

EXAMINING THE ROLE OF SOCIAL-COGNITIVE APPRAISALS AS A  
MECHANISM LINKING FRIENDSHIP AND DISLIKE NETWORKS TO  
LONELINESS IN ADOLESCENCE

by

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Examining the Role of Social-Cognitive Appraisals as a Mechanism Linking Friendship  
and Dislike Networks to Loneliness in Adolescence

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of  
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## TABLE OF CONTENTS

	Page
List of Tables .....	vi
List of Figures .....	vii
Abstract .....	viii
Chapter One .....	1
Introduction .....	1
Loneliness During Adolescence .....	4
Peer Networks on Loneliness .....	6
Peer Networks on Social-Cognitive Appraisals .....	7
Social-Cognitive Appraisals on Loneliness .....	9
Role of Fear of Negative Evaluation and Rejection Sensitivity .....	40
Gender Differences .....	41
Grade Differences .....	42
Ethnic-Racial Differences .....	13
Chapter Two .....	15
Methods .....	16
Participants .....	16
Procedure .....	17
Friendship and Rejection Networks .....	18
Fear of Negative Evaluation (FNE) .....	18
Rejection Sensitivity (RS) .....	19
Loneliness .....	19
Plan of Analysis .....	19
Chapter Three .....	22
Descriptive Statistics .....	22
Mediation Models .....	22
RS as a Mediator of Friendship Network – Loneliness Association .....	23

FNE as a Mediator of Friendship Network – Loneliness Association.....	24
RS as a Mediator of Rejection Network – Loneliness Association.....	24
FNE as a Mediator of Rejection Network – Loneliness Association .....	25
Moderated Mediation Models .....	30
Gender as a Moderator of Friendship Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome .....	30
Gender as a Moderator of Rejection Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome .....	31
Gender as a Moderator of RS/FNE – Loneliness Path of Mediational Model .....	31
Grade as a Moderator of Friendship Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome .....	32
Grade as a Moderator of Rejection Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome .....	32
Grade as a Moderator of RS/FNE – Loneliness Path of Mediational Model .....	33
Ethnic-Racial Background as a Moderator of Friendship Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome.....	34
Ethnic-Racial Background as a Moderator of Rejection Network – RS/FNE Path of Mediational Model for Loneliness as the Outcome.....	37
Ethnic-Racial Background as a Moderator of RS/FNE – Loneliness Path of Mediational Model.....	39
Chapter Four .....	42
Discussion .....	42
Social-Cognitive Appraisals as Mechanisms Linking Peer Networks to Loneliness .....	43
Gender, Grade, and Ethnic-Racial Background as Moderators of Social-Cognitive Appraisal Mechanisms Linking Peer Networks to Loneliness .....	46
Limitations and Future Directions .....	48
Conclusion .....	49
References.....	51

## LIST OF TABLES

Table	Page
Table 1 Descriptive Statistics [table from image file] .....	22

## LIST OF FIGURES

Figure	Page
Figure 1 Mediation.....	23
Figure 2 Moderated Mediation .....	30

## **ABSTRACT**

### **EXAMINING THE ROLE OF SOCIAL-COGNITIVE APPRAISALS AS A MECHANISM LINKING FRIENDSHIP AND DISLIKE NETWORKS TO LONELINESS IN ADOLESCENCE**

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Recent research has evaluated the influence of peer relationships on internalizing symptoms, such as loneliness, in adolescence. There remains an increasing need to understand the mechanisms by which peer relationships contribute to elevated loneliness. The present study drew on developmental psychopathology, evolutionary perspectives on loneliness, and peer relationship frameworks to examine how social-cognitive appraisals, namely fear of negative evaluation (FNE) and rejection sensitivity (RS), mediated the relationship between friendship and dislike networks with loneliness in adolescence. It was hypothesized that greater FNE and RS would mediate associations among smaller friendship networks, larger dislike networks, and elevated loneliness. The present study also hypothesized that these associations would be stronger for adolescent girls, younger adolescents and for minorities. These questions were examined using a sample of 279 6<sup>th</sup> graders and 435 9<sup>th</sup> graders from public schools in a metropolitan area in the Southwest U.S. (51% female; 28% European-American, 7% African American, 50.8%



Hispanic/Latino, 1.3% Asian, and 2% American Indian or Alaska Native). Results indicated that rejection sensitivity mediated the link between friendship network popularity, gregariousness, and loneliness. The indirect effects of RS and FNE on the link between peer networks and loneliness were not conditional on gender, grade, or ethnicity/race. These findings extend our understanding of the mechanisms and their heterogeneity in how peer networks were associated with loneliness. Discussion focuses on implications of findings and ways to advance the existing knowledge on peer networks, social-cognitive appraisals, and loneliness in adolescence.

