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Direct and Indirect Links between Peer Factors and Adolescent Adjustment Difficulties

Michael M. Criss,
Oklahoma State University

Benjamin J. Houltberg,
Fuller School of Psychology

Lixian Cui,
New York University Shanghai

Cara D. Bosler,
Oklahoma State University

Amanda Sheffield Morris, and
Oklahoma State University

Jennifer S. Silk
University of Pittsburgh

Michael M. Criss: michael.criss@okstate.edu

Abstract

The purpose of the current investigation was to examine the role of emotion regulation in the link between peer factors and adolescent adjustment difficulties. The sample consisted of 206 adolescents (ages 10–18 years) and parents. Peer factors (i.e., peer antisocial behavior, peer co-rumination, peer emotion regulation) and youth depressive symptoms were based on youth reports. Youth emotion regulation and antisocial behavior were assessed using parent and youth ratings. Results showed that peer antisocial behavior was directly (but not indirectly) related to youth antisocial behavior and depressive symptoms, whereas peer emotion regulation was indirectly (but not directly) related to both adolescent outcomes. In addition, peer co-rumination was indirectly related to youth antisocial behavior and directly and indirectly related to youth depressive symptoms. In general, the results indicated little evidence of moderation by adolescent age, sex, or ethnic differences. Implications for peer relationships as socialization contexts are discussed.

Keywords

adolescents; emotion regulation; antisocial behavior; depression; peer relationships

Correspondence to: Michael M. Criss, michael.criss@okstate.edu.

There has been considerable evidence in the literature connecting peer relationships to adolescent psychopathology (Dishion & Patterson, 2006; Rubin, Bukowski, & Parker, 2006; Snyder, 2002). For example, a number of peer factors (e.g., peer relationship quality, co-rumination, peer antisocial behavior) have been linked to both externalizing and internalizing problems (e.g., antisocial behavior, depression; Hankin, Stone, & Wright, 2010; Laird, Criss, Pettit, Dodge, & Bates, 2008; Rose, 2002). Although friendships appear to be key predictors of adolescent adjustment, less is understood regarding the processes and mechanisms underlying these links. One potential mechanism may be the adolescent's own emotion regulation as studies have demonstrated that youth emotion regulation is linked to both peer factors (e.g., Adrian et al., 2009; Kelly, Schwartz, Gorman, & Nakamoto, 2008) and adolescent adjustment (e.g., Eisenberg, Morris, & Spinrad, 2008; Kliewer et al., 2004; Silk et al., 2011). Another issue that remains unresolved is whether the pathways between peer processes and adolescent adjustment vary depending on adolescent age, sex, and ethnicity. The purpose of the current investigation was to examine whether peer factors were directly or indirectly (via youth emotion regulation) related to adolescent antisocial behavior and depressive symptoms. We also explored whether these links were moderated by adolescent age, sex, or ethnicity.

Adolescence is the developmental period consisting of the second decade of life (ages 10–18 years) that is characterized by a number of developmental transformations (Steinberg, 2014; Steinberg & Morris, 2001). For instance, compared to younger children, adolescents typically spend more time with friends (often unsupervised by adults), report greater levels of intimacy and companionship, and are more likely to identify trust and loyalty as defining features of their relationships with peers (Berndt, 2002; Buhrmester, 1998; Rubin et al., 2006). It is, therefore, not surprising that peer relationships have been identified as important socialization contexts in development of adjustment difficulties, such as antisocial behavior and depression (Dishion & Patterson, 2006; Rubin et al., 2006; Snyder, 2002). Although the specific dimensions of peer relationships and methods of assessment have varied, social scientists have posited a number of ways that adolescents' friends may influence psychopathology. For instance, peers may shape the development of adjustment difficulties by serving as role models (positive and negative) and through the reinforcement and/or affirmation of certain maladaptive behavioral and cognitive styles (e.g., deviant behavior, rumination; Dishion, Spracklen, Andrews, & Patterson, 1996; Rose, 2002). Specifically, some authors have highlighted peer relationships as contexts for deviancy training where children and adolescents essentially learn how to be aggressive and antisocial (Dishion et al., 1996). In addition to deviancy training, peers may encourage the rumination of negative thoughts and moods through co-rumination (e.g., Hankin et al, 2010; Rose, 2002) which can increase the risk for depressive symptoms. Adolescents' friends also may shape development of adjustment difficulties by introducing them to delinquent-reinforcing contexts and situations, such as violence and drug use in neighborhoods and schools (Snyder, 2002), which may increase both adolescent stress (and thus depressive symptoms) and deviant behavior.

Regardless of the process or manner in which peers influence adolescent development, there is considerable empirical evidence linking peer factors to both antisocial behavior and

depression. For instance, Laird et al. (2008) reported that friend antisociality (adolescent reports) was positively and significantly related to adolescent delinquent behavior (adolescent and parent reports). These findings are consistent with a study by Fergusson, Swain-Campbell, and Horwood (2002) who found that high levels of deviant peer association (adolescent reports) were related to high levels of adolescent self-reports of violent and properties crimes. Peer interactions also may influence the development of internalizing problems. For instance, different research groups (e.g., Hankin et al, 2010; Rose, 2002) have examined the link between peer co-rumination and adolescent adjustment. Given its positive (i.e., self-disclosure) and negative (i.e., rumination) features, it is not surprising that co-rumination has been linked to high levels of both internalizing problems and peer positive relationship quality (Hankin et al, 2010; Rose, 2002).

