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# The Relations Between Anxiety Symptoms and Friendships in Adolescence

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THE RELATIONS BETWEEN  
ANXIETY SYMPTOMS AND FRIENDSHIPS  
IN ADOLESCENCE

by

Phoebe J. Welcome

A Thesis Submitted in Partial Fulfillment  
of the Requirements for a Degree with Honors  
(Child Development and Family Relations & Psychology)

The Honors College

University of Maine

May 2019

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## ABSTRACT

Anxiety symptoms can often be experienced as a silent struggle in adolescence, as many anxious adolescents do not exhibit outward symptoms. Identifying adolescents who are struggling with subthreshold anxiety symptoms can be even more difficult. As adolescence is a time where friendships become primary sources for emotional support, youth who experience anxiety symptoms and associated distress may have trouble navigating close relationships with peers. The current study aims to investigate the relations between adolescents' anxiety symptoms and their friendship functioning, as well as the impact of their anxiety symptoms on friends' emotional adjustment. Data were taken from a larger project on adolescent friendships and emotional adjustment, approved by the University of Maine Institutional Review Board (IRB). Participants ( $N = 186$ ) were nested within 93 same-gender friendship dyads and were between 13 and 19 years of age. Dyads' emotional adjustment and friendship functioning were assessed concurrently and after 3 months. Self-report measures of anxiety symptoms, friendship quality, and depressive symptoms were gathered. Descriptive statistics, mean-level gender differences, and correlations among study variables were computed, and dyadic data analyses tested primary hypotheses of interest. Results indicated that anxiety symptoms were not associated with lower levels of positive friendship quality. Additionally, although friends were similar to one another in terms of anxiety symptoms, results did not support evidence of anxiety contagion over 3 months. Future research should test for anxiety contagion across a longer period of time (e.g., 1 year), and studies of adolescent anxiety should continue to control for depressive symptoms to account for the overlap in symptomatology between depressive and anxiety symptoms. This study contributes to the existing literature on the impact of adolescents' internalizing symptoms on friendships and the emotional adjustment of friends.

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## INTRODUCTION

Adolescence is a developmental period during which risk for experiencing anxiety symptoms is high, and friendships become increasingly important (Hammen & Rudolph, 2003; Rubin et al., 2006). Although some aspects of anxiety are adaptive, anxiety symptoms that are that persistent or debilitating can impede adaptive functioning in multiple contexts (e.g., academic, social). Given the shift toward increased autonomy and time spent with friends at adolescence (Brown, Dolcini, & Leventhal, 1997), the interplay of anxiety and friendships is an important area of focus. It is possible that adolescents' anxiety symptoms present challenges for their friendships or for their friends. However, the impact of anxiety symptoms on friendship functioning is understudied. Additionally, whether or not anxiety symptoms are socialized within friendships has received little empirical attention.

The current study addressed these two gaps in the literature. First, the current study aims to examine the association between anxiety symptoms in adolescence and friendship quality concurrently and over time. Second, this study aims to examine whether adolescents' anxiety symptoms predict increases in friends' anxiety symptoms over time, a process referred to as anxiety contagion. Gender differences in the impact of anxiety symptoms on their friendship functioning and on their friends' emotional adjustment are also explored.

### Anxiety Symptoms in Adolescence

Adolescents are at an increased risk for emotional adjustment problems, and specifically, the development of anxiety symptoms. Anxiety symptoms are reported at

much higher rates during adolescence than during earlier developmental stages (Haller et al., 2014). Given how common symptoms of anxiety can be at this time, it is important to note that some aspects of anxiety symptoms can be necessary and adaptive (Mash & Barkley, 2014). For example, feelings of urgency ahead of an academic deadline or feelings of fear in the presence of an actual threat can inspire motivation to achieve an adaptive goal. However, anxiety may become maladaptive when symptoms are disproportionately extreme vis-a-vis the situation or environment.

Clinical anxiety symptoms are marked by the excessive anticipation of a threatening experience that exceeds the actual risk for harm (APA, 2013). Anxiety disorders are among the most prevalent mental health problems for youth in the United States, with about one-third of the adolescents meeting criteria for an anxiety disorder by the age of 18 (Lewinsohn et al., 1998). Studies indicate gender differences in anxiety, such that adolescent girls are at a higher risk for experiencing anxiety symptoms than boys and, by age 6, females are already twice as likely to have experienced an anxiety disorder (Lewinsohn et al., 1998).

Subclinical symptoms (i.e., subthreshold symptoms that do not warrant a clinical diagnosis) also cause significant distress (Karsten et al., 2011). Indeed, research suggests that subthreshold general anxiety symptoms are just as distressing and impairing as diagnosable cases of Generalized Anxiety Disorder (Haller et al., 2014). Subthreshold levels of anxiety symptoms are quite common and are associated with reduced quality of life and functional impairment for the individual (Collings et al., 2005; Rucci et al., 2003). For example, these symptoms are associated with high levels of distress, low levels of daily psychosocial functioning (e.g., lower rates of loneliness, better social



skills), sleep disturbance and fatigue, suicide attempts, and poorer perceived physical health (Haller et al., 2014). Subthreshold anxiety symptoms place adolescents in particular at an increased risk for other problems such as substance use, academic problems (e.g., trouble focusing, lack of attendance), and other forms of psychopathology (e.g., depression, anxiety) (Haller et al., 2014; Strauss et al., 1987; Hammen & Rudolph, 2003; Mash & Barkley, 2014). Moreover, individuals with subthreshold symptoms appear to be at a higher risk for developing full-syndromal anxiety disorders (Cuijpers et al., 2005; Lewinsohn et al., 2000).

