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Friendship Quality Moderates the Relation Between Maternal Anxiety and Trajectories of Adolescent Internalizing Symptoms

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Abstract

The current study examined the moderating role of friendship quality on the relation between maternal anxiety and internalizing symptoms in a 3-year prospective study of adolescent development. Participants included 177 adolescents (M_{age} = 16.05, SD_{age} = 0.91) and their mothers. Mothers reported their own levels of anxiety; youth completed self-reports of internalizing symptoms and friendship quality. Positive friendship quality moderated the relation between maternal anxiety and initial levels of internalizing symptoms. Maternal anxiety was associated with steeper increases in internalizing symptoms over time, but only for those with greater negative peer interactions. Findings underscore the important role of both parental and peer relationships in the development of internalizing symptoms and highlight specific avenues for clinical interventions.

Keywords

Internalizing symptoms; Maternal anxiety; Friendship Quality; Adolescence

Adolescence is a period of transition during which individuals undergo substantial physical, psychological and social changes (Negriff & Susman, 2011). One such significant change is the increase in the importance and influence of peer relationships. Past research indicates that the relative importance of parental influence decreases during this period, and adolescents become more strongly influenced by their peers (Beal, Ausiello, & Perrin, 2001; Brown, 2004; Collins & Laursen, 2004; Sumter, Bokhorst, Steinberg, & Westenberg, 2009).

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Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was conducted in compliance with all procedures approved by the University of Maryland Institutional Review Board. All protocols were consistent with national and international ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Alongside these changes in relationships are concomitant increases in psychopathology, especially internalizing disorders. Anxiety and depressive disorders are the most prevalent disorders among adolescents (Costello, Egger, & Angold, 2005). Indeed, recent research suggests that 25.1% and 12.5% of youth between the ages of 12 and 18, experience an anxiety disorder and a major depressive episode, respectively (Center for Behavioral Health Statistics and Quality, 2016; Merikangas et al., 2010). This, in turn, negatively affects academic, interpersonal and emotional domains (Piacentini, Peris, Bergman, Chang, & Jaffer, 2007). Findings from longitudinal studies suggest that the prevalence of internalizing disorders is relatively low during childhood, but that it rises significantly during adolescence (Nivard et al., 2017; Roza, Hofstra, van der Ende, & Verhulst, 2003). Moreover, experiencing these disorders during adolescence increases the risk of reoccurrence in adulthood (Epkins & Heckler, 2011; Kessler et al., 2005). Thus, identifying risk factors as well as protective factors associated with the development and maintenance of internalizing disorders is critical. Parental psychopathology has been established as an important predictor of a wide range of negative outcomes in children (Dowling et al., 2016; van der Pol et al., 2016), including offspring depressive and anxiety symptoms (Burstein, Ginsburg, & Tein, 2010; Gluschkoff et al, 2017). The current study aims to examine the impact of maternal anxiety as a potential risk factor, and the protective role of friendships in predicting internalizing symptoms during this important period of adolescence.

Parental Anxiety and Internalizing Symptoms

The effects of parental anxiety have been extensively researched (Asselmann, Wittchen, Leib, & Beesdo-Baum, 2016; Biederman et al., 2006; Francis & Chorpita, 2011). Several studies have found that parental anxiety increases the risk of internalizing disorders in children (Beesdo, Pine, Lieb, & Wittchen, 2010; Merikangas, Lieb, Wittchen, & Avenevoli, 2003; 2009); children of parents with anxiety disorders were at 3.5 (range 1.3–13.3) times greater risk Micco et al., for anxiety disorders than children of parents without anxiety disorders (Merikangas, Avenevoli, Dierker, & Grillon, 1999).

There have been relatively fewer studies examining the effects of parental anxiety during the critical period of adolescence. Moreover, findings in this area have also been decidedly mixed. For example, with regard to child's gender, a study by Burstein, Ginsburg, Petras, and Ialongo (2009) on adolescents in grades s 6 through 12 found that parental anxiety disorders uniquely predicted the rate of ge in depression symptoms, but only among male adolescents; on the other hand, no gender differences with relation to effects of parental psychopathology on child psychopathology were found in other studies (e.g. Bouma, Ormel, Verhulst, & Oldehinkel, 2008; Hirshfeld-Becker et al., 2012). With regard to culture, in a study by Essau et al. (2013) examinin g the relation between parental and adolescent psychopathology in two countries, the authors found a significant correlation only among the participants in England, and not in Japan. Moreover, studies have reported conflicting findings in relation to the presence of depressive symptoms in children of parents with anxiety disorders. While some studies reported elevated levels of depressive symptoms among offspring of anxious parents (Beidel & Turner, 1997; Sylvester, Hyde, & Reichler, 1987), others did not (Merikangas, Dierker, & Szatmari, 1998; Warner, Mufson, & Weissman, 1995).