Although there is extensive evidence linking peer factors to adolescent adjustment, there have been few investigations examining potential pathways (i.e., direct and indirect) in this association. Examining direct and indirect pathways is important as it can inform the development of intervention programs targeting at-risk youth (Herts, McLaughlin, & Hatzenbuehler, 2012). One potential underlying mechanism linking peer processes and adjustment is *adolescent emotion regulation* (ER) which has been defined as the process of modulating the occurrence, form, intensity, and duration of internal feeling states and emotion-related physiological processes (Eisenberg & Morris, 2002). There is growing evidence that, compared to children, adolescents are better able to self-regulate and tend to use more advanced cognitive strategies when modulating their negative emotions (e.g., Morris, Silk, Steinberg, Myers, & Robinson, 2007). In addition, studies have shown that ineffective emotion regulation is an important predictor of many problems that emerge during adolescence (Dahl, 2004), such as risk taking behaviors, delinquency, and depression (Eisenberg et al., 2008; Kliewer et al., 2004; Silk et al., 2011).

Investigating adolescent emotion regulation as an underlying mechanism in the links between peer factors and adolescent behavior problems is based on the premise that friends serve as socializing agents in the development of emotion regulatory skills. For example, children have reported that friends may suppress or reinforce the expression of certain emotions, such as anger or sadness (Zeman & Garber, 1996). Likewise, friends can serve as role models for adaptive or maladaptive emotion regulatory skills (von Salisch, 2001). In addition to theoretical evidence, empirical findings from the literature have provided further support for the links between peer factors and emotion regulation. For instance, Rudolph, Troop-Gordon, and Flynn (2009) found that peer relational victimization (child reports) was positively and significantly related to observed emotion dysregulation. These findings are consistent with Kelly et al. (2008) who reported that peer nominations of bullying and rejection were positively and significantly related to teacher reports of adolescent emotion dysregulation. In sum, there is preliminary empirical and theoretical evidence that peer factors are related to adolescent emotion regulation, which in turn, is related to behavior problems. However, very few investigations have investigated direct and indirect (via youth emotion regulation) pathways between peer processes and adolescent adjustment. In research conducted by McLaughlin and Hatzenbuehler (Herts et al., 2012; McLaughlin & Hatzenbuehler, 2009; McLaughlin, Hatzenbuehler, & Hilt, 2009), the authors reported that

peer victimization (youth reports) was indirectly (but not directly) related to adolescent aggression and internalizing symptoms (parent and adolescent reports) via emotion dysregulation (parent and adolescent reports).

Although there is preliminary evidence that peer factors may be directly and indirectly related to adolescent behavior problems, it is possible that these pathways may vary by adolescent sex, age, and ethnicity. For example, there may be stronger links among older youth as they often report spending more time with their friends compared to younger adolescent (Larson & Richards, 1991). Indeed, Fleming, Catalano, Haggerty, and Abbott (2010) reported that adolescent perceptions of negative peer relationships at grade 9 (but not grade 5) predicted self-reports of substance use at age 19. There also is some evidence of ethnic differences regarding the impact of peer factors on adjustment. For example, using a sample of children in grades 3–5, Risi, Gerhardstein, and Kistner (2003) reported that peer reports of social withdrawal were more strongly related to negative education outcomes (i.e., achievement tests) for African Americans compared to European Americans. With respect to sex differences, girls often report significantly higher levels of support, intimacy, and affection in their friendship compared to boys (Belle, 1989; Rose, 2002), suggesting the possibility of stronger direct effects for girls compared to boys. Although these findings suggest potential sex, age, and ethnic differences regarding the direct link between peer factors and adolescent adjustment, it is not clear whether there would be comparable differences with respect to indirect effects (via adolescent emotion regulation). In their research, McLaughlin and Hatzenbuehler (Herts et al., 2012; McLaughlin et al., 2009) reported no significant differences between boys and girls (aged 11–14 years) regarding direct and indirect effects. To the best of our knowledge, there have been no investigations examining age or ethnic differences regarding indirect effects, and it is unclear whether these findings would be replicated using other peer factors (e.g., peer antisocial behavior) and using a larger age span during adolescence. Clearly, more research is needed.

In sum, the existing literature has identified several peer factors as critical predictors of adjustment difficulties during adolescence. However, there are some notable gaps in the literature. First, there have been few investigations of the pathways underlying this link during adolescence. In addition, the few published studies that have investigated the indirect effects of emotion regulation (Herts et al., 2012; McLaughlin & Hatzenbuehler, 2009; McLaughlin et al., 2009) focused only on peer victimization without examining other potential peer factors (e.g., peer emotion regulation). We addressed these gaps in the literature with the following research goals. First, we examined whether peer processes were directly and indirectly (via youth emotion regulation) related to adolescent adjustment difficulties. Consistent with the recommendations of the peer relationship literature (Hartup, 1996), we focused on three peer factors: peer antisocial behavior, peer co-rumination, and peer emotion regulation. Also, given that peer factors have been linked to externalizing and internalizing problems (e.g., Rubin et al., 2006), we included two types of adolescent adjustment difficulties simultaneously in the model: antisocial behavior and depressive symptoms. Based on previous studies (Herts et al., 2012; McLaughlin et al., 2009), we expected to find evidence of direct and indirect effects. Second, we examined whether the direct and indirect effects differ across adolescent age, sex, and ethnicity. Based on the evidence (albeit limited) in the literature, it was expected tentatively that stronger links in

the pathways would be found among older adolescents (compared to younger youth), girls (compared to boys), and ethnic minorities (compared to European Americans).