## CHAPTER ONE

During adolescence, significant social transformations occur when youth increase in autonomy, distance from parents, and become more focused on social relationships with peers (Laursen & Hartl, 2013). Peers play an important role in an adolescent's social development by providing a sense of belonging and inclusion (e.g., Kingery et al., 2011). Negative experiences with peers, such as rejection and interpersonal stressors, precipitate emotional maladjustment and serve as risk factors for poor mental health throughout development (Rudolph et al., 2016). For instance, when an adolescent perceives their social relationships as scarce, they may develop negative emotions that contribute to loneliness (Goossens, 2018). Indeed, loneliness is frequently experienced by adolescents with over 80% of teens reporting feeling lonely sometimes and more than 50% of adolescents experience recurring loneliness (Hawkley & Cacioppo, 2010). Loneliness is detrimental for adolescent health and well-being (Moore & Schultz, 1983; Qualter et al., 2013).

In evaluating predictors of adolescent loneliness, social relationships should be considered because of the importance of peer connections and the frequency of experiencing social stressors, like victimization and bullying, in adolescence (Pellegrini & Long, 2002). Research has shown that friendship quantity and quality is associated with adolescent loneliness (Kingery et al., 2011; Vanhalst et al., 2014). To evaluate

adolescents' adjustment to middle school, Kingery et al. (2011) found that a smaller number of friends and lower friendship quality were unique predictors of loneliness over time. Additionally, Vanhalst and colleagues (2014) examined the contribution of interpersonal experiences on loneliness in a sizable sample of adolescents to determine that less friends and poor-quality friendships significantly predicted loneliness. Peer rejection is also predictive of loneliness (Parkhurst & Asher, 1992; Xiao et al., 2020). Parkhurst & Asher (1992) determined that middle schoolers who experienced greater peer rejection reported higher levels of loneliness. Peer rejection has also been found to relate to loneliness in Non-Western middle schoolers both concurrently and over time in a cross-lagged study (Xiao et al., 2020). Not many studies have considered how the combination of positive and negative peer experiences predict loneliness, however, a primary focus and contribution of the present study.

Individual differences in social-cognitive appraisals are significantly associated with elevated loneliness, as well as internalizing symptoms including depression and anxiety (Geukens et al., 2020; McDonald et al., 2010). Among social-cognitive appraisals include *fear of negative evaluation* (FNE), which is the concern of being unfavorably evaluated by others (Leary, 1983), and *rejection sensitivity*, or the cognitive tendency to angrily or anxiously expect rejection (Ayduk et al., 2000). Findings have demonstrated that rejection sensitivity (Zimmer-Gembeck et al., 2014), and fear of negative evaluation (FNE) relate to higher levels of adolescent loneliness (Geukens et al., 2020). Other lines of work have shown that friendship experiences (McLachlan et al., 2010) and peer rejection are predictive of greater FNE and rejection sensitivity (Storch et al., 2003).

Thus, as suggested by interpersonal models of developmental psychology for internalizing behaviors such as depression and anxiety (Rudolph et al., 2016), it is plausible that social-cognitive mechanisms would be linking experiences of social relationships to loneliness during adolescence. Furthermore, there is evidence that these associations are stronger for adolescent girls compared to boys (Maes et al., 2019), as well as for younger compared to older adolescents (Parkhurst & Asher, 1992; Kingery et al., 2011). Although prior research has not thoroughly explored racial differences in the effects of peer experiences and social-cognitive appraisals on adolescent loneliness, it is possible racial differences exist in these associations as well. The purpose of this study was to examine associations between peer relationships, rejection sensitivity, FNE and loneliness, and to explore gender, grade and racial differences in these linkages.