These inconsistencies in the literature may be due to a number of factors. First, many studies were cross-sectional in nature, making it impossible to examine causal links between variables (e.g. Challacombe & Salkovskis, 2009; Essau et al., 2013). Second, several of these studies utilized parental reports of child psychopathology or adolescent reports of parental psychopathology (e.g. Biederman et al., 2001; Rasing, Creemers, Janssens, & Scholte, 2015), thus giving rise to the possibility of biased reporting. Indeed, studies across different cultures have demonstrated that parents may not be reliable informants of their adolescent children's emotional and behavioral problems, including internalizing symptoms (De Los Reyes & Kazdin, 2005; Tillery, Disabatino, Parra, Buckholdt, & Jobe-Shields, 2014). Third, several of these studies utilized small sample sizes (e.g. Biederman et al., 2006) or samples that only included one sex or race/ethnicity (e.g. Burstein et al., 2009; Rasing et al., 2015). Fourth, most studies have not considered the specific effects of m aternal anxiety (above and beyond general maternal distress or emotion regulation) on the development of adolescent internalizing symptoms. Given that studies have found strong associations between maternal anxiety and maternal emotion dysregulation, which in turn have been linked to higher levels of anxiety and negative affect in the child (Edwards et al., 2017; Kerns, Pincus, McLaughin, & Comer; 2017), examining the specificity of maternal anxiety (as opposed to general emotion dysregulation) is critical for better understanding these relations. Finally, inconsistent results may reflect the presence of important moderators of the relation between maternal anxiety and youth internalizing symptoms. Indeed, very few studies considered potential buffers of the effect of maternal anxiety on youth psychopathology, specifically those which may come online across adolescence.

Friendship quality and Internalizing Symptoms

One such potential moderator of the relation between maternal anxiety and adolescent symptomology is peer social support (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). Research indicates that support from peers, friends and classmates reduces adolescents' vulnerability to depression and anxiety (La Greca, & Harrison, 2005; Newman, Newman, Griffen, O'Connor, & Spas, 2007). Moreover, positive friendship quality, a specific facet of social support including peer intimacy, care and support, has been negatively associated with maladaptive behaviors, and internalizing problems (Berndt, 1996).

The buffering effects of positive friendship on the relation between stress and internalizing symptoms, however, is less clear. Findings from several studies indicate that social support protects adolescents from the negative effects of unhealthy family environments, one's own chronic illness, dating violence and natural disasters (Herzer, Umfress, Aljadeff, Ghai, & Zakowski, 2009; Holt & Espelage, 2005; Kliewer, Murrelle, Mejia, Torres de, & Angold, 2001; Paul et al., 2015). Similar findings have emerged from studies conducted on adults; social support moderated the effects of stressful work environments, child abuse or neglect, and sexual abuse on mental health symptoms (Evans, Steel, & DiLillo, 2013; Murthi & Espelage, 2005, Woodhead, Northrop, & Edelstein, 2016). However, a recent meta-analytic review that included adolescents (Rueger, Malecki, Pyun, Aycock, & Coyle, 2016) did not find that social support significantly moderated the relation between stress and psychopathology. Conversely, findings from studies investigating the relation between

internalizing symptoms and negative friendship quality suggest a positive relation, such that negative friendship quality may lead to worse mental health outcomes. For instance, a recent study examining the impact of a large flood on posttraumatic stress symptoms (PTSS) found that youth who reported greater levels of negative friendship quality (defined as conflict, antagonism and criticism) experienced significantly steeper increases of PTSS after the disaster, even after controlling for level of disaster exposure and other child and environmental characteristics (Martin, Felton & Cole, 2016). Other studies found that negative interactions in best friendships (including conflict, criticism, exclusion, dominance, and pressure), poor friendship quality, and peer rejection predicted internalizing symptoms (Festa & Ginsberg, 2011; La Greca & Harrison, 2005; Su, Pettit, & Erath, 2016). Moreover, negative friendship quality (i.e. antagonism and conflict) also predicts loneliness, low self-esteem and internalizing problems (Nangle, Erdley, Newman, Mason, & Carpenter, 2003; Rubin et al., 2004). As opposed to positive friendship quality, no study, to our knowledge, has examined whether negative friendship quality exacerbates the impact of specific risk factors for the development of internalizing symptoms.

Current Study

Given the limited research on maternal anxiety and adolescent internalizing problems, and the disparities in findings highlighted in the sections above, there is a need to examine the role of maternal anxiety specifically during adolescence. Moreover, no studies to the best of our knowledge have investigated the moderating role of both positive and negative friendship quality on maternal anxiety in relation to internalizing symptoms during adolescence. Thus, the current study aims to add to the understanding of the subject area by examining the role of maternal anxiety as a predictor of adolescent internalizing symptoms and the impact of both positive and negative friendship quality on these relations over time. Specifically, we will evaluate whether positive friendship quality buffers the relation between maternal anxiety and adolescent internalizing symptoms while negative friendship quality exacerbates these associations in a three-year prospective study of youth. We will also examine the role of maternal anxiety above and beyond general maternal emotion dysregulation. We hypothesize that:

1. negative friendship quality and maternal anxiety (at baseline), controlling for broader difficulties with emotion regulation, will predict increases in adolescent internalizing symptomatology over time, while positive friendship quality will predict decreases in internalizing symptoms over time
2. positive friendship quality will buffer the effects of maternal anxiety on changes in internalizing symptoms, while negative friendship quality will exacerbate the effects of maternal anxiety on adolescent internalizing.