Method

Participants and Procedure

The sample consisted of 206 families with adolescents who participated in the Family and Youth Development Project (Criss et al., 2015), a study of the predictors and outcomes of adolescent emotion regulation. Data were collected from both adolescents (*M* age = 13.37 years, *SD* = 2.32, Age Range = 10–18 years; 51% female; 29.6% European American, 32% African American, 19.4% Latino American, 19% other ethnic groups) and their primary caregivers (83.3% biological mothers, 10.7% biological fathers, 2% grandparents, 4% other). The sample was predominantly comprised of low-income (*Median* annual income = $40,000) families with 38.7% headed by single parents, 25.4% living below the poverty line, and an average of 4.35 people living in each home. Families were recruited from disadvantaged communities through fliers distributed throughout the community (e.g., Boys and Girls Clubs) and convenience and snowball sampling methods. Adolescents and their parents participated in a 2½ hour laboratory assessment. At the beginning of the assessment, the purpose and procedure of the project were discussed with the adolescent and primary caregiver before they signed assent and consent forms, respectively. Next, they separately completed a set of questionnaires in different rooms. Both the parent and adolescent received $60 compensation for their time spent in the lab and were debriefed after the study. This project was approved by the university IRB prior to data collection.

Measures: Peer Factors

The adolescents were asked to report on the characteristics of their best friend or a friend with whom they hang out with the most, other than a relative or romantic partner. Youths reported knowing this friend (friend *M* age = 13.57, *SD* = 2.57; 51.5% female) on average 4.75 years (*SD* = 3.73). In general, the adolescents and their friends were very similar to each other with 88.6% of girls and 87.1% of boys reporting same-sex friendships. In addition to sex, the friends were similar in age with 93.3% of girls and 84.2% of boys reporting an age difference of one year or less.

Peer antisocial behavior—Youths reported on their friend's antisocial behavior using a questionnaire adapted from the Problem Behavior Frequency Scale (PBFS; Farrell, Danish, & Howard, 1992; Farrell, Kung, White, & Valois, 2000). Each of the 35 items (e.g., "hit or slap another kid," "break a rule at home," "threaten to hit another kid," "skip school," "start a fight," "smoke cigarettes") was rated using a 5-point scale (1 = "never" to 5 = "7 or more times"). Farrell et al. (1992) reported adequate predictive validity and internal consistency for this scale. In the current study, the 35 items were averaged (α = .95) to create the *peer antisocial behavior* score.

Peer co-rumination—Co-rumination reflects the extent to which the adolescent and friend repeatedly discuss negative feelings and problems occurring in each other's lives. This instrument was adapted from a measure developed by Rose (2002) who found it to be

linked to adolescent depressive symptoms and peer relationship quality. Adolescents used a 5-point Likert scale (0 = "not at all true" to 5 = "really true) to rate the 15 items (e.g., "When my friend and I talk about a problem that one of us has, we will keep talking even after we both know all of the details about what happened." "When my friend and I talk about a problem that one of us has, we spend a long time talking about how sad or mad the person with the problem feels.") which are part of the "rehashing" subscale (i.e., the extent to which the peers repeatedly discuss the aspects and implications of a problem in detail; Byrd-Craven, Granger, & Auer, 2011; Davidson et al., 2014). In the current project, we chose to assess these 15 items and not include the other 12 questions comprising the "mulling" and "encouraging problem talk" subscales as the "rehashing" items were conceptually more compatible with the overall goals and measures of the project. To create the *peer co-rumination* factor, the mean (α = .96) of the 15 items was computed.

Peer emotion regulation—Adolescents reported on their friend's anger and sadness regulation skills using the four-item anger (i.e., "My best friend controls temper when he/she is angry." "My best friend stays calm and keeps him/her cool when mad." "My best friend can stop him/herself from losing temper." "My best friend tries to calmly deal with what is making him/her mad.") and the modified four-item sadness (i.e., "My best friend controls his/her crying and carrying on when he/she feels sad." "My best friend stays calm and doesn't let sad things get to him/her." "My best friend can stop him/herself from losing control over sad feelings." "My best friend tries to calmly deal with what is making him/her sad.") coping scales from the Sadness and Anger Management Scales developed by Zeman and colleagues (Zeman, Shipman, & Penza-Clyve, 2001; Zeman, Shipman, & Suveg, 2002). Each item was rated using a 3-point Likert scale (0 = "not true," 1 = "somewhat true," 2 = "very true"). The scales have demonstrated adequate internal reliability and predictive validity in the assessment of adolescent emotion regulation (Zeman et al., 2002). The peer anger regulation (α = .75) and sadness regulation (α = .65) factors each were created by averaging the four items.

Measures: Youth Emotion Regulation

Adolescents and their parents reported on youth anger and sadness regulation using the same items and rating scale that used to rate their friends' anger and sadness regulation (Zeman et al., 2001, 2002), though the items reflected the youth's regulation skills. Adequate evidence for predictive validity (i.e., links to internalizing and externalizing problems) and internal consistency for both scales have been reported in the literature (Zeman et al., 2001, 2002). The youth-reported (anger regulation: α = .74; sadness regulation: α = .61) and parent-reported (anger regulation: α = .79; sadness regulation: α = .60) emotion regulation factors were all created by averaging the four items.

Measures: Youth Adjustment Difficulties

Youth antisocial behavior—Both parents and adolescents reported on the adolescents' level of antisocial behavior using the same items and rating scale that the youth used when rating the frequency of peer antisocial behavior (Farrell et al., 1992, 2000). The adolescent-reported (α = .93) and parent-reported (α = .93) youth antisocial behavior scores were each computed by averaging the 35 items.