Anxiety symptoms and their associated distress and impairment are not the only problems. These issues are compounded when considering the number of children who are affected but who are not receiving help. Of the 23.66 million children experiencing anxiety symptoms, only 17.8% of them will receive formal treatment (Mash & Barkley, 2014). As such, anxiety symptoms are a prevalent public health concern worthy of empirical research.

### Friendships in Adolescence

At the same time that adolescents are navigating increased emotional challenges, adolescence further marks a period in which friendships grow in importance (Rubin et al., 2006). In childhood, peers function as playmates, but during adolescence these relationships become more intimate and supportive (Schaffer, 1996). Developmental theory and research indicate that the transition to adolescence is marked by gradually decreased time spent with family and increased frequency of interactions with friends (Brown, Dolcini, & Leventhal, 1997). As such, friendships transition from a social

convenience in childhood to a significant social support system in adolescence (Rubin et al., 2006).

Friendships are important because of the provisions they offer to those involved. Through these relationships, adolescents master prosocial interpersonal behaviors (e.g., helping others, sharing), learn social roles, and encounter new interpersonal experiences (Brown, 1990). Friendships are unique as compared to family or peer relationships due to their reciprocal and voluntary nature. Unique to friendships, reciprocal validation of one another's developing sense of self is provided to both members of the dyad (Parker & Asher, 1993). An extremely important function of friendships is companionship and support (Rubin et al., 2006). Friendships become a source of emotional security outside the family (Furman & Buhrmester, 1985). These unique relationships are also a developmental training ground in which adolescents learn social skills (e.g., managing conflict, sharing support) that are crucial for later relationships (Sullivan, 1953).

Given these provisions, it is not surprising that research indicates that friendships can be protective, buffering adolescents' emotional adjustment. Both having friendships and, in particular, having friendships that are high in quality are related to positive emotional adjustment in adolescence (Bukowski et al., 1996). Specifically, adolescents that report experiencing high quality friendships tend to have better emotional adjustment than those who report having no friends or those who report having average or low quality friendships (Parker & Asher, 1993).

One study found that friends can mitigate the negative effects of stressful experiences, specifically depression symptoms (Brendgen et al., 2013). The study gathered self-reports and friendship nominations from twin pairs in the 4th grade.

Depressive symptoms were measured through both teacher and peer reports. As the study observed twins, evidence emerged suggesting that females with a genetic vulnerability for depressive symptoms experienced reduced symptomology when they had at least one reciprocal close friend. An alternative view of the results suggests that the most beneficial effects of having at least one close friend emerge for girls at highest genetic risk for depression, as compared to girls at lowest genetic risk.

Additionally, research has found that having friends can prevent feelings of loneliness in adolescence (Parker & Asher, 1993). These researchers gathered measures of acceptance, friendship, loneliness, very best friendships, and friendship satisfaction from 881 early adolescents in 3rd, 4th, and 5th grade. Results suggested that children without reciprocated best friends were more lonely than children with best friends, and this was true regardless of how well accepted they were by their peers. Other analyses indicated that friendship quality and acceptance contributed separately and about equally to the prediction of loneliness. Together, these findings suggest that lacking a friend, or having a friendship that fails to meet important relationship needs each contribute to feelings of loneliness.

Other research underscores that dyadic friendship experiences, and not popularity among peers, most directly affect feelings of loneliness and depression (Nangle et al., 2003). In a study of 193 adolescents from 3rd through 6th grade, students completed measures of popularity, friendship quantity, quality of best and good friendships, loneliness, and depression. The provisions derived from close friendships (e.g., affection, intimacy, reliable alliance) appeared to be more important in determining levels of loneliness than the sense of inclusion resulting from group acceptance and popularity.

Taken together, the above mentioned studies highlight the importance of friendships for emotional adjustment in adolescents. However, the literature is lacking in two key areas. First, studies have more often studied links between depressive symptoms and friendship functioning, with far fewer studies examining associations of anxiety symptoms with friendship functioning. Second, many more studies of emotional adjustment and friendship examine the impact of friendship functioning on emotional adjustment, with fewer studies examining the other direction of effect (Schwartz-Mette et al., under review).

Although friendships seem to offer benefits to both boys and girls, research supports that there are important gender differences in the characteristics and qualities of friendships. At a basic level, youth prefer to interact with same-gender peers during childhood and adolescence (Underwood, 2004). Gender differences arise in the pure groupings of friendships, as girl dyads and boy dyads are more common than friendships forged across genders. Even how these dyads are formed tend to be different. Female friendships tend to spark over verbal communication while male friendships come from shared active endeavors.

Interestingly, gender differences in the provisions of friendships are in line with gender-typical friendship groupings and activities. Specifically, female friendships tend to be initiated and reinforced face-to-face (Mjaavatn et al., 2016). Through verbal communications and reciprocal self-disclosure, girls develop intimate rapport and feel emotional closeness. Male friendships on average provide a more “side-by-side” dynamic. Boys tend to develop intimacy while participating in activities focused on common and shared interests, such as games and sports.

Additionally, research supports gender differences in friendship quality. Girls tend to value peers' social skills, particularly intimacy and closeness, more than boys (Mjaavatn et al., 2016), and female friendships are characterized by greater emotional connectedness (Rose & Rudolph, 2006), and higher expectations and levels of symmetrical reciprocity factors (e.g., trust, loyalty, commitment; Mjaavatn et al., 2016). When general positive friendship quality and expectations of intimacy, self-disclosure, and empathic understanding in their friendships are measured, girls tend to report overall higher levels than boys (Rose et al., 2011). As such, studies of the associations between adolescents' emotional and friendship functioning benefit from attention to gender.