Method

Participants and Procedures

Participants were recruited from a metropoli an area as part of a larger, 10-year longitudinal study investigating the predictors of risk-taking behavior in adolescents. Flyers about the study were put up at schools, libraries, community centers and Boys and Girls clubs, and

information about the study was posted on social media. Interested families were screened for inclusion based on having a child between the ages of 9 and 13 (M_{age} = 11.01, SD_{age} = 0.82), their ability to participate in annual assessments, and their English proficiency. Participating youth and their parents were asked to come into the lab annually to complete a series of self-report questionnaires. Because key measures were not included until the later years of the project, data presented here is from year 6 through 8 (re-labeled waves 1 – 3 for clarity).

Of the original sample of 277 youth, a total of 177, 153 and 153 adolescents participated in waves 6, 7, and 8 (respectively). Youth who engaged in these waves did not differ from adolescents who dropped out of the study on age, race/ethnicity, sex or internalizing scores ($p > .050$). The final sample used in the current analyses was composed of 58% boys and ranged in age from 14 to 18 years old (M_{age} = 16.05, SD_{age} = 0.91). Mothers of participants ranged in age from 34 to 68 (M_{age} = 51.33, SD_{age} = 12.24). The sample was diverse and representative of the geographic area it was recruited from, with 53.6% White, 41.6% Black, .6% Native American or Alaska Native, .6% "other race" and 3.6% multiple race/ethnicities.

Measures

Maternal anxiety.—In order to measure the mothers' anxiety symptoms, we used the state anxiety subscale of the State-Trait Anxiety Inventory (STAI-S; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), which is a 20-item self-report measure of anxiety. The tool was completed by mothers at wave 1. Given that research suggests that the STAI trait (STAI-T) scale has been more strongly correlated with depression rather than anxiety (e.g. Bados, Gomez-Benito, & Balaguer, 2010; Bieling, Antony, & Swinson, 1998), and that the STAI-S mean scores may be a better predictor of current and future anxiety disorders compared to the STAI-T mean scores (Hishinuma et al., 2001), we chose to use the STAI-S in our study. Sample items on the STAI-S scale include, "I am tense", "I am worried", "I feel secure." Mothers were asked to rate their anxiety on a 4-point rating scale, ranging from (1) "not at all" to (4) "very much so." The STAI is a psychometrically sound tool with internal consistency coefficients ranging from .86 to .95, and test-retest reliability coefficients ranging from .65 to .75 over a two-month interval. In the current study, the measure demonstrated good internal consistency with coefficient alpha = 0.94.

Maternal emotional dysregulation.—The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to measure mothers' emotion dysregulation. Mothers were administered the questionnaire at wave 1. The tool consists of 36 items. Sample items include, "I am clear about my feelings", "When I am upset, I become out of control", and "When I am upset, I feel like I am weak." Items are answered on a 5-point rating scale based on how frequently an item applied to their current emotion regulation skills, ranging from (1) "almost never" to (5) "almost always." The total score was computed by adding each item; higher scores are indicative of greater emotion regulation difficulties. The tool has demonstrated good psychometric qualities including construct validity and internal consistency (Gratz & Roemer, 2004), and is a good predictor of depression (Weinberg & Klonsky, 2009), and anxiety disorders (Roemer et al., 2009; Tull,

Stipelman, Salters-Pedneault, & Gratz, 2009) The The internal consistency of the measure in our study was 0.93.

Internalizing symptoms.—The Revised Children's Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a youth self-report measure of internalizing symptoms. It consists of 47 items, and participants were asked to rate how often each item applies to them on a 4-point rating scale from (0) "never" to (3) "always." Sample items include: "I have problems with my appetite", "I feel restless." Adolescents were administered the tool at each wave. The measure yields a total score on internalizing symptoms, and a score for the following scales: generalized anxiety disorder, panic disorder, social anxiety disorder, separation anxiety disorder, obsessive compulsive disorder and major depressive disorder. For the current study, only the total internalizing symptoms score was used. The total score was computed by summing each item, with higher scores indicating higher levels of internalizing symptoms. The RCADS has demonstrated good factor structure, reliability, and validity in school-based and clinical samples (Chorpita et al., 2000; Chorpita, Moffitt, & Gray, 2005). The measure demonstrated excellent internal reliability, with coefficient alphas of .95 at each wave.