Youth depressive symptoms—Adolescent self-reported depressive symptoms were measured using the Mood and Feelings Questionnaire (MFQ; Angold, Costello, Messer, & Pickles, 1995). This scale has 33 items (e.g., "I felt I was no good anymore." "I blamed myself for things that weren't my fault.") which were rated on a 3-item Likert scale (0 = "not true," 1 = "sometimes," 2 = "true). The final *youth depressive symptoms* score was created by summing (α = .93) the 33 items. In the current sample, 11.7% (girls = 11.4%, boys = 11.9%; European American = 9.7%, ethnic minorities = 12.5%; ages 10–13 = 8.7%, ages 14–18 = 14.7%) reported scores at or above the clinical cutoff, indicating significantly elevated depressive symptoms (i.e., score of 25 and higher; Angold et al. 1995).

Results

Analytical Strategy

Descriptive statistics (Table 1) and bivariate correlations (Table 2) for the study variables were computed. Structural equation modeling (SEM) was adopted using M*plus* 7.3 (Muthén & Muthén, 1998–2012) to test a theoretical model with latent factors of peer relationships, youth emotion regulation, and youth antisocial behavior and depressive symptoms, controlling for parent education (see Figure 1). First, the measurement model with latent factors was tested. Second, youth antisocial behavior and youth depressive symptoms were regressed on youth emotion regulation, peer antisocial behavior, and peer co-rumination with youth emotion regulation regressed upon all the three peer factors. We did not specify links between peer emotion regulation and youth antisocial behavior and depressive symptoms in the model as we wanted to avoid multicollinearity issues (Kline, 2011) that may result from the high correlations between peer and youth emotion regulation. The three peer factors were allowed to co-vary with each other, as were youth antisocial behavior and depressive symptoms. All latent factors were regressed on parent education. Non-significant links between parent education and the latent factors were trimmed to create more parsimonious final model (Kline, 2011; see Figure 1). Model goodness of fit was evaluated using chi-square test (χ^2) and other fit indexes, such as CFI (near .95), root mean square error of approximation (RMSEA; near .06) and standardized root mean square residual (SRMR; near .08; Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). We employed full information maximum likelihood (FIML) for parameter estimation.

In addition, indirect effects were estimated, and bootstrapping was used to estimate the standard errors and 95% biased-corrected confidence intervals of these coefficients (MacKinnon, 2008). Finally, a multiple group analysis was used to to examine whether there were adolescent age, sex, or ethnic differences in the pattern of effects (Kline, 2011). Specifically, the factor loadings of the observed variables and variances of the latent variables were constrained to be equal across groups to first test for measurement invariance. Next, constraints were implemented on all path coefficients in the structural models and individually relaxed based on theory and improvement in model fit according to the chi-square difference ($\Delta\chi^2$) test of nested models.

Bivariate Correlations

The pattern of associations within and between domains was generally consistent with expectations (see Table 2). In particular, high levels of peer antisocial behavior were related to high levels of peer co-rumination and low levels of peer anger and sadness regulation. In addition, the four youth emotion (parent and youth reports of anger and sadness) regulation factors were all significantly and positively related with each other. Also, high levels of youth and parent reports of antisocial behavior were related to high levels of depressive symptoms. Turning to the between-domain analyses, the correlations indicated that high levels of peer antisocial behavior were significantly related to high levels of youth antisocial behavior (youth and parent reports) and youth depressive symptoms and low levels of anger regulation (youth and parent reports). Unexpectedly, high levels of peer co-rumination were correlated to with high levels of youth anger regulation and sadness regulation (youth reports). The analyses also showed that high levels of peer anger regulation were significantly related to high levels of adolescent anger regulation and sadness regulation (youth and parent reports) and low levels of youth antisocial behavior (youth and parent reports) and depressive symptoms. Moreover, peer sadness regulation was significantly and positively related to adolescent anger regulation (youth and parent reports) and sadness regulation (youth reports) and significantly and negatively related to youth antisocial behavior (youth and parent reports). In addition, all four youth emotion regulation factors were significantly and inversely related to adolescent antisocial behavior and depressive symptoms with one exception: adolescent sadness regulation (youth reports) was not significantly related to depressive symptoms.

Regarding the correlations involving the adolescent demographic variables, the results showed that older adolescents reported higher levels of peer antisocial behavior, youth antisocial behavior (youth reports), and depressive symptoms and lower levels of peer sadness regulation compared to younger youth. In addition, boys had significantly higher levels of peer antisocial behavior and youth antisocial behavior (youth and parent reports) and lower levels of anger regulation (parent reports) and co-rumination. There was only one significant ethnic difference: European Americans had significantly higher levels of youth sadness regulation (parent reports) compared to ethnic minority adolescents. In addition, high levels of parent education were significantly related to low levels of peer antisocial behavior, youth antisocial behavior (parent reports), and depressive symptoms and significantly related to high level of peer anger regulation. Finally, there were significantly higher levels of parent education among European Americans compared to ethnic minority families.

Testing Direct and Indirect Effects

To investigate the possible direct and indirect (via youth emotion regulation) pathways between peer factors (i.e., peer antisocial behavior, peer co-rumination, and peer emotion regulation) and adolescent adjustment difficulties (i.e., antisocial behavior and depressive symptoms), a theoretical model was tested (see Figure 1). First, we created a latent factor of peer emotion regulation using anger and sadness regulation as two indicators, a youth emotion regulation latent factor using both youth self-reports and parent-reports of anger and sadness regulation as four indicators, and a youth antisocial behavior latent factor using

both youth self-reports and parent-reports as two indicators. Peer antisocial behavior, peer co-rumination, and youth depressive symptoms were single-indicator latent variables. The measurement model fit the data adequately, χ^2 (31) = 73.35, $p < .001$; CFI = .94; RMSEA = .08; SRMR = .06. Second, a structural model was examined and non-significant links between parent education and focal latent variables were trimmed to improve model fit and maintain model parsimony (Kline, 2011). The final model (Figure 1) fit the data well, χ^2 (42) = 82.32, $p < .001$; CFI = .94; RMSEA = .07; SRMR = .06. We also examined the indirect effects using MacKinnon's asymmetric distribution of products test (MacKinnon, 2008) as it can analyze more than one pathway simultaneously (e.g., Cui, Morris, Criss, Houltberg, & Silk, 2014). Using this procedure, a confidence interval is constructed around the product of the two unstandardized path coefficients that makes up the pathway (e.g., youth emotion regulation regressed on peer antisocial behavior × youth antisocial behavior regressed on youth emotion regulation). All of the pathways linking peer factors and behavior problems were tested simultaneously.