### Anxiety Symptoms and Adolescent Friendships

*Impact of anxiety symptoms on friendship functioning.* While decades of research have documented the many social and emotional benefits of friendships, researchers in recent years have become increasingly interested in the impacts of adolescents' emotional difficulties on their social relationships. For example, studies have investigated the impact of loneliness and depressive symptoms on youths' friendship functioning, finding that elevated symptom levels are associated with lower levels of friendship quality (e.g., Kamper & Ostrov, 2013; Kingery & Erdley, 2007). As with other adjustment difficulties, the presence of anxiety symptoms may impact adolescents' friendships. Verbal rumination, apprehension in social circumstances, and lack of attendance in school may be examples of how subthreshold anxiety symptoms could negatively impact adolescent friendships. However, the impact of anxiety symptoms on friendship functioning is relatively understudied. Despite how common anxiety symptoms are in this age range,

many researchers agree and state in their own work that few studies have directly tested concurrent relations between anxiety symptoms and adolescent friendships (Fordham & Stevenson-Hinde, 1999; Rose et al., 2011; Schmidt & Bagwell, 2007).

What is more, there may be important unexplored gender differences in the association between anxiety symptoms and friendship functioning. Documented gender differences in both anxiety symptoms and friendship functioning suggest potential differences in the association between anxiety symptoms and friendships in adolescence. Specifically, researchers have found that females are particularly interpersonally oriented and sensitive to interpersonal stress, especially in adolescence (Rose & Rudolph, 2006). Anxiety symptoms might create extra stress for girls or heightened perceived stress within their friendships, causing the adolescent to be anxious about the relationship. This may inadvertently lead to decreased friendship functioning because girls' friendships are notorious for high emotional connectedness (Rose et al., 2011). If the friendship is not highly connected emotionally, it may be unsuccessful. Given that there is limited literature that examines the impact of anxiety on friendship functioning, this association and any potential gender differences therein are important directions for further research.

*Homophily and contagion processes.* Additionally, research indicates that adolescents' emotional adjustment can impact the emotional adjustment of their friends. At a very basic level, studies suggest that friends tend to be similar on many characteristics (Mjaavatn et al., 2016), a phenomenon often described by the term homophily (Brechwald & Prinstein, 2011; McPherson, Smith-Lovin & Cook, 2001; Pijl, Frostad & Mjaavatn, 2011). Homophily provides a potential explanation for the fact that boys usually select boys and girls select girls as their close friends. Friends also tend to

be similar in terms of their preferred activities, defining characteristics, and even their levels of emotional adjustment (Brechwald & Prinstein, 2011; Mjaavatn et al., 2016). Similarities between friends create relationships that are in sync rather than discordant (Campbell et al., 2015), and similarity between friends tends to increase as a function of the level of positive quality in the relationship (Linden-Andersen et al., 2009). Because adolescents tend to choose friends to whom they are similar, adolescents with elevated anxiety symptoms may seek friendships with other youth who experience similar symptoms. However, only one study has investigated the concordance of adolescent friends with regard to anxiety symptoms (Schwartz-Mette & Rose, 2012).

In addition to documented homophily, studies indicate that friends become increasingly similar to one another over time in terms of their emotional adjustment. This process has been referred to as socialization, or contagion, of symptoms from one youth to another. Contagion processes have been documented in the context of adolescent depressive symptoms (Coyne, 1976; Rook et al., 1994; Schwartz-Mette & Rose, 2012). However, only one study has investigated whether anxiety symptoms are socialized within friendships. Schwartz-Mette and Rose (2012) investigated whether contagion of anxiety symptoms was present in children and adolescents. Although anxiety contagion was not present in children or in adolescent boys, the researchers did find evidence of anxiety contagion for adolescent girls.

There are several processes that may help to explain socialization of anxiety symptoms in friendships. Emotional mimicry has been documented in friendships where one friend is exposed to the other's distressed, repetitive, and negative problem talk and then mirrors the behavior (Hatfield et al., 1994). Findings have suggested that this

process may enhance risk for distress passing from one person to the other. Another study researched the “cost of caring,” suggesting that individuals can become distressed as a function of being exposed to the troubles of others (Kessler & McLeod, 1984). This process may be similar to the process of empathetic distress. A study from Smith and Rose in 2011 indicated that adolescents can experience empathetic distress in response to friends’ problems. This means that they can strongly share in friends’ distress to the point of taking on the distress as their own experience. Given these possibilities, anxiety contagion is important to study in adolescence. Indeed, researchers have posited that contagion may represent a previously unexplored pathway to the development of internalizing symptoms for adolescents (Buhrmester & Furman, 1987).

Gender differences may also be present in homophily and contagion of anxiety symptoms in adolescent friendships. Homophily may seem less likely than contagion to have gender differences. As the construct reflects the likelihood of people to gravitate toward friendships with people similar to themselves, the adolescent in question would likely perceive themselves as similar to their reciprocal friend despite their gender. In contrast, conclusions from Twenge and Nolen-Hoeksema’s (2002) meta-analysis suggest that contagion may be especially strong for adolescent girls, who also are most prone to developing internalizing symptoms. As previously described, the only study that found evidence to support anxiety contagion revealed that anxiety contagion was present for adolescents and girls, suggesting that it was not a significant process in childhood or boys’ friendships (Schwartz-Mette & Rose, 2012). As such, anxiety contagion may be particularly strong in adolescent females’ friendships.



