measure created by the YLC-CURA (Youth Lifestyle Choices-Community University Research Alliance) in which participants report the degree to which they are bothered by being isolated from their peers and friends (YLC-CURA, 2001). Using Principal Components Analysis with varimax rotation, we identified a four-item factor ($\alpha = .69$) accounting for 18% of the variance, which assessed problems regarding loneliness, a lack of friends, and romantic partners including items such as “not enough close friends,” and “being lonely.”

Procedure

The self-report questionnaire was group-administered to students in classrooms by trained research staff. A total of two hours was allotted for survey administration at each school. If students had literacy difficulties, the survey was read aloud to ensure that everyone could participate regardless of literacy level. Adolescents were informed that their responses were confidential and remained available throughout the administration to answer any questions from the participants.

Results

Treatment of Missing Data

Composite (average) scores were computed for participants who responded to at least 50% of the items within an identified factor. For students who did not give a sufficient number of responses within a factor (i.e., less than 50%), composite scores were imputed. In total, 14% of the data were missing. Missing data were imputed using the expectation-maximization (EM) algorithm

in SPSS. EM is an iterative maximum-likelihood procedure in which a cycle of calculating means and covariances followed by data imputation is repeated until a stable set of estimated missing values is reached. Methodological research has demonstrated that the maximum likelihood estimation of missing data is preferable to more common methods such as pair-wise deletion, list-wise deletion, or mean substitution (Allison, 2002; Enders, 2001; Schafer & Graham, 2002).

Preliminary Analyses

Means and standard deviations (SD) are presented in Table 1 for the overall sample and for females and males separately. Given gender differences reported in the literature regarding peer relations, self-esteem, and internalizing problems, we conducted a series of ANOVA tests to examine potential gender differences in study variables (see Table 1). Given the large sample size, tests of statistical significance were insufficiently stringent and uninformative, and thus we reported Cohen's *d* effect sizes to index the magnitude of the separation between group means (Cohen, Cohen, West, & Aiken, 2003). We considered only group differences exceeding a Cohen's *d* effect size of .20 to be of meaningful magnitude, consistent with Cohen and colleagues (2003) suggestion that this is the lower boundary of a small but meaningful effect. There were statistically significant and meaningful gender differences indicating that males had higher self-esteem, friendship conflict and friendship alienation than females, whereas females reported higher levels of friendship attachment-trust, and friendship quality-support than males.

Consistent with previous research (Craig, 1998; Marini et al., 2005), measures of direct and indirect victimization were dichotomized. Participants were classified as direct victims if they scored 1 SD above the mean on the direct victimization scale, and as non-victims of direct aggression if they scored below 1 SD above the mean on the direct victimization scale. The same criterion was used to classify victims and non-victims of indirect aggression. Chi-square analyses revealed that compared to females there were a significantly higher percentage of males ($p < .001$) classified as direct victims (4.5% female; 10.6% male), ($1, N = 7280$) = 246.56, and indirect victims (3.7% female, 5.3% male), ($1, N = 7280$) = 31.31.

To explore the zero-order relations among the main study variables, correlations were computed for the entire sample, as reported in Table 2. To adjust for the number of comparisons computed, correlations were considered to be statistically significant and meaningful at $p < .001$. Each of the predictors was significantly correlated at $p < .001$ level with both depression and social anxiety. However, correlations between friendship support and both depression and social anxiety, and between friendship conflict and depression explained less than 1% of the variance in the internalizing outcome (i.e., $-.10 < r < .10$) and thus are not of a meaningful magnitude, below the threshold suggested by Cohen and colleagues for a small, meaningful effect (Cohen, Cohen, West, & Aiken, 2003).