Because of the negative effects that loneliness has on physical and psychological well-being (Cacioppo et al., 2002; Richardson et al., 2017), it is important to better understand the mechanisms describing associations between peer relationships and loneliness via social-cognitive appraisals. To address this gap in the literature, the present study examined a mediational chain linking the size of friendship and dislike networks via fear of negative evaluation and rejection sensitivity to predict adolescent loneliness (Figure 1). The current study also evaluated gender differences in these associations given that prior research has shown significant, but small gender differences in these social and psychological outcomes (Maes et al., 2019; Rose & Rudolph, 2006). Furthermore, the present study examined grade and ethnic/racial differences in links

between peer relationships, social-cognitive appraisals and loneliness to add to the literature (Figure 2).

### **Loneliness During Adolescence**

Loneliness is defined as a subjective feeling that emerges when the state of one's existing social relationships does not match the state of one's desired social relationships (Peplau & Perlman, 1982). Evolutionary perspectives on the psychology of loneliness suggest that loneliness occurs when an individual perceives their social relationships as lacking in quality and availability (Goossens, 2018). As such, loneliness can ignite a motivation to re-establish a social connection that is seemingly unsatisfied (Maner et al., 2007), and research has focused on understanding the links between the state of social relationships and loneliness.

Loneliness has been conceptualized as the feelings one experiences in response to their objective lack of social relationships, often referred to as social isolation (Beller & Wagner, 2018). Subjective measures of loneliness have been found to moderately relate to objective measures of social isolation (Hughes et al., 2004), which indicates the importance of examining both constructs. With both a subjective measure of loneliness and an objective account for peer network size in adolescence, the present study can better evaluate the value of friendships and dislike networks in adolescents on their mental well-being.

Adolescence is a period when loneliness tends to increase due to developmental transitions and transformations occurring during this age range (Peplau & Perlman, 1982). Early adolescents tend to report high loneliness prevalence rates due to the

ongoing pubertal, cognitive, and social changes (Qualter et al., 2015; Vanhalst, et al. 2013). In Qualter et al.'s review (2015), the authors found that, across studies, 11-20% of early adolescents report experiencing loneliness often, and 20-70% of mid- to late adolescents report experiencing loneliness often. However, normative loneliness trajectories imply that loneliness lessens over the course of adolescence, which is supported by Vanhalst and colleagues' (2013) findings that, on average, loneliness decreased from mid- to late adolescence (15 to 20 years old). The findings indicate that while adolescence is a developmental period of experiencing increases in loneliness, those feelings do not always persist throughout the lifespan.

Among many physiological and behavioral transitions, adolescents often experience normative changes in their peer network composition and structure which have important implications for their psychological adjustment and well-being (Schwartz-Mette et al., 2020). For instance, peer affiliations have been found to fluctuate at different stages in adolescence due to shifts in social environments, such that early adolescents transitioning into middle school significantly decrease in initial affiliations and progressively re-affiliate with peers over time (Pellegrini & Long, 2002). If peer re-affiliation needs are not met, such experiences can be stressful and possibly lead to psychological adjustment problems, including elevated loneliness and depressive symptoms, especially for youth with greater levels of social-evaluative concerns such as fear of negative evaluation and sensitivity to rejection (Rudolph et al., 2016).

## **Associations between Peer Network Experiences and Loneliness in Adolescence**

Peer relationships are multi-faceted social experiences during adolescence and involve a variety of peer-related constructs such as peer acceptance, rejection, friendship quality and quantity, and victimization (Steinberg & Morris, 2001). Having friends and experiencing peer rejection are important components of peer relationships in adolescence because of their associations with loneliness (Qualter et al., 2015). In evaluating loneliness across the lifespan, Qualter and colleagues (2015) noted that common sources of adolescent loneliness involve a lack of close friendships and peer rejection. At different stages of adolescent development, experiencing loneliness and appreciating certain aspects of peer relationships vary considerably. Due to the differences in significance and relevance of friendship and rejection at different points in adolescence, the present study examined quantity of friendship networks in 6<sup>th</sup> graders compared to 9<sup>th</sup> graders.