### The Current Study

The current study aimed to fill gaps in the literature regarding the impact of adolescents' anxiety symptoms on friendship functioning, as well as homophily and contagion of anxiety symptoms in a large sample of adolescents' same-gender friendships. First, this study aimed to examine whether anxiety symptoms negatively impact friendship quality in adolescence. It was predicted that elevated anxiety symptoms would be associated with lower levels of positive friendship quality, both concurrently and over 3 months. Gender differences were further anticipated, such that the association between anxiety symptoms and positive friendship quality would be stronger for females than males both concurrently and over 3 months.

The second aim of the study was to evaluate initial homophily of anxiety symptoms and to test contagion of anxiety symptoms over 3 months in adolescents' friendships. It was hypothesized that adolescent friends would be moderately similar to one another in regard to anxiety symptoms at an initial assessment (homophily). Based on the previous literature, gender differences were not expected in this association. Additionally, it was expected that initial levels of friends' anxiety would predict increases in adolescents' own anxiety over 3 months, controlling for initial levels of adolescents' own anxiety. It was further predicted that the anxiety contagion effects would be stronger for females than for males.

It is important to note that anxiety and depressive symptoms are commonly comorbid in adolescence. Of adolescents with anxiety disorders, rates of comorbid depressive disorders range from 10% to 15% (Cummings et al., 2014). Although there is considerable overlap between symptoms of the two disorders (e.g., cognitive biases,

worry and rumination, negative affect, impaired cognitive processes; Eysenck & Fajkowska, 2018), research indicates that anxiety and depression are distinguishable from one another. Thus, in studies of adolescent anxiety symptoms it is important to also assess depression so that the construct of anxiety can be isolated by controlling for depressive symptoms. As such, all hypotheses in the current study will be tested both with and without controlling for adolescents' depressive symptoms, in order to address this overlap.

## METHOD

### Participants

Data for the current study were drawn from a larger project regarding adolescent friendships and emotional adjustment, approved by the University of Maine Institutional Review Board (IRB). Participants were adolescents between 13 and 19 years of age recruited from the towns surrounding the University of Maine. The final sample included 93 same-gender friendship dyads ( $N = 186$ ;  $M = 15.68$  years; 69% female). The racial and ethnic breakdown of the sample was 87.6% White, 4.3% Black/African American, 3.2% Asian/Pacific Islander, 1.6% American Indian/Alaskan Native; 3.2% Hispanic or Latino(a). These percentages do not equal 100% due to the fact that participants were able to select more than one race and/ or ethnicity, or did not respond to this item.

### Procedures

Before beginning the research procedures, parental consent was obtained from the adolescent participants who were under 18 at the time of the study, as well as for their identified minor friends. If target adolescents or identified friends were 18 or over, he or she provided their own written consent.

The target adolescent and his or her friend were scheduled and then attended a lab session together in the Peer Relations Lab at the University of Maine. Both youth were directed to sit at individual computers in separate rooms where they read an assent form and then were asked whether they had any questions pertaining to the study. After the researcher answered any questions they had, participants were asked if they wanted to

participate in the study. All participants provided assent (or consent, in the case of those 18 or older) to participate.

The target adolescent and his or her friend then completed a variety of self-report questionnaire measures using online Qualtrics survey software at their individual computers. Measures assessed aspects of the adolescents' emotional adjustment, friendship functioning, and interpersonal behavior. The measures of interest to the current study are further described below.

Following completion of these questionnaires, target youth and their friends completed an observed dyadic interaction task followed by more questionnaires. For the purposes of this investigation, this portion of the procedure is not of interest.

At the end of the lab session, participants were asked whether they had any questions regarding their participation or the project. Each target adolescent and his or her friend was thanked for their engagement in the project and compensated for their time with \$40 and UMaine merchandise (e.g., water bottle). They were informed that with their completion of follow-up assessments, they would be entered into a drawing to win a pair of headphones. Upon request, youth were provided with the consent and/or assent forms, both containing contact information for the lab.

Approximately 3 months after the initial lab visit, participants were contacted over email to complete a follow-up assessment. Target adolescents and their friends were asked to fill out questionnaire measures online. In cases where participants did not have access to reliable internet service, questionnaires were mailed to participants, who mailed the questionnaires back to the lab after completion. The follow-up assessment was intended to take approximately one hour. Questionnaires completed at the 3-month

follow-up were identical to those completed at the initial lab visit. Participants were then compensated following their submission of the follow-up questionnaire with a \$10 gift card to Amazon.com. Note that adolescents also completed a follow-up assessment 6 months after the lab visit, but the 6-month follow-up data are not addressed in this study.

Some participants ( $n = 93$ ) did not complete the Time 3 assessment and thus data for these participants at Time 2 were missing. Little's MCAR test indicated that these data were missing completely at random (MCAR),  $X^2(11) = 6.54, p = .84$ . Missing data were imputed using an expectation maximization (EM) procedure in SPSS, and the full sample was retained for all analyses.

### Measures

*Demographics and basic information.* Questions assessed participants' age, gender, date of birth, ethnicity, race, friendship status (i.e., whether the friend they elected to participate in the study is a best friend, close friend, just a friend, or not a friend), household members, and employment status and occupation of parent(s)/guardian(s). All participants reported participating with a best or close friend.

*Anxiety symptoms.* Participants completed the 28-item Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1978) to determine the degree to which they experienced symptoms of generalized anxiety. An example item is, "I worry about what other people think of me". Each item was rated on a 1-5 Likert scale ranging from 1 "not at all true" to 5 "really true". Scores were the mean of participants' responses to the 28 items. This measure was reliable in the current sample (Time 1  $\alpha = .95$ ; Time 2  $\alpha = .95$ ).