As indicated in Figure 1, high levels of peer antisocial behavior were marginally related to low levels of youth emotion regulation, which in turn were significantly and negatively related to youth antisocial behavior and youth depressive symptoms. Moreover, peer antisocial behavior was significantly and positively related to youth antisocial behavior and depressive symptoms. Indirect effects for youth antisocial behavior and depressive symptoms after bootstrapping were not significant, *indirect estimate* = 0.04, *ns*; 95% CI [−0.01, 0.12] and *indirect estimate* = 0.91, *ns*; 95% CI [−0.38, 3.00], respectively. However, the direct link between peer antisocial behavior and youth antisocial behavior was significant after bootstrapping, *direct estimate* = 0.45, $p < .01$; 95% CI [0.31, 0.65]. Moreover, the direct effect between peer antisocial behavior and depressive symptoms was marginally significant, *direct estimate* = 4.01, $p < .10$; 95% CI [−0.03, 6.56] and 90% CI [0.84, 6.56]. This suggests that peer antisocial behavior was directly (but not indirectly) related to youth antisocial behavior and depressive symptoms.

Turning to the pathways involving peer co-rumination, the findings indicated that high levels of co-rumination were significantly and positively related to youth emotion regulation, which in turn was significantly and inversely related to youth antisocial behavior and depressive symptoms. The direct link between co-rumination and youth antisocial behavior was not significant, *direct estimate* = 0.01, *ns*; 95% CI [−0.03, 0.06], and the indirect effect was significant, *indirect estimate* = −0.03, $p < .05$, 95% CI [−0.07, −0.01]), demonstrating that peer co-rumination was indirectly (but not directly) related to youth antisocial behavior via youth emotion regulation. In contrast, the direct link between co-rumination and youth depressive symptoms was significant and positive, *direct estimate* = 1.87, $p < .05$; 95% CI [0.29, 3.66], and the indirect effect was significant, *indirect estimates* = −0.69, $p < .05$, 95% CI [−1.64, −0.12]), indicating that co-rumination was directly and indirectly related to depressive symptoms.

Finally, the results indicated that high levels of peer emotion regulation were significantly related to high levels of youth emotion regulation, which in turn was significantly and negatively related to youth antisocial behavior and depressive symptoms. The indirect effects for both antisocial behavior and depressive symptoms were significant, *indirect*

estimate = −0.25, $p < .01$, 95% CI [−0.46, −0.13], and −6.02, $p < .01$, 95% CI [−10.99, −2.50] respectively. These findings indicate that peer emotion regulation was indirectly (but not directly) related to both adolescent outcomes. Finally, although not a major focus of the investigation, the analyses indicated that high levels of parent education were related to low levels of peer antisocial behavior and high levels of peer emotion regulation. None of the other associations involving parent education were significant.

Examining Adolescent Age, Sex, and Ethnicity as Moderators

For the next research goal, we examined whether the pattern of findings varied by youth age. To examine age differences, we recoded youth age to a dichotomous variable (via median split): younger youth ($n = 104$; ages 10–13 years; *M* age = 11.37 years, *SD* = 1.08; 50% female) and older youth ($n = 102$; ages 14–18 years; *M* age = 15.44 years, *SD* = 1.06; 52% female). We chose to split the data at this point to demarcate the adolescent's entry into high school (Steinberg, 2014). Measurement invariance across age groups was tested first, and we found that older youth reported higher levels of antisocial behavior than younger youth, *M* = 1.56 vs. 1.34, and the variance of youth antisocial behavior latent factor was bigger for older youth compared to younger youth, *variance* = 0.21 vs. 0.09. Therefore, these equality constraints across age groups were released before the multi-group structural model was tested. In the structural model, all pathway coefficients were constrained to be equal across age groups first, and certain equality constraints were released according to model modification indices and theoretical consideration. The findings revealed that the direct effect of peer antisocial behavior on youth antisocial behavior differed across younger and older youth, $\Delta\chi^2$ (1) = 15.85, $p < .001$. Specifically, the associations were stronger for older youth compared to younger youth, $\beta = .72$, $p < .001$ and $\beta = .52$, $p < .001$ respectively. We also found that the association of co-rumination and peer antisocial behavior differed, $\Delta\chi^2$ (1) = 5.35, $p < .05$. It was only significant for younger youth, $\beta = .27$, $p < .01$, not for older youth, $\beta = -.07$, $p = .59$. There were no significant differences regarding the indirect effects.