Hierarchical Multiple Regression Analyses of Mediator Models

Plan of analysis. We examined the four criteria suggested by Baron and Kenny (1986) and Holmbeck (1997) to determine whether self-esteem mediated the relations between the peer relationship difficulty measures and internalizing outcomes (depression, social anxiety). We addressed Baron and Kenny's (1986) first criterion, to determine whether the predictors (peer relationships) were associated with the outcomes (depression, social anxiety), by entering variables in a hierarchical multiple regression analysis in the following two steps: gender, peer relationships (see Table 3). The interaction terms between gender and peer relationships were both nonsignificant and did not reach a meaningful magnitude ($sr^2 > .01$; see paragraph below), and therefore were excluded from the regression equation and are not reported.

Given the large sample size, it is possible for small, trivial effects to be statistically significant. Therefore, to assess whether data for a given predictor were consistent with Baron and Kenny's first criterion, we examined statistical significance and the squared semi-partial correlation (sr^2), and considered effects to be meaningful only when sr^2 was greater than .01, consistent with Cohen and colleagues suggestions regarding the lower boundary for a small, meaningful effect (Cohen, et al., 2003).

To test the second criterion stipulated by Baron and Kenny (1986), we examined the relation between peer relationships (predictors) and self-esteem (mediator). We conducted a hierarchical multiple regression analysis in which self-esteem was designated as the outcome variable and predictors were entered in the following two steps: gender and peer relationships (see Table 4). Gender by peer relationship interaction terms were tested to examine the possibility of moderated mediation (Kenny, 2003), specifically whether there were differential relations between the predictors (peer relationships) and the proposed mediator in the overall model (self-esteem) for males and females. Consistent with procedures stipulated for the first criterion, we evaluated whether the peer relationship predictors were uniquely and meaningfully associated with self-esteem by examining level of statistical significance and whether sr^2 exceeded .01.

We conducted a third set of hierarchical regression analyses to examine the third and fourth criteria specified by Baron and Kenny (1986). Gender, peer relationships, and self-esteem were entered together in the first step (see Table 5). To examine Baron and Kenny's third criterion, we examined whether self-esteem (the mediator in the model) was associated with social anxiety and depression (outcomes), above and beyond gender and peer relationships (see Table 5). Gender by self-esteem interactions were tested to examine the possibility of moderated mediation (Kenny, 2003), in particular whether the proposed mediator (self-esteem) was differentially related to the internalizing outcomes (depression, social anxiety) for males and females. In addition to examining possible statistical significance, we also considered whether the sr^2 value for each relation surpassed .01 (as outlined above).

To evaluate Baron and Kenny's (1986) fourth criterion, we tested whether reductions in direct relations (Criterion 1) between peer relationships and the internalizing outcomes (depression and anxiety, see Table 3) were statistically significant, after controlling for self-esteem (the mediator) (see Table 5). To evaluate whether reductions in direct relations were statistically significant, we performed the Sobel (1982) test to determine whether indirect effects comprising the relations between each predictor and the mediator (Criterion 2) and the relations between the mediator and each internalizing outcome (Criterion 3) were statistically significant (Preacher & Leonardelli, 2004). According to Kenny (2003), a significant indirect effect implies a significant reduction in the direct association between a predictor and an outcome. In addition, consistent with our approach to evaluating direct effects pertaining to Criterion 1, we examined whether the two constituent relations comprising the indirect effect (i.e., predictor-mediator relation and the mediator-outcome relation) had an sr^2 value that exceeded .01, the lower boundary of what we considered a meaningful association.

For descriptive purposes, we quantified the proportion of the direct association between a predictor and an internalizing outcome that was partially mediated by self-esteem (P_M), in accordance with the formula specified by Shrout and Bolger (2002). Specifically, we subtracted the unstandardized regression coefficient for the direct relation after the mediator was controlled from the unstandardized regression coefficient for the direct relation prior to the mediator being entered into the equation, and divided the resulting difference score by the latter unstandardized regression coefficient. Finally, to assess whether the direct association between a peer relationship predictor and an internalizing outcome was of a meaningful magnitude after self-esteem was controlled, we

examined whether the sr^2 value exceeded .01. We repeated the procedures used to assess Criterion 4, as outlined above, in regard to the gender by peer relationship interactions, to examine the possibility of mediated moderation (Kenny, 2003). Specifically, we investigated whether any relations between the peer relationship variables and an internalizing outcome that may have been moderated by gender (i.e., significant and meaningful gender by peer relationship interaction terms) were in turn partially mediated by self-esteem. For example, does self-esteem mediate a relation between peer relationships and internalizing outcomes found for females only? In the interest of presenting findings parsimoniously, non-significant interaction terms were excluded from the regression equations and not reported in the tables.