Friendship quality.—In order to assess friendship quality, we used the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985), which consists of 33 questions. In its original format, the tool measures the quality of relationship and social support from key individuals in one's life like mother, father, sibling, relative, boy/girlfriend, same-sex friend, other sex friend and extra person. However, since we were interested in capturing the effects of their relationship with their best friend only, for the purposes of our study, we asked adolescents to answer the questions keeping only their best friend in mind. The tool was administered at wave 1. The measure yields a positive friendship quality construct composed of seven subscales (reliable alliance, reassurance of worth, instrumental aid, companionship, affection, intimate disclosure, and nurturance) and a negative friendship quality construct composed of two subscales (conflict and antagonism). Participants were asked to rate the items on a 5-point Likert scale, ranging from (1) "little or none" to (5) "the most." Sample items include: "How often do you spend fun time with this person?", "How often do you and this person disagree and quarrel with each other?" Items within each subscale are summed to create a total score for positive and negative friendship quality. The measure has demonstrated good internal consistency, with a Cronbach's Alpha of .80 (Furman & Buhrmester, 1985). For the current sample, the questionnaire demonstrated good internal consistency, coefficient alpha = .95 and .91 for the positive and negative friendship qualities respectively.

Data Analytic Plan

In order to examine the relations between maternal anxiety, friendship quality, and internalizing symptoms we utilized a latent growth modeling (LGM) approach. LGM is a specific case of structural equation modeling that estimates trajectories of internalizing symptoms over the three years included in the study. All analyses were conducted using *Mplus* 6 (Muthén & Muthén, 2010) with full information maximum likelihood estimation,

which is both robust to violations of normality among variables and provides less bias estimates than other missing data approaches (such as listwise or pairwise deletion).

Growth modeling approaches allow for the determination of latent intercept (baseline) and slope (change over time) factors. These models are estimated by fixing the regression weight from each manifest variable (in this case, internalizing symptoms at Waves 1 through 3) to be 1.0. In order to estimate linear change over time, we constrained the regression weights of each manifest variable to be 0.0, 1.0, and 2.0, respectively. Next, we constrained the error variances to be the same across each wave. If this more parsimonious model continues to fit the data, then the constraint is included in each subsequent model. Intercept and slope factors were allowed to correlate. Several fit indices were used to evaluate the fit of the model to the data, including the χ^2 statistic, the Comparative Fit Index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI, Tucker & Lewis, 1973) and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). Good fit was indicated by CFI and TLI values ≥ .90, RMSEA values ≤ .08, and nonsignificant chi-square values (Schweizer, 2010). Because χ^2 values are sensitive to sample size, the CFI, TLI, and RMSEA were used as primary measures of model fit.

Once we determined the best fitting and most parsimonious model, we examined the means and variances of the latent intercept and slope factors. Statistically significant estimates of the mean of the intercept and slope indicate that the baseline value and change over time differs from zero. Significant estimates of the variances indicate individual differences around these estimates, supporting the inclusion of predictors in the model.

Utilizing a model building approach, we first examined an unconditional latent growth model. We then added maternal anxiety, positive and negative friendship quality as a predictor of the intercept and slope of internalizing symptoms. In order to examine the effects of maternal anxiety specifically (above and beyond maternal emotional dysregulation broadly), we controlled for maternal emotion regulation. Given noted effects of child sex on internalizing symptom trajectories (Angold, Costello, & Worthman, 1998; Wichstrom, 1999), we also included sex as covariates. Finally, we examined the interaction between maternal anxiety and both positive and negative friendship interactions (controlling for sex and maternal emotion dysregulation) in a single model.

Results

Preliminary Analyses

We examined the data to assess missing data patterns in two ways. First, we conducted a Little's MCAR analyses, which suggested that the data were missing completely at random, χ^2 (61) = 53.57, p = .739. Second, we examined correlations between missingness and values of key study variables and found that participants who were missing on any wave of data did not differ significantly from participants who completed that wave (ps > .05).

Next, we examined skew and kurtosis statistics for all dependent variables. All distributions appeared to be within the normal range (≤ 3.0). Means, standard deviations, and correlations between key study variables are included in Table 1. Of note, being female was significantly

associated with reporting more positive friendship interactions and evidencing greater levels of internalizing symptoms at every wave. Curiously, higher levels of positive friendship interactions were associated with internalizing symptoms at baseline only, while maternal state anxiety was correlated with children's internalizing symptoms at every wave.

Latent Growth Models: Unconditional Growth Model

Next, we examined a univariate latent growth curve modeling changes in internalizing symptoms over time. The linear growth model fit the data well; $\chi^2_{(df=1)} = 0.03, p = 0.860$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00 (90%CI = 0.00 – 0.10). We then constrained the residuals to be homoscedastic. This resulted in a more parsimonious model that continued to fit well: $\chi^2_{(df=3)} = 0.74$, $p = 0.863$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00 (90%CI = 0.00 – 0.06); thus, these constraints were retained throughout subsequent analyses. The mean of the intercept ($M = 23.88$, $SE = 1.09$, $p < .001$) was significant, suggesting that youth start with non-zero levels of internalizing, while the slope ($M = 0.36$, $SE = 0.59$, $p = .547$) was not, indicating that rates of internalizing symptoms stay, on average, consistent over time. Further, the variances of the intercept (Var. = 175.63, $SE = 24.74, p < .001$) and the slope (Var. = 23.46, $SE = 7.47, p = .002$) were both significant, supporting the utility of adding predictors to the model. The correlation between the intercept and slope, however, was not significant ($r = -0.18$, $p = .183$).