Next, we investigated whether the pattern of findings varied by adolescent sex (girls: $n = 105$; boys: $n = 101$). Measurement invariance testing suggested that parents reported higher levels of anger regulation and lower levels of sadness regulation for girls compared to boys, *M* = 1.07 vs. 0.94, and 1.05 vs. 1.12 respectively. The variance of peer antisocial behavior latent factor was bigger for boys than girls, *variance* = 0.36 vs. 0.23. Therefore, these equality constraints were released across girls and boys. Multi-group testing of the structural model revealed that the link between parent education and peer antisocial behavior differed across sex groups, $\Delta\chi^2$ (1) = 5.21, $p < .05$. Specifically, parental education was more strongly related to peer antisocial behavior among boys, $\beta = -.30$, $p = .001$, compared to girls, $\beta = -.07$, $p = .50$. No other evidence of moderation by adolescent sex was found.

Finally, we analyzed whether the links in the theoretical model were moderated by adolescent ethnicity (European Americans: $n = 62$; Ethnic minorities: $n = 144$). Testing of measurement invariance indicated that parent reported higher levels of sadness regulation among European American families compared to ethnic minority families, *M* = 1.17 vs. 1.01. This equal mean constraint was released. Multi-group testing of the structural model suggested two links that differed across the ethnic groups: the relation between parent

education and peer emotion regulation differed across ethnic groups, $\Delta\chi^2$ (1) = 6.03, $p < .05$, and the association between peer co-rumination and youth antisocial behavior, $\Delta\chi^2$ (1) = 4.53, $p < .05$. In particular, the findings indicated that parent education was more strongly related to peer emotion regulation among European American adolescents, $\beta = .52$, $p < .001$, compared to ethnic minority youth, $\beta = .05$, $p = .54$. Moreover, co-rumination was significantly and positively related to youth antisocial behavior for European Americans, $\beta = .16$, $p < .05$, but not among ethnic minorities, $\beta = -.06$, $p = .45$. The indirect effect of co-rumination for youth antisocial behavior was same for all ethnic groups.

Discussion

The purpose of the current study was to examine direct and indirect (via youth anger and sadness regulation) pathways between peer factors (i.e., peer antisocial behavior, co-rumination, peer emotion regulation) and adolescent adjustment difficulties (i.e., antisocial behavior and depressive symptoms). Using an ethnically-diverse sample of youth ages 10–18 years, we found that peer antisocial behavior was directly (but not indirectly) related to youth antisocial behavior and depressive symptoms, and peer emotion regulation was indirectly (but not directly) related to both adolescent outcomes via youth emotion regulation. In addition, peer co-rumination was indirectly related to adolescent antisocial behavior and directly and indirectly related to youth depressive symptoms. Moreover, the analyses demonstrated little evidence for adolescent age, sex, or ethnic differences in the pathways. Overall, the findings suggest that the pathways linking peer factors and adolescent adjustment difficulties may vary depending on the peer factor and adolescent outcome.

Previous research has demonstrated that relationships with friends are important predictors of adolescent adjustment difficulties, such as externalizing and internalizing problems (Dishion & Patterson, 2006; Rubin et al., 2006; Snyder, 2002). For the first goal of this study, we extended this body of literature by examining potential pathways in this link. Examining direct and indirect pathways is critical as it can inform interventions targeting at-risk youth (Herts et al., 2012). The results indicated that peer antisocial behavior was directly related to antisocial behavior and depressive symptoms. These findings are consistent with evidence in the literature indicating that relationships with antisocial peers may serve as contexts for the socialization of deviancy training and ineffective mood regulation (Laird et al., 2008; Rose, 2002; Rubin et al., 2006; von Salisch, 2001). In particular, friends who engage in deviant behavior may serve as poor role models for multiple types of self-regulation (e.g., behavior, mood) that are critical during adolescence. Moreover, it is possible that antisocial peers may introduce adolescents to stressful, violent, and/or delinquent-reinforcing situations and contexts (Snyder, 2002) that may put them at risk for internalizing problems, such as depression. In addition, the findings showed that peer emotion regulation was indirectly related to adolescent antisocial behavior and depressive symptoms via youth emotion regulation. These results are consistent with previous research (Herts et al., 2012; McLaughlin et al., 2009) and suggest that youth emotion regulation may be one mechanism through which peers may shape adolescent development. For instance, friends who display effective emotion regulatory skills may

serve as good role models for adolescents (von Salisch, 2001) which may lead to high levels of youth emotion regulation, which in turn may decrease the risk for behavior problems.

Interestingly and unexpectedly, the findings showed that peer co-rumination was positively related to both emotion regulation and depressive symptoms. These paradoxical findings could be attributed to the positive (i.e., self-disclosure) and negative (i.e., rumination) attributes of the construct. That is, the rumination component may lead to the development of depressive symptoms (Nolen-Hoeksema, Parker, & Larson, 1994), whereas the self-disclosure component may enhance the quality of the relationship (Rose, 2002) and, thus, create a more supportive context for the development of adaptive emotion regulatory skills (Adrian et al., 2009). It is also likely that discussing daily struggles and problems with good friends, even if it is somewhat repetitive as during co-rumination, may create supportive and safe contexts for youth to vent their emotional frustrations (Adrian et al., 2009; Rose, 2002; Rubin et al., 2006). This suggests that peers may play an active role in the development of emotion regulation. Furthermore, as with emotional autonomy (Steinberg & Silverberg, 1986), relationships with friends may serve as emotion regulation "way stations" between the time parents stop actively regulating their children's emotions and the adolescents are able to fully self-regulate.