Peer relationships and depression. Table 3 summarizes the results of analyses that we completed to assess relations between peer relationships (i.e., the predictors) and depression (outcome), the first criterion for testing mediation (Baron and Kenny, 1986). As shown in Table 3, after controlling for gender and the other peer relationship measures, social isolation, was positively, significantly and meaningfully related to depression, whereas friendship attachment-trust was negatively, significantly and meaningfully (i.e., $sr^2 > .01$) related to depression, after controlling for gender and the other peer relationship measures. No peer relationship by gender interactions were both significant and of a meaningful magnitude, and therefore were excluded from the regression equation and are not reported.

Peer relationships and self-esteem. As shown in Table 4, we analyzed the relations between the peer relationship variables (i.e., the predictors) and self-esteem (mediator), to address Baron and Kenny's (1986) second criterion for establishing mediation. Results indicated that males had a higher level of self-esteem than females. In addition, controlling for gender and the other peer relationship variables, social isolation, and friendship attachment-alienation were negatively, significantly and meaningfully associated with self-esteem, whereas friendship attachment-trust was positively, significantly and meaningfully associated with self-esteem. None of the gender by peer relationship interactions were both statistically significant and of a meaningful magnitude ($sr^2 < .01$), and were therefore excluded from the regression equation, and are not reported.

Self-esteem and Depression. To address Baron and Kenny's (1986) third criterion for establishing mediation, we investigated the relations between self-esteem (mediator) and depression (outcome), controlling for the peer relationship variables. As shown in Table 5, self-esteem was significantly and meaningfully associated with depression above and beyond the contribution of gender and peer relationships, accounting for 16.2% of the variance. The self-esteem by gender interaction term was not found to be statistically significant and of a meaningful magnitude, and was removed from the regression and not reported.

Reductions in direct relations between peer relationships and depression. Finally, to address Baron and Kenny's (1986) fourth criterion for establishing mediation, we examined reductions in direct relations between peer relationship variables and depression, after self-esteem was controlled. As indicated in Tables 4 and 5, there were three relations that met our criteria for significant and meaningful indirect effects, having significant Sobel test values and constituent bivariate relations (peer relationship predictor-self-esteem, self-esteem-depression) with sr^2 values exceeding .01. The indirect effects included social isolation-self-esteem-depression, friendship trust-self-esteem-depression, and friendship alienation-self-esteem-depression. In accordance with Kenny (2003), these indirect effects imply that the inclusion of self-esteem as a mediator significantly reduced the three direct relations between predictors and outcomes, namely social isolation-depression, friendship trust-depression, and friendship alienation-depression. As indicated by the proportion mediated statistic (P_M) reported in Table 5, the inclusion of self-esteem as a mediator reduced the direct social isolation-depression association by 59%, the direct friendship

trust-depression relation by 71% and the friendship alienation-depression association by 39%. Finally, although each of these direct relations remained significant after controlling for self-esteem, and thus were only partially mediated, it is interesting to note that only friendship alienation continued to have a direct association with depression with an sr^2 value that exceeded .01, and thus could be considered of meaningful magnitude.

Peer relationships and social anxiety. Table 3 summarizes the results pertaining to our analyses of the relations between peer relationships (i.e., predictors) and social anxiety (i.e., outcome), the first criterion for testing mediation (Baron & Kenny, 1986). Social isolation and friendship attachment-alienation were positively, significantly and meaningfully associated ($sr^2 > .01$) with social anxiety. Gender and peer relationship interaction terms were non-significant, and therefore were removed from the regression equation and not reported.