Conditional Model 1: Main Effects of Maternal Anxiety and Friendship Quality

Our first hypothesis predicted that state maternal anxiety and both positive and negative friendship quality would be associated with children's internalizing symptoms at baseline and over time. In order to test this hypothesis, we examined a conditional growth curve model of internalizing symptoms in which we regressed the intercept and slope onto maternal anxiety and friendship quality controlling for youth sex and maternal emotion dysregulation. The model continued to fit the data well: $\chi^2_{(df=8)} = 11.09$, $p = .196$, CFI = 0.99, TLI = 0.97, RMSEA = 0.05 (90%CI = 0.00 – 0.12). Sex (std. est. = −0.21 $p = .016$), maternal emotion dysregulation (std. est. = 0.32 $p = .002$) and positive friendship interactions (std. est. = 0.32 $p = .024$) each predicted baseline internalizing symptoms. These results indicate that girls and children with mothers who evidenced greater emotion dysregulation reported higher baseline levels of internalizing symptoms. Unexpectedly, positive friendship quality was associated with greater initial levels of internalizing symptoms.

Consistent with our hypotheses, maternal anxiety (std. est. = .31, $p = .026$) and negative friendship quality (std. est. = .22, $p = .049$) predicted changes in internalizing symptoms over time. Specifically, children with more anxious mothers and those reporting more negative friendship quality experienced greater increases in internalizing symptoms over time.

Conditional Model 2: Interactive Effects of Maternal Anxiety and Friendship Quality

Our final model included interactions between maternal anxiety and both positive and negative friendship interactions (see Figure 1), controlling for maternal emotion dysregulation and child sex. This model also fit the data well: $\chi^2_{(df=10)} = 14.12$, $p = .168$,

CFI = 0.98, TLI = 0.96, RMSEA = 0.05 (90%CI = 0.00 – 0.11). Higher levels of maternal emotion dysregulation (std. est. = .29, p = .005), and being female (std. est. = −.25, p = .003) were significantly associated with baseline internalizing symptoms only. The interaction between positive friendship quality and maternal anxiety was a significant predictor of the intercept (std. est. = −1.46, p = .006), indicating that maternal anxiety is more strongly (and positively) related with greater initial levels of internalizing symptoms for children with lower positive friendship quality. Only the interaction between *negative* friendship quality and maternal anxiety significantly predicted the slope (std. est. = .85, p = .041). These results suggest that maternal over time for youth reporting higher levels of negative friendship quality (see Figure 2).

Discussion

It has been well established that children of anxious parents are at risk for developing psychopathology, but there is limited research examining the effects of maternal anxiety in adolescents, and factors that may buffer or exacerbate this relation. Thus, the primary aims of the current study were to investigate the effects of maternal anxiety on their adolescent children's internalizing symptoms, and examine if positive or negative friendship quality moderated these relations. Three major results emerged. First, maternal anxiety was a significant predictor of adolescent internalizing symptoms over time. Second, negative friendship quality (but not positive friendship quality) was associated with changes in adolescent internalizing symptoms over time, such that higher levels of negative friendship quality predicted increases in internalizing. Unexpectedly, positive friendship quality was also associated with greater initial levels of internalizing. Third, positive friendship quality moderated the relation between maternal anxiety and adolescent internalizing symptoms at baseline only, while negative friendship quality interacted with maternal anxiety to predict greater increases in internalizing symptoms over time. These findings along with their implications are discussed below.

Consistent with our expectations, maternal anxiety was associated with increases in internalizing symptoms in adolescents over time. The results are in line with several previous studies that have found that parental anxiety predicted child psychopathology (Beesdo et al., 2010; Knappe et al., 2009). This finding is of special importance since it is generally believed that parents become less influential during adolescence. However, our results suggest that parents continue to impact their children's mental health during adolescence. Genetic and psychosocial factors in the transmission of anxiety may help explain this finding. Past research indicates that anxiety disorders are highly inheritable (Gregory & Eley, 2007). Moreover, several studies have shown correlations between parental anxiety and parental behaviors like greater intrusiveness and control, and lesser warmth and supportiveness in both clinical (Teetsel, Ginsburg, & Drake, 2014; Ginsburg, Grover, & Ialongo, 2004; van der Bruggen, Stams, & Bögels, 2008) and non-clinical (Coplan, Arbeau, & Armer, 2008; Möller, MajdandziC, & Bögels) samples. These behaviors, in turn, have been linked to depression and anxiety in children (see Rapee, 1997 for a review) and adolescents (Rudolph & Zimmer-Gembeck, 2014).

Our findings, however, counter some prior work that found no relation between maternal and adolescent anxiety (e.g. Challcombe and Salkovskis, 2009; Liberman and Öst, 2015). These inconsistencies could be explained by the differences in methodology and design between the studies. For example, utilizing longitudinal data helped us to understand the temporality of the relations between these variables, and how maternal anxiety may influence the longer term trajectory of internalizing symptoms, which would have been impossible to understand using cross-sectional designs that were employed by other studies. Also, the current study used adolescents' and parents' report of their own internalizing and anxiety symptoms respectively, thereby reducing the possibility of bias related to parents' reporting of youth symptoms.