*Friendship quality.* Participants completed the 18-item revised version of the Friendship Quality Questionnaire (Rose, 2002, revision of Parker & Asher, 1993) with regard to the friend who accompanied them to the lab. Each item was rated on a 1-5 Likert scale ranging from 1 “not at all true” to 5 “really true”. Three items assessed each of the following five positive components of friendship: companionship and recreation, conflict resolution, help and guidance, intimate exchange, and validation and caring. The mean of these items was calculated and each participant was assigned a positive friendship quality score. An example positive quality item is, “My friend and I tell each other that we’re good at things”. Three additional items assessed conflict. An example negative quality/conflict item is “My friend and I get mad at each other a lot”. Responses to relevant items were averaged to create a positive friendship quality and a negative friendship quality score. This measure was reliable in the current sample (positive friendship quality: Time 1  $\alpha = .92$ ; Time 2  $\alpha = .96$ ; conflict: Time 1  $\alpha = .86$ ; Time 2  $\alpha = .84$ ). Only the positive friendship quality scores were used in analyses.

*Depressive symptoms.* Participants rated each of the 20 items of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) to assess how often within the last week they experienced various symptoms of depression including affective, somatic, interpersonal, cognitive, and behavioral symptoms (Time 1  $\alpha = .90$ ). Sum scores were computed for each participant for the purposes of controlling for depressive symptoms in primary analyses.

## RESULTS

### Descriptive Statistics

Means and standard deviations were calculated for all study variables (see Table 1). On average, participants' depressive symptoms fell in the moderate range. Anxiety symptoms at Times 1 and 2 also fell at moderate levels. Levels of positive friendship quality were high at Time 1 and were slightly lower (but still above average) at Time 2.

### Correlations

Correlations among study variables are presented in Table 1. Anxiety symptoms at Time 1 and Time 2 were highly correlated, indicating stability of anxiety over time. Time 1 positive friendship quality was both strongly and significantly correlated with Time 2 positive friendship quality, also indicating consistency over time.

Depressive symptoms and anxiety symptoms were highly and significantly correlated at Time 1. Positive friendship quality was negatively correlated with anxiety symptoms both concurrently and over time, with the concurrent association at Time 2 reaching statistical significance. The association between Time 1 positive friendship quality and Time 2 depressive symptoms also was negative and significant.

### Mean-Level Gender Differences

A series of t-tests was conducted to examine mean-level gender differences in all variables. Results of t-tests and means and standard deviations by gender are presented in Table 2. Significant gender differences were observed for all study variables (Time 1

depressive symptoms, Time 1 and 2 anxiety symptoms, Time 1 and 2 positive friendship quality) with girls reporting higher levels than boys for each variable.

#### Data Analysis Approach for Primary Hypotheses

To account for the nested, dependent nature of the dyadic data (i.e., self-reports from adolescents and friends), multilevel modeling was used to test hypotheses about associations of anxiety symptoms and positive friendship quality and about contagion of anxiety symptoms. Specifically, multilevel modeling statistically accounts for the fact that friends tend to be more similar than non-friends and that this similarity can artificially inflate parameter estimates when more traditional statistical approaches (e.g., OLS regression) are used (Newman, 2010). Thus, to address primary research questions 1-3, multilevel modeling in SPSS version 24.0 was used.

#### Research Question #1: How do anxiety symptoms influence friendship quality in adolescence, both concurrently and over time? Are there gender differences?

*Concurrent association.* Multilevel modeling was used to test whether anxiety symptoms predicted positive friendship quality concurrently. To address the concurrent association, a multilevel model in which Time 1 anxiety symptoms predicted Time 1 positive friendship quality was tested. The main effect of Time 1 anxiety symptoms was significant ( $b = -.10, p < .05$ ), indicating that higher levels of anxiety symptoms were associated with lower levels of friendship quality at Time 1.

To test for gender differences, the main effect of gender and the interaction of Time 1 anxiety symptoms and gender were added to the model. The main effect of Time 1 anxiety symptoms was not significant ( $b = -.09, p = .10$ ), and neither the main effect of



gender ( $b = -.14, p = .55$ ) nor the interaction ( $b = -.14, p = .19$ ) was significant. This suggests that the concurrent association between Time 1 anxiety symptoms and Time 1 positive friendship quality does not depend on gender.

This concurrent association was tested again, controlling for adolescents' Time 1 depressive symptoms. In this model, the main effect of depression was significant ( $b = -.01, p < .05$ ), but the main effect of anxiety was no longer significant ( $b = .02, p = .77$ ). This suggests that the previous significant effect of anxiety symptoms on friendship quality may have been driven by depressive symptoms. Again, gender differences in this model were tested. In this model, the main effect of Time 1 depressive symptoms was significant ( $b = -.01, p < .05$ ). However, the main effects of Time 1 anxiety symptoms ( $b = .05, p = .56$ ) and gender ( $b = -.07, p = .78$ ), and the interaction ( $b = -.17, p = .10$ ) were not significant, indicating that this association also did not depend on gender.

*Longitudinal association.* To address the longitudinal association, a multilevel model in which Time 1 anxiety predicted Time 2 positive friendship quality (controlling for Time 1 positive friendship quality) was tested. The main effect of Time 1 positive friendship quality was significant, indicating that positive friendship quality was stable over time ( $b = 1.01, p < .0001$ ). The main effect of Time 1 anxiety was not significant ( $b = -.02, p = .70$ ) suggesting that anxiety symptoms did not predict changes in friendship quality over time.