Peer relationships and self-esteem. According to Baron & Kenny (1986), the second criterion for establishing mediation is to examine the relation between the predictors (i.e., peer relationships) and the mediator (i.e., self-esteem). Results are summarized in Table 4, as described above in the section pertaining to depression.

Self-esteem and social anxiety. To investigate the third criterion (Baron & Kenny, 1986) for establishing mediation, we analyzed the relations between self-esteem (i.e., mediator) and social anxiety (i.e., outcome). As shown in Table 5, self-esteem was negatively, significantly and meaningfully associated with social anxiety, controlling for gender and peer relationships, accounting for 2% of the variance. No self-esteem by gender interactions were found to be statistically significant and to have an effect size of meaningful magnitude, and therefore were excluded from the regression equation and not reported.

Reductions in direct relations between peer relationships and social anxiety. Finally, to address Baron and Kenny's (1986) fourth criterion for establishing mediation, we examined reductions in direct relations between peer relationship variables and social anxiety after self-esteem was controlled. As indicated in Tables 4 and 5, there were two relations that met our criteria for significant and meaningful indirect effects, having significant Sobel test values and constituent bivariate relations (peer relationship predictor-self-esteem, self-esteem-social anxiety) with sr^2 values exceeding .01. The indirect effects included social isolation-self-esteem-social anxiety, and friendship alienation-self-esteem-social anxiety. Consistent with Kenny (2003), these indirect effects imply that the inclusion of self-esteem as a mediator significantly reduced the two direct relations between predictors and outcomes, specifically social isolation-social anxiety, and friendship alienation-social anxiety. As indicated by the proportion mediated statistic (P_M) reported in Table 5, the inclusion of self-esteem as a mediator reduced the direct positive social isolation-social anxiety association by 22% and the positive friendship alienation-social anxiety association by 19%. Finally, despite being significantly, albeit partially, mediated by self-esteem, social isolation and friendship alienation continued to have a direct positive association with social anxiety with an sr^2 value that exceeded .01, and thus could be considered of meaningful magnitude.

Discussion

Results were partially consistent with our prediction that self-esteem would mediate the relation between peer relationship difficulties and internalizing problems. Consistent with criteria for testing mediational models (Baron and Kenny, 1986), social isolation, friendship attachment-

alienation and friendship attachment-trust were significantly and meaningfully related to both the mediator, self-esteem, and the two internalizing outcomes, social anxiety and depression. Self-esteem in turn was significantly and meaningfully related to social anxiety and depression independent of the peer difficulty variables. Finally, as predicted in the proposed mediational model, the direct associations between each of these peer relational difficulties and the internalizing outcomes were reduced significantly once self-esteem was entered into the equation. Taken together, these findings suggest that self-esteem partially mediates relations between some peer relationship difficulties and internalizing problems.

These results are in accord with our prediction that an adolescent's emerging sense of self may be adversely affected by difficulties establishing and maintaining successful peer relationships, which in turn would increase the risk of internalizing problems. This hypothesis was made in light of several normative developmental features of adolescence, including the increased importance of peer relations, the mutual validation of self-esteem that occurs within close adolescent friendships, and the heightened attention to identity formation (Brown & Klute, 2003). In accord with cognitive models of depression and anxiety (e.g., Abramson et al., 1978; Beck, 1987; Silverman & Ginsburg, 1998), damage to self-esteem may in turn to increase vulnerability to depression, although given the cross-sectional data, the reverse is also possible, such that depression could lower self-esteem, which in turn could adversely affect peer relationships.