Our next hypothesis examining the effects of friendship quality on adolescent internalizing symptoms predicted that positive friendship quality would be associated with decreases in internalizing symptoms over time, while negative friendship quality would be a significant predictor of increases in internalizing symptoms. Our results supported this hypothesis with regard to negative friendship quality, finding that it was associated with increases in internalizing symptoms in adolescents over time. This finding is consistent with previous studies that suggest that negative interactions and poor friendship quality predicted anxiety and depressive symptoms in adolescents (Humphreys et al., 2015; Martin et al., 2016). The results also suggest that the harmful impact of negative interactions in friendships is not short-lived, but that it affects adolescents' mental health negatively over a long period of time. What was surprising, though, was that positive friendship quality did not predict decreases in internalizing symptoms. In fact, contrary to our expectations and previous research (Kugbey, Osei-Boadi, Atefoe, 2015; Salzinger, Feldman, Rosario, & Ng-Mak, 2011), we found that positive friendship quality was associated with greater initial levels of internalizing. One possible reason for this finding is that depressed/anxious youth may affiliate with other peers that exacerbate these symptoms. Indeed, a recent review examining the development of personality and friendships (Wrzus & Neyer, 2016) suggests that individuals with certain personality characteristics select or elicit relationship experiences that reinforce those specific characteristics. Alternatively, the finding may also be explained by the effect of a third variable, like co-rumination, which has been associated with simultaneous increases in both positive friendship quality (Felton, Cole, Havewala, Kurdziel, & Brown, 2018; Rose, 2002) and depression (Calmes & Roberts, 2008; Schwartz-Mette & Rose, 2012).

Our next hypothesis predicted that positive friendship quality would buffer the effects of maternal anxiety on internalizing symptoms while negative friendship quality would exacerbate them. Consistent with prior research on stress buffering (Carter, Dellucci, Turek, & Mir, 2015; Folger & Wright, 2013; Paul et al., 2015; Zhang, Yan, Zhao, & Yuan, 2015), we found that positive friendship quality moderated he relation between maternal anxiety and adolescent internalizing symptoms, but only at baseline. While this was expected, it was an interesting, but on]finding given that positive friendship quality was also associated with higher levels of internalizing symptoms at baseline as discussed above. This suggests that two distinct process may be at play: while a third variable like co-rumination could be driving increases in both, positive friendship quality and internalizing symptoms, causing them to covary, positive friendship quality may also buffer the harmful effects of maternal

anxiety, separate from the relation of any other variables. Negative friendship quality, on the other hand, exacerbated the effects of maternal anxiety over time. This finding reflects that while positive friendships may not long-lasting. On the other hand, negative interactions in friendships, in the form of conflicts and antagonism, may set the trajectory of internalizing symptoms over time. This may reflect that the collective stress arising from the negative effects of maternal anxiety and negative friendship interactions may lead to the exacerbation of internalizing symptoms. Given the importance placed on friendships during adolescence, conflicts in friendships are likely to be stressful (Buhrmester, 1998). These negative interactions in friendships could lead to even higher levels of stress when coupled with the negative effects of maternal anxiety. Thus, maternal anxiety could worsen the impact of negative friendship quality, and vice-versa, on internalizing symptoms.

Clinical Implications

Our research has several important clinical implications. Maternal anxiety was associated with children's internalizing symptoms at each wave, suggesting that youth with mothers with higher levels of anxiety are prone to greater symptomatology. Treatment protocols for adolescents with depressive and anxiety symptoms should thus include a formalized screening of psychiatric symptoms of their parents as well. This would provide a holistic understanding of adolescent symptomatology, which in turn could help clinicians tailor. treatment accordingly. Our study also highlighted the importance of assessing social factors, while working with adolescents. Results suggesting that negative interactions in friendship were associated with increases in internalizing symptoms in adolescents underscores the need to include components of social skills training into traditional interventions of treating depression or anxiety, such as cognitive behavioral therapy (CBT). Indeed, research shows that interventions integrating social skills training with CBT proved to be effective in improving social interactions, as well as led to significant reductions in social and general anxiety among children with social phobia (Beidel, Turner, & Morris, 2000; Spence, Donovan, & Brechman-Toussaint, 2000).