To test for gender differences in this longitudinal association, gender and the interaction of gender and Time 1 anxiety symptoms were entered into the model. Time 1 positive friendship quality was again significant ( $b = .99, p < .0001$ ), but the main effect of Time 1 anxiety symptoms ( $b = .01, p = .80$ ), the main effect of gender ( $b = .22, p =$

.30), and the interaction between gender and Time 1 anxiety symptoms ( $b = -.14, p = .15$ ) were not significant.

The above longitudinal models were tested again, this time controlling for depressive symptoms. In the model without gender, only the main effect of Time 1 positive friendship quality ( $b = 1.00, p < .0001$ ) was significant. Neither the main effect of Time 1 depressive symptoms ( $b = -.01, p = .24$ ) nor the main effect of Time 1 anxiety symptoms ( $b = .05, p = .46$ ) were significant. Additionally, gender differences were tested in this model. Time 1 positive friendship quality remained significant ( $b = .98, p < .0001$ ). The effects of Time 1 depressive symptoms ( $b = -.01, p = .18$ ), anxiety symptoms ( $b = .10, p = .23$ ), gender ( $b = .25, p = .25$ ), and the interaction ( $b = -.15, p = .11$ ) were each nonsignificant. These results suggest that initial anxiety symptoms do not appear to affect later positive friendship quality, with or without taking into account the potential effects of depressive symptoms and gender.

Research Question #2: Do adolescent friends tend to be similar with regard to anxiety symptoms (homophily)? Are there gender differences in homophily?

To investigate whether adolescent friends tend to be similar with regard to initial anxiety symptoms (homophily), a model was tested in which adolescents' Time 1 anxiety was predicted from friends' Time 1 anxiety symptoms. The main effect of friends' Time 1 anxiety was significant ( $b = .32, p < .0001$ ), indicating that friends are moderately similar with regard to initial levels of anxiety symptoms. Analyses next tested whether this association was moderated by gender. In this model, adolescents' Time 1 anxiety was predicted by friends' Time 1 anxiety, gender, and the interaction. The main effect of friends Time 1 anxiety remained significant ( $b = .28, p = .001$ ). However, the main effect

of gender ( $b = -.30, p = .39$ ), and the interaction ( $b = -.01, p = .94$ ) were not significant. This indicates that homophily at Time 1 does not appear to depend on gender.

Research Question #3: Do friends' initial anxiety symptoms predict increases in adolescents' own anxiety symptoms over time (contagion)? Are there gender differences in contagion?

To test whether adolescents' anxiety symptoms were impacted by their friend's anxiety symptoms, a model was tested in which adolescents' Time 2 anxiety symptoms were predicted by their friend's Time 1 anxiety symptoms (controlling for adolescents' own Time 1 anxiety symptoms). The main effect of adolescents' Time 1 anxiety was significant ( $b = .78, p < .0001$ ). However, the main effect of friend's Time 1 anxiety was not significant ( $b = .02, p = .55$ ). This indicates that adolescents' anxiety symptoms are stable over time, but that friends' anxiety levels do not appear to impact adolescents' anxiety symptoms longitudinally. Analyses then tested whether the contagion effect was moderated by gender; the interaction was not significant ( $b = .01, p = .96$ ).

Finally, analyses tested whether anxiety contagion controlling for both adolescents' and friends' Time 1 depressive symptoms. In this model, the main effect of adolescents' Time 1 anxiety symptoms remained significant ( $b = .76, p < .0001$ ). However, the effects of adolescents' Time 1 depressive symptoms ( $b = .00, p = .69$ ), friends' Time 1 depressive symptoms ( $b = -.01, p = .30$ ), and friends' Time 1 anxiety symptoms ( $b = .07, p = .24$ ) were each nonsignificant in predicting adolescents' anxiety over time. Moreover, the contagion effect (controlling for both youths' depressive symptoms at Time 1) was not further moderated by gender ( $b = -.02, p = .83$ ). This suggests that adolescents' anxiety symptoms remain stable longitudinally, even when

accounting for depressive symptoms. Additionally, depressive symptoms and gender seem to not play a role in the progression of anxiety symptoms over time.

## DISCUSSION

Anxiety can often be a silent and underreported experience for children and adolescents. This is an important topic for research, given that not all adolescents with anxiety symptoms receive help. As adolescence is a time important for forging friendships, understanding how anxiety can impact friendships may aid in the understanding and development of intervention. The current study examined the impact of anxiety symptoms on friendships and on friends' adjustment, both concurrently and over time. The first aim of the study was to observe the concurrent and longitudinal associations between anxiety symptoms and adolescent friendship functioning. The second aim was to study the contagion of anxiety symptoms between the adolescent and his or her friend.

### Anxiety Symptoms and Friendship Quality

In terms of the study's first aim, results supported the hypothesis that higher levels of subthreshold anxiety symptoms were concurrently associated with lower positive friendship quality. Interestingly, when this model was tested again while controlling for depressive symptoms the main effect of depression was significant, but the main effect of anxiety was no longer significant. These results could be due to depressive symptoms being the factor negatively affecting positive friendship quality in the dyad rather than anxiety symptoms.

Further, findings did not support a significant association between anxiety symptoms and decreases in positive friendship quality over time, with or without controlling for depressive symptoms. That this association did not hold over time could

indicate that although initial levels of friendship quality are low for adolescents experiencing internalizing symptoms, these experiences do not seem to further deteriorate friendship quality. Still, these findings support a link between internalizing symptoms and relationship quality, at least in the shorter term. It is difficult to couch these findings in past research because the association is understudied. Investigating the potential impact of anxiety symptoms on friendship functioning remains an important direction for inquiry.