Although there were similarities regarding the specific peer relationship problems associated with social anxiety and depression, there were also differences in the extent to which the mediational model was supported with respect to these two internalizing outcomes. The proportion mediated statistic (P_M) indicated that the social isolation-depression, friendship trust-depression, and friendship alienation-depression relations were reduced by 59%, 71% and 39% respectively, which suggests that self-esteem is a key mechanism that partially accounts for the association between these peer relationship difficulties and depression. An additional indication of the key role of self-esteem in this process is that the direct effects of social isolation and friendship trust were reduced to a sr^2 value of less than .01, when self-esteem was controlled, which we considered to be below a meaningful magnitude. With regard to social anxiety, results demonstrated that self-esteem significantly though partially mediated the direct relations involving social isolation-social anxiety and friendship alienation-social anxiety. However, in comparison to the results for depression, self-esteem does not seem to be a substantial component in the mechanism explaining the direct association between social isolation-social anxiety and friendship alienation-social anxiety, insofar as these relations were reduced by only 22% and 19% respectively. Furthermore, the direct relations between social isolation-social anxiety, and friendship alienation-social anxiety remained significant and of a meaningful magnitude ($sr^2 > .01$) after controlling for self-esteem.

Self-esteem may be a weaker mediator of the link between peer relationship difficulties and social anxiety than is the case for depression because self-esteem is a self-focused construct, whereas social anxiety (fear of negative evaluation) addresses participants' expectations or perceptions of others. Although negative self-perceptions are thought to play a key role in generally predisposing individuals to problems with anxiety (Salkovskis, 1996), and are a key component in cognitive models of social phobia (Clark, 1996), measures more specifically related to how one is perceived by others in a social situation, or how one's performance is evaluated in a social situation, may mediate the relation between peer relationship problems and social anxiety more strongly than self-esteem per se.

Results were more consistent with the mediational model in respect to measures specifically indexing problems with close relationships, such as lacking trust in, or being alienated from a friend, as well as being lonely and dissatisfied with the number of close relationships in which one

is involved (i.e., social isolation). These findings are in accord with developmental research that stresses the importance of close peer relationships in adolescence. Given the vital role of friends in adolescence as companions, confidants and providers of emotional and instrumental support (Dubois, Felner, Sherman, & Bull, 1994; Rubin, Bukowski & Parker, 1998; LaGreca & Harrison, 2005; Prinstein et al., 2001), we expected that difficulties establishing or maintaining intimate, supportive friendships would damage self-esteem and place youth at risk for internalizing problems.

Interestingly, the measures of social isolation and friendship attachment-alienation, which were uniquely associated with both depression and social anxiety, have a common focus on emotional distress related to low involvement with friends or problematic friendship characteristics. For instance, the measure of social isolation indicated the extent to which participants were “bothered” by problems like not having enough friends and being lonely, whereas the friendship-attachment alienation measure included items such as “I feel angry with my friends,” and “Talking over my problems with my friends makes me feel ashamed and foolish.” In contrast, the measures of friendship quality, which were not significantly associated with self-esteem or internalizing problems, tapped perceived qualities of the relationship or the partner in a more “factual” manner, without reference to the respondents’ negative affect about the subject. Thus, the degree of emotional distress about peer relationships may be associated with internalizing problems to a greater extent than perceptions of relationship problems per se. This raises the possibility that some individuals may react more emotionally to difficult peer relationships, and may therefore be at higher risk for internalizing problems. Future researchers may wish to examine whether some adolescents are more likely than others to succumb to internalizing problems in the face of interpersonal stress (e.g., Cummings et al., 2000). Perhaps some adolescents are psychologically or biologically vulnerable to internalizing problems in the face of difficulties involving close relationships, as a consequence of factors such as temperament characteristics or parent-adolescent relationship qualities that render them more emotionally reactive.

The findings are consistent with those of Wilkinson (2004) insofar as friendship attachment was found to be associated with adolescent self-esteem and depression. However, whereas Wilkinson (2004) found that peer attachment was indirectly related to adolescent depression through its intermediate association with self-esteem, we noted a direct association with depression that was partially mediated by self-esteem. A key implication of these somewhat different findings is that in Wilkinson’s (2004) research, the link between peer attachment and depression depends entirely on its intermediate effect on self-esteem. In contrast, in the present research, the direct relation with depression was reduced by 39% when self-esteem was introduced as a mediator, meaning that other intermediate factors may well explain the association between friendship attachment and depression. Another key difference in the current study is that depression was more strongly associated with alienation from friends than with trust and communication, and both measures of friendship attachment were associated with self-esteem and depression independent of peer victimization, social isolation and friendship quality.