Limitations and Future directions

study should be considered in light of several limitations. Firstly, we were unable to examine if gender Findings from the current further moderated the relation between maternal anxiety and friendship quality on adolescent internalizing symptoms. Past research indicates that gender could affect these relations. For example, according to a study by Lee and Goldstein (2016), the adverse impact of lack of support from friends on loneliness was greater in females than in males. On similar lines, social support moderated the effects of stress and depressive symptoms only in adolescent girls, but not in boys (e.g. Landman-Peeters, Hartman, van der Pompe, & den Boer, 2005). In contrast, other studies found that social support exacerbated the relation between stress and internalizing symptoms only in adolescent females (e.g. Brittian, Toomey, Gonzales, & Dumka, 2013; Grant et al., 2000). On the other hand, some studies found that social support moderated the relation between stress and depression equally for adolescent boys and girls (e.g. Cohen et al., 2015; Rueger et al., 2016). Given that there are inconsistencies in the findings with regards to how gender differences could affect these relations, future research utilizing larger samples should aim at examining the role of gender in relation to the variables of maternal anxiety, adolescent

internalizing and friendships. Secondly, the study was conducted on a community sample. Although past research has demonstrated relations between subthreshold symptomology and later depressive disorders (Georgiades, Lewinsohn, Monroe, & Seeley, 2006), given that community samples have lower levels of depressive and anxiety symptoms, it is unclear if the findings from our study would generalize to clinical samples. Thus, investigating the relation between maternal anxiety and friendship quality in clinical samples would further extend these findings. Thirdly, the tool that was used to measure the quality of friendships assessed adolescents' perception of friendships versus actual friendship quality. It is likely that youth with internalizing symptoms could perceive their relationships more negatively (Siegel & Alloy, 1990). Thus, future research should examine these relations using multi-informant approaches, including peer-reports of friendship quality and observational methods. Also, while investigating friendship quality, only relationship with best friends were taken into consideration. Future research may benefit from extending the findings to other forms of friendships and peer relationships. Finally, the current study focused solely on the role of maternal anxiety. Fathers have been historically underrepresented in research on parent-child relations, and additional research on the role of paternal parenting behaviors and psychopathology on the development of adolescent internalizing symptoms would be beneficial (Liber et al., 2008; Teetsel et al., 2014).

Conclusion

Notwithstanding the limitations, the current study revealed important risk and protective factors in relation to adolescent internalizing symptoms. While there are numerous studies on the links between parental anxiety and child psychopathology, and on stress-buffering, the current study is one of the first to examine the variables of maternal anxiety, friendship quality and internalizing symptoms during the critical period of adolescence. Our findings also highlight the importance of developing future interventions targeted at both parental psychopathology and social influences.

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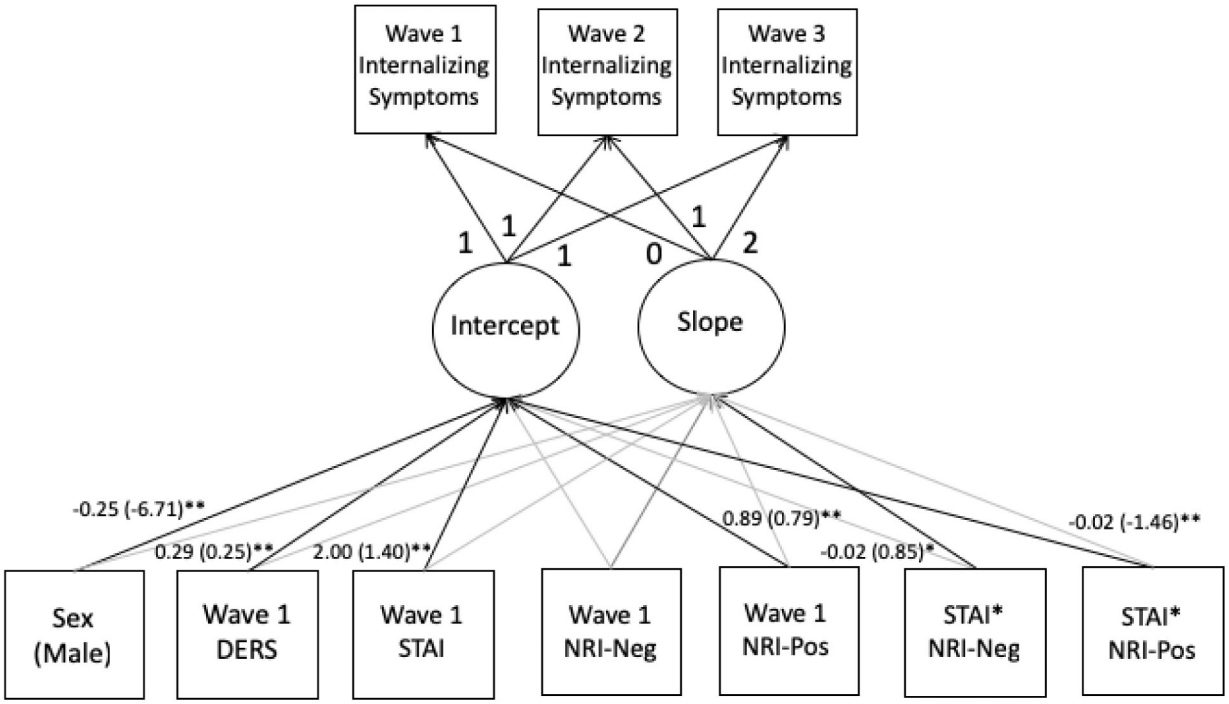

Figure 1.