Inconsistent with hypotheses, there were no significant gender differences in the association between anxiety and positive friendship quality, either concurrently or over time. Lack of gender differences persisted when controlling for depressive symptoms. Given research to support mean-level gender differences in both the prevalence of anxiety symptoms and in positive friendship quality, this finding was unexpected. However, current results indicate that the associations between anxiety symptoms and friendship quality do not depend on gender.

#### Homophily and Contagion of Anxiety Symptoms

The second aim of the research was to investigate the homophily, or similarity, among friends in terms of anxiety symptoms and to test whether adolescents' anxiety symptoms predicted increases in friends' anxiety symptoms over time. Results indicate that friends were moderately similar in terms of anxiety at Time 1, supporting the presence of homophily of anxiety symptoms within the friendship dyads. This result was in line with the one past study of adolescent friends' similarity of anxiety symptoms (Schwartz-Mette & Rose, 2012). It is likely that this result is another example of adolescents' general tendency to befriend those to whom they are similar. Yet this result

extends past research by adding to the very small number of studies that have previously addressed this relation in terms of anxiety symptoms. Although the available studies are few, it does seem that adolescents with elevated anxiety symptoms may select similarly anxious peers as friends.

The data also indicated that for this sample, initial homophily did not depend on gender. Male and female adolescents might be similar in regard to homophily because both males' and females' friendships are formed, at least in part, on the basis of their perceived similarity to friends. In line with these results, Schwartz-Mette and Rose (2012) also did not find gender differences in initial homophily.

Although the data suggest stability in adolescents' anxiety symptoms over time, adolescents' anxiety symptoms did not appear to be significantly impacted by their friend's anxiety symptoms over time. In other words, the current study did not find support for the socialization, or contagion, of anxiety symptoms. These findings are in contrast to hypotheses that were informed by the one past study of anxiety contagion in adolescent friendships (Schwartz-Mette & Rose, 2012). This study was longitudinal over 3 months, whereas Schwartz-Mette and Rose (2012) observed socialization processes across 9 months. Results in the current study could have been nonsignificant because of the shorter time span, possibly because contagion may take longer to come to fruition. Interestingly, a short-term longitudinal study of older adolescents enrolled in college also did not find evidence of anxiety contagion between roommates over a short period of time (Joiner, 1994). The possible time dependency of anxiety contagion is an important question for future research.

Additionally, gender differences in contagion did not emerge. This is in contrast to the one past study of anxiety contagion in adolescent friendships (Schwartz-Mette & Rose, 2012). Again, future research that examines contagion processes over varying periods of time and that tests for gender differences will shed additional light on whether or not anxiety contagion processes may differ for girls and boys.

All contagion analyses conducted were also run a second time, controlling for depressive symptoms in the model. Interestingly, controlling for this overlap between depressive and anxiety symptoms did not impact any of the contagion analyses. This suggests that neither friends' anxiety nor friends' depressive symptoms predict increases in adolescents' anxiety symptoms over time. Past studies of depression contagion have not controlled for anxiety symptoms. Future research should continue to control for both depressive and anxiety symptoms because of the comorbidity between the disorders.

#### Strengths, Limitations, and Future Directions

There are several notable strengths to this study. The larger study from which these data were drawn recruited adolescents and a close friend. Because the study was not conducted in a school, adolescents were able to choose their closest friend that may or may not have been at their same school. Because of this, their elected close friend may have been their most influential friendship. Additionally, the study gathered self-reports of anxiety symptoms from both the adolescents and their friends, circumventing limitations of past studies of contagion that relied on adolescents' perceptions of friends' symptoms and behavior (e.g., Jarvi et al 2013).

In addition, a multilevel modeling approach to analyses was used to account for the dyadic nature of the data collected. Another strength in the analyses stems from the



decision to consider depression in the model to account for the overlap between anxiety and depressive symptoms. This allowed for isolation of anxiety symptoms in testing all hypotheses.

The current study does have limitations to note as well. Although data were missing at random and the decision to impute missing data was justified, there was attrition across the three months. In light of this common challenge in longitudinal research, the results may have been different had responses from all participants at Time 2 been collected from all participants. Relatedly, it is unknown whether those adolescents who did not participate in the follow-up assessment were still friends. Changes in the status of friendships could have implications for the outcome variables of interest.

Additionally, the choice to study symptoms of anxiety in adolescents, rather than diagnosed anxiety poses a possible limitation to the study. It is possible that adolescents with diagnosed anxiety differ from those who experience subthreshold anxiety symptoms. This may contribute to differences in findings from the literature, given the heterogeneity across anxiety disorders and friendships. More research is needed focusing on subthreshold anxiety symptoms and their effect on adolescent friendships.

The findings from the current study and its limitations indicate important directions for future research. First, future studies could benefit from a larger sample of participants. Also, it is possible that analyses would differ with a sample of more symptomatic adolescents. Conducting diagnostic assessments of anxiety in a clinical sample of adolescents rather than a community sample may have increased the likelihood of observing anxiety contagion, as adolescents' clinical levels of anxiety may be more influential to friends' emotional adjustment. Future studies may also observe different

results when studying negative friendship quality, in comparison to this study which only measured positive friendship quality. Anxiety could cause conflict in the friendship dyad, possibly causing more anxiety for both involved.

Similarly, it is also unknown how long the adolescents had been friends. Length of friendship may potentially impact contagion effects. If the dyad had been friends for a few years, contagion of anxiety symptoms could have already occurred prior to the data collection. Finding a way to standardize the length of friendship in the observed dyads may increase opportunities to observe socialization of internalizing symptoms.

In addition, considering the length of time between administering questionnaires in this study, future research may see greater effects with increased time between assessments. Specifically, continuing the data collection across a greater amount of time (i.e., more than 3-months) may allow for greater development of friendship and, potentially, increased likelihood of contagion.