In contrast to findings with respect to friendship attachment and social isolation, measures of direct and indirect victimization were not significantly related to self-esteem, social anxiety or depression, independent of the other peer relationship difficulties. As is typical in the literature (e.g., Salmivalli & Nieminen, 2002), the present measures of peer victimization made no explicit reference to whether friends were involved in the attacks, or whether close friendships were adversely affected by them. In line with previous research demonstrating a link between internalizing problems and relational aggression perpetrated by friends (e.g., Crick & Nelson, 2002), it may well be that an adolescent’s emotional well-being would be more greatly affected by victimization in the context of friendships. One question that may be addressed in future research is

whether victimized adolescents whose friendships remain intact are less vulnerable to internalizing problems than those whose friendships are destroyed by peer victimization, or those who have failed to establish such close relationships.

In previous research (Grills and Ollendick, 2002), peer victimization was more strongly associated with anxiety in early adolescents than was the case in the present study. The present research findings can be distinguished from Grills and Ollendick's (2002) research in two important ways, which might account for the discrepant results. First, peer victimization measures had significant albeit small zero-order correlations with depression and social anxiety, but they were not meaningfully and uniquely associated with the internalizing outcomes when examined in conjunction with measures that explicitly tapped difficulties with friendship formation or friendship experiences. A second difference between the present research and that of Grills and Ollendick (2002) is that our sample comprised middle to late adolescents rather than early adolescents. Difficulties within friendships, which were more strongly associated with internalizing problems in the present study than was peer victimization, may take on added importance later in adolescence because of the increase in intimate disclosure that results in friends playing a substantial role as confidants and providers of emotional support.

Contrary to our expectations, gender did not appear to moderate the relations among peer relationships, self-esteem, and internalizing problems. This finding is inconsistent with previous empirical research and theoretical models indicating that female adolescents' sense of self is more likely than that of males to be influenced by their social relations, given the high value that they place on close relationships (Brown, 2003; Harter, 1999; Maccoby, 1998). It is also discordant with Hankin and Abramson's (2001) observation that female adolescents may be more susceptible to depression partly because they are more inclined than are males to make pessimistic, self-blaming attributions to explain negative interpersonal events. In addition, Grills and Ollendick (2002) found a key gender difference, namely that among girls global self-worth mediated the association between peer victimization and anxiety, whereas for boys self-esteem acted as a moderator of this relation. In the present study, problems with social isolation, friendship attachment-alienation, and friendship attachment-trust appear to be equally damaging to males and females with regard to self-esteem, depression and social anxiety, suggesting that supportive friendships are critical to the psychosocial adjustment of adolescent males and females. Moreover, self-esteem appears to be a key component of the mechanism linking friendship difficulties to internalizing problems for both males and females, especially in regard to depression.

Implications

As a number of authors have suggested (e.g., Bukowski & Adams, 2005; Cummings et al., 2000), it is critical to examine process-oriented models to better understand why and how a given form of psychopathology emerges. The present study suggests a possible pathway or chain of events that may culminate in the development of social anxiety and depression, particularly the latter. This evidence has important implications for the prevention and treatment of internalizing problems. In particular, it highlights that parents, teachers, guidance counselors, psychologists or coaches who interact with youth should be aware that adolescents may be at-risk of internalizing problems when they have trouble establishing close, intimate friendships. Those adolescents having difficulty in this regard may benefit from intervention programs designed to foster skills that should enable them to establish and maintain positive friendships (e.g., Selman, 2003), and appropriate referrals by concerned adults could potentially divert the youth from a pathway toward internalizing problems.

Furthermore, in agreement with previous research (e.g., Dubois & Tevendale, 1999; Grills & Ollendick, 2002; Harter 1999), the present findings suggest that self-esteem plays a critical intervening role with regard to adolescent psychosocial adjustment. The risk of internalizing problems, particularly depression, among youth with problematic peer relationships may also be addressed by seeking alternate means to bolster self-esteem, such as interventions directly targeting low self-esteem through assertiveness training, attribution restructuring, and social reinforcement of positive self-statements (Shirk et al., 2003), or by facilitating involvement in extra-curricular activities that instill a sense of achievement and pride (Harter, 1999).