Final latent growth curve model with sis nt standardized (and unstandardized) path estimates DERS = Difficulties in Emotion Regulation Scale; STAI = Mother-Reported State Trait Anxiety Inventory; NRI-Pos = Network of Relationships Inventory, Positive Friendship Quality Subscale; NRI-Neg = Network of Relationships Inventory, Negative Friendship Quality Subscale. *$p < 0.05$, **p < 0.01.

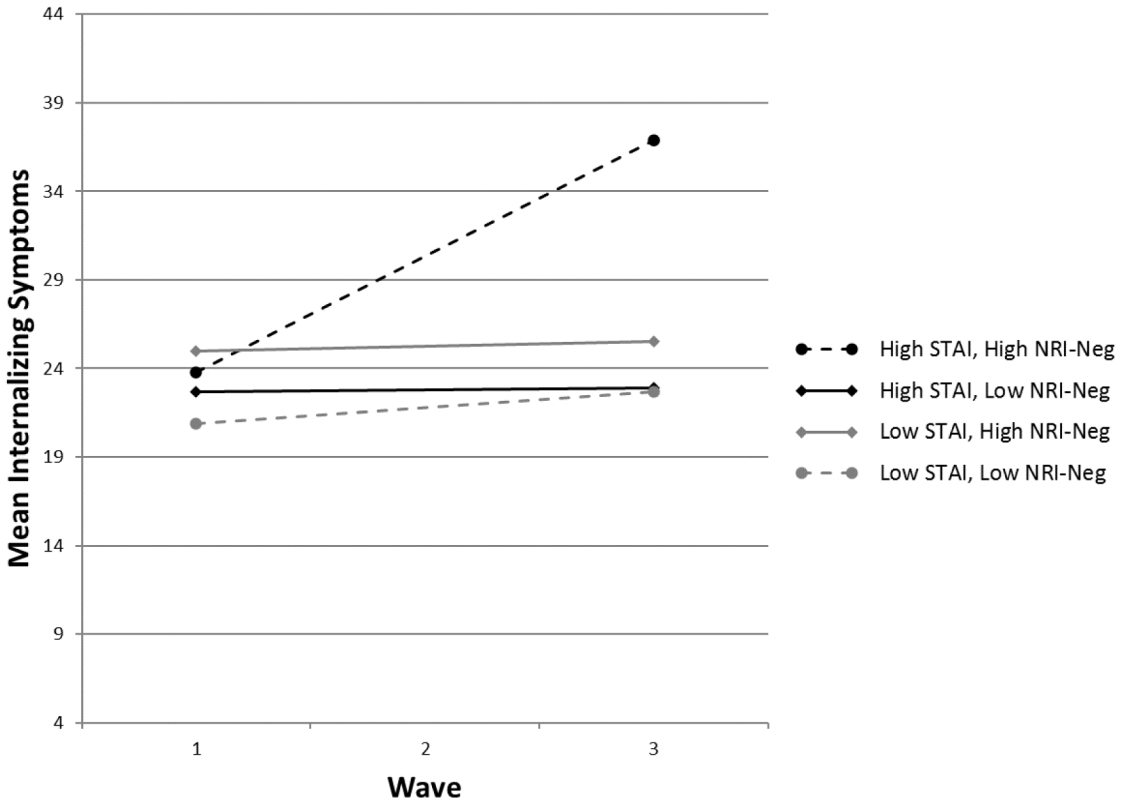

Figure 2.

Linear trajectories of inter ψtoms in youth with low and high levels of maternal anxiety and negative friendship quality

For pictorial clarity, group membership was determined using a mean split of maternal anxiety and negative friend) quality. STAI = Mother-Reported State Trait Anxiety Inventory; NRINeg = Network of Relationships Inventory, Negative Friendship Quality Subscale.

Table 1

Summary of Intercorrelations, Means and Standard Deviations on key study variables

		1	2	3	4	5	6	7	8
1.	RCADS Wave 1	-							
2.	RCADS Wave 2	.73**	-						
3.	RCADS Wave 3	.61**	74**	-					
4.	STAI Wave 1	.18*	.30**	.19*	-				
5.	DERS Wave 1	.17*	.10	.17	41**	-			
6.	NRI Negative Wave 1	.05	.12	.16	−.11	.07	-		
7.	NRI Positive Wave 1	.21**	.17	.10	.08	−.04	.15	-	
8.	Sex (male)	−.26**	−.18*	− 21**	−.12	−.02	.09	− 35**	-
M		23.65	24.19	25.18	28.22	60.49	10.18	73.86	.56
SD		15.30	15.76	17.25	9.23	16.59	4.38	15.90	.50

Note. RCADS = Revised Children's Anxiety and Depression Scale: Total Score; STAI = Mother-Reported State Trait Anxiety Inventory; DERS = Difficulties in Emotion Regulation Scale; NRI Negative = Network of RelationshipsI Inventory, Negative Friendship Quality Subscale Score; NRI Positive = Network of Relationships Inventory: Positive Friendship Quality Subscale Score.

* $p < .05$,

** $p < .01$.