Although there was very little evidence of moderation in the overall findings, it is important to note a couple significant differences for direct links. Specifically, peer antisocial behavior was more strongly related to youth antisocial behavior among older youth compared to younger adolescents. One possible explanation for these findings could be that adolescents may have more involvement with friends (including deviant peers) in their surrounding neighborhood as they age (Ingoldsby & Shaw, 2002). Indeed, age was positively related to peer antisocial behavior in the current sample. As in previous studies (Hankin et al., 2010), we found no significant ethnic differences in levels of peer co-rumination. However, there was a significant and positively relation between peer co-rumination and youth antisocial behavior for European American youth but not ethnic minorities. It is possible that although the overall frequency of co-rumination may not vary across ethnic groups, its perceived impact may be more pronounced among European American youth compared to ethnic minority adolescents. Although these age and ethnic differences are noteworthy, it should be emphasized that overall, there were very few adolescent age, sex, and ethnic differences regarding the direct and indirect links in the current study. This pattern of findings is in accordance with the work by McLaughlin and Hatzenbuehler (Herts et al., 2012; McLaughlin et al., 2009) who found no significant sex differences in the pathways tested in their research. It is possible that whereas there may be individual differences in the relational attributes of friendships (e.g., Belle, 1989; Rose, 2002) and in the relative importance of peers in the lives of adolescents (Steinberg & Monahan, 2007), there may be few or no individual differences regarding the specific pathways linking peer factors to adolescent adjustment difficulties.

One limitation of this study was the cross-sectional design. Although the findings are consistent with current theoretical and empirical evidence in this area (Herts et al., 2012; McLaughlin et al., 2009), cross-sectional data can limit the ability to definitively determine issues of causality. For instance, whereas the results showed that the peer factors were

related to adolescent adjustment via emotion regulation, it is equally possible that peer factors may be related to emotion regulation via adolescent adjustment. Clearly, future longitudinal research is needed to address these issues. Another limitation of the current study was the scores for the adolescent antisocial behavior, adolescent depressive symptoms, and peer antisocial behavior factors were not especially high. Thus, it is possible that the pattern of findings may be different using samples with higher antisocial behavior and depressive symptom scores. Another limitation of the current investigation was the low internal consistency for sadness regulation. Previous investigations (e.g., Zeman et al., 2002) also found lower alphas for sadness regulation relative to anger regulation which could suggest that that the modulation of sad emotions may be a more subtle phenomenon (and thus harder to capture via a self-report instrument). Another limitation of the current investigation was that some of the associations may have been inflated due to informant bias (e.g., adolescent reports of peer co-rumination and depressive symptoms). Future work in this area would benefit from utilizing other informants and methods of assessments beyond parent and youth reports, such as peer reports, observer ratings, or neurobiological indices of emotion regulation. Although recruiting adolescents and their friends can be challenging, much could be gained from obtaining the perspectives of the peers. Moreover, it must be emphasized that the selection of variables was not meant to be exhaustive, as there are other peer (e.g., peer victimization, peer group acceptance), emotion (e.g., emotional understanding, positive affect), and adolescent adjustment problems (e.g., anxiety, substance use) that could be tested in future research. It also must be acknowledged that some of the items from the emotion regulation scales (e.g., “I control my crying and carrying on when I feel sad.”) and adolescent adjustment difficulties (e.g., “I cried a lot.”) scales were similar. This similarity may reflect a conceptual overlap among the emotion regulation, antisocial behavior, and depressive symptoms factors as these scales may be tapping the ability (or inability) to self-regulate or modulate one’s emotions, behavior, and mood, respectively. This degree of overlap may account, in part, for the magnitude of the associations among these factors found in the current investigation.

Implications

Although these results are preliminary and need to be replicated in future studies, findings from this investigation have provided valuable information regarding the underlying processes and mechanisms linking adolescent relationships with friends to adjustment difficulties. In addition, the analyses suggest that peer relationships may serve as contexts for the socialization of emotional development during adolescence. Namely, characteristics of friends (e.g., antisocial behavior, emotion regulation) or dynamics of daily peer interaction (e.g., co-rumination) may shape the adolescent’s ability to effectively modulate negative emotions, such as anger and sadness. As such, interventions focusing on at-risk adolescents might benefit from acknowledging the role that peers play in emotional development (Klimes-Dougan et al., 2014). Indeed, research has shown significant peer effects regarding the impact of community-based programs and interventions (see Lansford, 2006 for a review). Moreover, peers have participated in interventions focusing on emotion-approach coping among college students (Baker & Berenbaum, 2008) and socioemotional development among kindergarteners (Gatzke-Kopp, Greenberg, & Bierman, 2015). Thus,

interventions targeting adolescent regulation of daily emotion, behavior, and/or mood may be more successful with the inclusion of friends in the programs.

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Research Highlights

- We examined direct and indirect pathways between peer relationships and adolescent adjustment.
- Peer antisocial behavior was directly (but not indirectly) related to both adolescent outcomes.
- Peer emotion regulation was indirectly (but not directly) related to both adolescent outcomes.
- Co-rumination was indirectly related to youth antisocial behavior and directly and indirectly related to adolescent depressive symptoms.