Limitations and Future Directions

Interpretations of the present findings must be tempered by two limitations. First, the data are cross-sectional, which precludes definitive conclusions regarding the direction of causation. It is conceivable, for example, that internalizing problems increase the likelihood of low self-esteem and difficult peer relations, as opposed to the reverse. Future longitudinal research would help to disentangle this ambiguity of causal direction. An additional limitation is that the data were derived from self-report measures, which of course are subject to social desirability bias and shared method variance. However, this methodology has been used extensively in this area of study, and researchers have demonstrated that when students are assured of confidentiality, self-report measures of risk behaviors have good validity (e.g., Murray & Perry, 1987; White, 1991). Moreover, some constructs may be tapped by only assessing self-perceptions (e.g., self-esteem). Future research may also address other dimensions of anxiety that were not the focus of the present study (Silverman and Ginsburg, 1999). We focused on social anxiety, specifically fear of negative evaluation, in the present research, because it seemed particularly salient to difficulties with peer relationships, and because social-cognitive developments in adolescence may facilitate greater reflection of how the self is perceived by others (Dusek & McIntyre, 2003).

To extend the present study, we encourage future researchers to use alternate methodologies to assess peer relationships, such as teacher reports and sociometric measures. Finally, understanding of the mechanisms by which internalizing problems emerge may be further enhanced through the examination of alternate mediator models. Given past evidence that suggests supportive friendships may buffer individuals experiencing stressful life events from the onset of depression (Brown & Klute, 2003), the impact of problematic peer relations on the availability of social support from friends may be an additional pathway that is worth examining.

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Table 1
Means, Standard Deviations, and Gender Differences for Study Variables

Variables	Group			<i>F</i> Gender Main Effect	<i>d</i> Effect Size
	Total <i>N</i> = 7290	Females <i>n</i> = 3756	Males <i>n</i> = 3534		
1. Social Anxiety	1.69 (.52)	1.68 (.53)	1.70 (.51)	1.45	.028
2. Depression	2.01 (.52)	2.04 (.54)	1.97 (.46)	26.80***	.122
3. Self-Esteem	3.74 (.63)	3.70 (.65)	3.80 (.63)	70.75***	.200
4. Direct victimization ^a	--	--	--	--	--
5. Indirect victimization ^a	--	--	--	--	--
6. Social Isolation	1.62 (.46)	1.65 (.46)	1.59 (.45)	29.41***	.121
7. Friendship trust	3.13 (.55)	3.27 (.52)	2.98 (.53)	543.34***	.527
8. Friendship alienation	1.60 (.53)	1.54 (.52)	1.66 (.53)	100.42***	.234
9. Friendship support	3.26 (.53)	3.44 (.45)	3.07 (.54)	1043.12***	.710
10. Friendship conflict	1.69 (.53)	1.63 (.55)	1.75 (.52)	92.30***	.225

Note. Friendship trust and Friendship alienation are two subscales of the Friendship attachment measure; Friendship support and Friendship conflict are two subscales of the Friendship Quality measure.

a = Means and standard deviations were not calculated for the Victimization variables as they were categorical. For gender differences regarding peer victimization, see the text for Chi-Square results.

*** $p < .001$.

Table 2
Correlations Among Social Anxiety, Depression, Self-Esteem, and Peer Relationship Variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Social Anxiety	---	.29	-.27	.12	.14	.23	-.17	.21	-.08	.09
2. Depression		---	-.55	.14	.15	.27	-.19	.29	-.07	.14
3. Self-Esteem			---	-.15	-.17	-.33	.25	-.28	.10	-.14
4. Direct victimization				---	.43	.12	-.13	.10	-.10	.10
5. Indirect victimization					---	.15	-.07	.10	-.05	.09
6. Social Isolation						---	-.11	.18	-.01	.07
7. Friendship trust							---	-.28	.50	-.15
8. Friendship alienation								---	-.17	.22
9. Friendship support									---	-.15
10. Friendship conflict										---

Note. All correlations are significant at $p < .001$; except those otherwise indicated, namely: $-.02 < r < .02$ are non-significant.