### Clinical Implications and Findings

The study's findings have implications for the development of early intervention for youth with anxiety and depressive symptoms. Therapies related to the formation and continuation of healthy peer relationships may be most effectively implemented in health or guidance programs in schools. Noting the aforementioned statistics concerning the low percentage of adolescents affected by anxiety that seek treatment, normalizing these skills and making them accessible to all children and adolescents may influence positive friendship functioning on a larger scale in communities.

Since the current study found that internalizing symptoms (namely depressive symptoms) do seem to negatively impact positive friendship quality in the short term,

adolescents with internalizing symptoms may have problems in their friendships that are important to attend to in therapy to prevent further deterioration of those relationships. Research findings support that children who learn how to develop and maintain friendships, manage difficult social situations, and cope with troubling symptoms are at an advantage compared to peers who do not receive this type of targeted therapy (Brendgen et al., 2013). This may be especially important for those youth with depressive symptoms.

On a positive note, anxiety symptoms in isolation do not appear to negatively impact positive friendship quality. This means that youth with elevated anxiety symptoms appear able to sustain meaningful and high-quality friendships. As such, therapeutic resources could be more pointedly targeted at areas where research does support anxiety-related deficits, such as academic difficulties (Haller et al., 2014).

Further, results did not support the presence of anxiety contagion. In a way, a lack of findings in this realm is also a positive result. Adolescents with anxiety do not seem to be a risk to their friends' emotional adjustment, at least in terms of anxiety symptoms. Additionally, friends' depressive symptoms do not appear to predict increases in adolescents' anxiety symptoms over time. These findings suggest that friends' internalizing symptoms may not be a risk factor for adolescents' own anxiety symptoms increasing over time.

Taken together, findings indicate that anxiety symptoms in isolation do not appear to impact friendship functioning or friends' anxiety. However, in past research and in the current study, anxiety and depressive symptoms commonly co-occur, and this overlap is important to address. Depressive symptoms did appear to drive the negative impact on

friendship functioning observed in the current study, and past research also documents its negative impact on friendships (Brendgen et al., 2013) and friends' depressive symptoms (Schwartz-Mette & Rose, 2012). Thus, it is important for clinicians to both assess for and address any depressive symptoms that may be experienced by youth presenting with anxiety.

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## APPENDIX A

Table 1. *Descriptive Statistics and Correlations Among Primary Study Variables*

	Possible Range	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.
1. Depressive symptoms (Time 1)	0-60.00	12.45	9.27	-	.82**	.70**	-.14	-.16*
2. Anxiety symptoms (Time 1)	1.00-5.00	2.23	.78		-	.85**	-.08	-.08
3. Anxiety symptoms (Time 2)	1.00-5.00	2.16	.73			-	-.13	-.16*
4. Friendship Quality (Time 1)	1.00-5.00	4.14	.57				-	.80**
5. Friendship Quality (Time 2)	1.00-5.00	3.79	.74					-

*Notes.* \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$ . \*\*\*\* $p \leq .0001$ .

## APPENDIX B

Table 2. *Mean Level Gender Differences in Study Variables*

	Females (n = 131)		Males (n = 55)		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
1. Depressive symptoms (Time 1)	13.59	9.29	9.75	8.75	2.62**
2. Anxiety symptoms (Time 1)	2.36	.76	1.92	.75	3.62****
3. Anxiety symptoms (Time 2)	2.27	.73	1.90	.66	3.12***
4. Friendship quality (Time 1)	4.25	.48	3.87	.69	4.35****
5. Friendship quality (Time 2)	3.92	.67	3.48	.80	3.87***

*Notes.* \* $p \leq .05$ . \*\* $p \leq .01$ . \*\*\* $p \leq .001$ . \*\*\*\* $p \leq .0001$ .

## APPENDIX C

### IRB Approval Letter

Application #: 2015-10-01  
Title: Maine Adolescent Peer Project  
PI: Rebecca Schwartz-Mette  
Approval Period End Date: 9/10/2019

The Institutional Review Board for the Protection of Human Subjects (IRB) conducted its continuing review of the above referenced project in an expedited review on 9/11/2018. The IRB approved renewal, and the new approval period end date is noted above. The next continuing review of this project must be conducted by the IRB before the end of the approval period. Although you will receive a request for review information approximately 6-8 weeks before that date, it is your responsibility to submit review information before the approval period expires.

Given that you indicated data collection has been completed, a consent for for the new approval period was not approved. If you later decide you would like to recruit additional participants, please contact the IRB.

Please remember that any proposed changes to the research must be approved by the IRB **prior** to implementation. If you require a modification in the future, please follow these [instructions](#).

Please contact me if you have any questions. Thank you.

Website for the Office of Research Compliance: <https://umaine.edu/research-compliance/>

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Phoebe J. Welcome was born in Waltham, Massachusetts on April 30<sup>th</sup>, 1997. She was raised in Salisbury, Vermont as well as Easton, Massachusetts. Phoebe graduated from High School in 2015 from Oliver Ames High School. Her primary major is in Child Development and Family Relations with a concentration in Individual and Family Studies. In addition, she double majors in Psychology with a concentration in Developmental Psychology. Phoebe has been an undergraduate research assistant for three years in the Peer Relations Lab and has served on the executive councils of the Delta Nu chapter of Alpha Phi, Panhellenic Council, Her Campus, and Order of Omega.

Upon graduation, Phoebe plans to embark on a new journey and move overseas to pursue a doctorate in Counseling Psychology. Looking toward the future, Phoebe's ultimate goal is to practice in a hospital setting with pediatric patients.