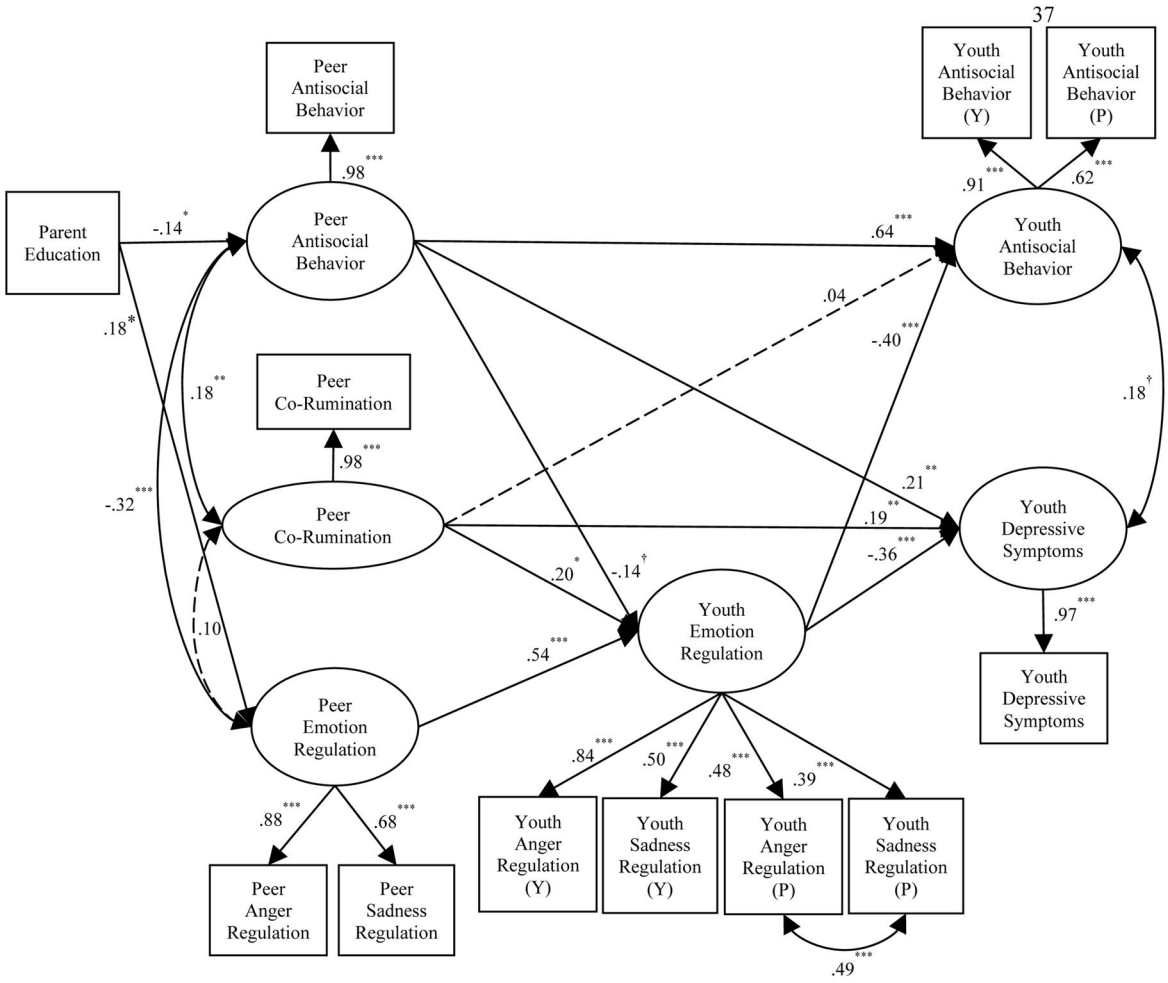

Figure 1.

The effects of peer relationships on youth antisocial behavior and depressive symptoms (full sample).

Note. Y = youth reports, P = parent reports. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1

Descriptive Statistics

	M	SD
Peer Antisocial Behavior	1.44	.57
Peer Co-Rumination	2.73	1.11
Peer Anger Regulation	1.21	.55
Peer Sadness Regulation	1.25	.51
Youth Anger Regulation (Y)	1.19	.52
Youth Anger Regulation (P)	1.00	.51
Youth Sadness Regulation (Y)	1.32	.49
Youth Sadness Regulation (P)	1.08	.44
Youth Antisocial Behavior (Y)	1.44	.43
Youth Antisocial Behavior (P)	1.48	.43
Youth Depressive Symptoms	12.25	11.04

Note: Y = youth reports, P = parent reports.

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Table 2

Bivariate correlations

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Peer Antisocial Behavior	.17*	−.34***	−.19***	−.24***	−.22**	−.11	−.12	.66***	.41***	.32***	.16*	.16*	−.01	−.20**
2. Peer Co-Rumination		.03	.16*	.15*	.12	.21**	.04	.03	.03	.13	.10	−.22***	.02	−.11
3. Peer Anger Regulation			.61***	.46***	.25***	.28***	.17*	−.32***	−.23**	−.22**	−.12	−.12	.06	.15*
4. Peer Sadness Regulation				.43***	.10	.28***	.19**	−.18**	−.15*	−.04	−.16*	−.01	.06	.03
5. Youth Anger Regulation (Y)					.36***	.43***	.30***	−.44***	−.37***	−.32***	−.03	−.02	.08	.07
6. Youth Anger Regulation (P)						.19**	.57***	−.38***	−.48***	−.21**	−.04	−.15*	.01	.05
7. Youth Sadness Regulation (Y)							.25***	−.19**	−.20**	−.13	.06	−.03	−.06	.04
8. Youth Sadness Regulation (P)								−.19**	−.36***	−.16*	.04	.08	−.14*	.00
9. Youth Antisocial Behavior (Y)									.54***	.41***	.30***	.17**	.02	−.18*
10. Youth Antisocial Behavior (P)										.21**	.03	.14*	−.07	−.10
11. Youth Depressive Symptoms											.15*	.05	−.02	−.17*
12. Youth Age												−.00	.00	−.05
13. Youth Sex[a]													.01	−.03
14. Youth Ethnicity[b]														−.32***
15. Parent Education														

Note:

[a] Youth sex was coded as 0 (*female*) and 1 (*male*);

[b] Youth ethnicity was coded as 1 (*European American*) and 2 (*ethnic minorities*); Y = youth reports, P = parent reports.

* $p < .05$.

** $p < .01$.

*** $p < .001$.