Table 3
Hierarchical Multiple Regression of Gender and Peer Relationships as Predictors of Depression and Social Anxiety in Adolescents

Variable	Depression				Social Anxiety			
	B	sr^2	R ²	R ² Ch	B	sr^2	R ²	R ² Ch
<u>Step 1</u>			.00	.00***			.00	.00
Gender	-.06***	.004			.01	.001		
<u>Step 2</u>			.17	.17***			.11	.11***
Gender	-.13***	.014			-.04**	.001		
Direct victimization	.10***	.004			.08***	.002		
Indirect victimization	.11***	.003			.12***	.003		
Social Isolation	.10***	.034			.09***	.030		
Friendship trust	-.06***	.010			-.01***	.008		
Friendship alienation	.11***	.037			.07***	.020		
Friendship support	.00	.000			.00	.000		
Friendship conflict	.04***	.005			.01	.000		

Note. sr^2 = squared semipartial correlations; Gender: 1 = male, 0 = female.
 $p^{***} < .0001$, $p^{**} < .001$. $p^* < .01$.

Table 4
Hierarchical Multiple Regression of Gender and Peer Relationships as Predictors of Self-Esteem in Adolescents

Variable	Self-Esteem			
	B	sr^2	R^2	$R^2\text{Ch}$
<u>Step 1</u>			.01	.01***
Gender	.12***	.010		
<u>Step 2</u>			.23	.22***
Gender	.23***	.029		
Direct victimization	-.12***	.004		
Indirect victimization	-.17***	.005		
Social Isolation	-.15***	.056		
Friendship trust	.12***	.025		
Friendship alienation	-.11***	.026		
Friendship support	.01	.000		
Friendship conflict	-.04***	.004		

Note. sr^2 = squared semipartial correlations. Gender: 1 = male, 0 = female. Friendship trust and Friendship alienation are two subscales of the Friendship attachment measure; Friendship support and Friendship conflict are two subscales of the Friendship Quality measure.
 $p^{***} < .001$, $p^{**} < .01$, $p^* < .05$.

Table 5
Hierarchical Multiple Regression of Gender, Peer Relationships, and Self-Esteem as Predictors of Depression and Social Anxiety in Adolescents

Variable	Depression					Social Anxiety				
	B	sr^2	P_M	ST	R^2	B	sr^2	P_M	ST	R^2
<u>Step 1</u>					.33					.12
Gender	-.04***	.002				-.01	.000			
Direct victimization	.05***	.001	.47	33.06***		.06***	.013	.21	5.40***	
Indirect victimization	.05***	.001	.57	34.06***		.10***	.002	.19	5.86***	
Social Isolation	.04***	.005	.59	19.10***		.07***	.017	.22	10.23***	
Friendship trust	-.02**	.001	.71	-13.81***		-.04***	.004	.27	-9.10***	
Friendship alienation	.06***	.014	.39	14.36***		.06***	.011	.19	9.26***	
Friendship support	.01	.000	-4.0 _a			.00	.000	-1.0 _a		
Friendship conflict	.02***	.001	.44	5.79***		.01 _s	.000	.46	-5.22***	
Self-Esteem	-.24***	.162				-.08***	.020			

Note. sr^2 = squared semipartial correlations; P_M = Proportion of direct association with depression or social anxiety mediated by gender or self-esteem; ST = Sobel Test (only significant values reported, $p < .001$); Gender: 1 = male, 0 = female.

a = indicates proportion by which direct effect of depression and social anxiety (outcomes) increased after self-esteem (mediator) entered.

$p^{***} < .0001$, $p^{**} < .001$, $p^* < .01$.