Friendship quantity is commonly found to predict adolescent loneliness, such that a greater number of reported friends is associated with less loneliness both concurrently and over time (Kingery et al., 2011; Vanhalst et al., 2014). A recent meta-analysis provided support for these notions and reported significant effects for number of friends, in addition to positive and negative friendship quality, on initial and subsequent loneliness levels (Schwartz-Mette et al., 2020). The effects found were small to medium in size, but they still indicate the presence of direct associations between the absence of friendships and elevated feelings of loneliness.

Peer rejection is another salient aspect of social relationships that refers to the active dislike from one's peers and could potentially involve various levels of exclusion or victimization (Leary, 2001). Research regarding associations between dislike networks and loneliness in adolescence is lacking, however the evidence linking peer rejection status to elevated loneliness (Parkhurst & Asher, 1992; Pederson et al., 2007) suggests that being embedded in larger dislike networks could also be predictive of increases in adolescent loneliness. Additional studies provide support for this association in mid- to late childhood, such that peer rejection was positively correlated with and predicted greater loneliness levels (Ferguson & Zimmer-Gembeck, 2014) and peer rejected children were the loneliest group compared to non-rejected children (Asher & Wheeler, 1985). Therefore, the present study aimed to expand the understanding of and provide support for the relationship between dislike networks and loneliness in adolescence.

### **Associations between Peer Network Experiences and Social-Cognitive Appraisals in Adolescence**

In gaining more autonomy, adolescents begin to focus primarily on peer relationships, their social status among peer groups and the evaluations they receive from others (Dahl et al., 2018). Research demonstrates that adolescents rate their friends high in companionship and intimacy, indicating the importance of peers in this developmental period (Furman & Buhrmester, 1985). Experiencing negative peer interactions, however, could possibly increase the likelihood that individuals will foster negative perceptions or fears of being negatively evaluated and/or rejected by others. Individuals high in fear of negative evaluation (FNE) tend to worry they will often be negatively evaluated in



various social situations (Geukens et al., 2020), while those high in rejection sensitivity have a tendency to anxiously or angrily expect being rejected by others (London et al., 2007).

Negative peer experiences, such as being disliked or having a low quantity of friendships, likely contribute to fear of negative evaluation and rejection sensitivity. Much of the existing literature on social causes of rejection sensitivity and fear of negative evaluation discuss the constructs as developing in response to parent and family-related rejection (Ferguson & Zimmer-Gembeck, 2014). Less research focuses on peer relationships contributing to experiences with rejection sensitivity or FNE. Nevertheless, available findings do demonstrate the presence of associations between peer network constructs and the social-cognitive appraisals of FNE and rejection sensitivity. For rejection sensitivity in particular, one study shows that peer rejection in early adolescence more strongly predicts rejection sensitivity than parent-rejection does (McLachlan et al., 2010). Furthermore, McLachlan and colleagues (2010) found that friendship satisfaction buffers the positive association between peer rejection and rejection sensitivity in adolescents. Longitudinal analyses also indicate that greater dislike nominations in early adolescence contributes to increases in rejection sensitivity over time, while nominations of being “liked” or accepted predicted lower levels of rejection sensitivity (London et al., 2007). Additionally, peer *support* in late childhood is determined to be negatively related to rejection sensitivity in adolescence (Araiza et al., 2019).

While there is some research regarding peer-related contributions to rejection sensitivity in adolescents, there is limited literature that explores how peer rejection or

quantity of friendships serve to predict fear of negative evaluation in adolescent individuals. Previous research, however, has found that higher levels of social anxiety, specifically FNE, was linked to less classmate support, less peer acceptance, fewer friends and less intimacy in friendships for adolescents (LaGreca & Lopez, 1998). More recent studies suggest that adolescent experiences with both overt and relational aggression are associated with elevated fear of negative evaluations (Storch et al., 2003). Further support demonstrates that adolescents' lack of perceived peer acceptance significantly predicts the outward expression of FNE (Teachman & Allen, 2007). Teachman and Allen (2007) also found that over-intensity in adolescents' close relationships tends to predict more implicit experiences with FNE where the individual is not as aware of being fearful of negative evaluations, due to the pressures of the relationship. There is previous support for associations between peer network constructs and fear of negative evaluation, however more recent research is necessary to strengthen the understanding of this relationship.

### **Associations between Social-Cognitive Appraisals and Loneliness in Adolescence**

Although research has demonstrated an association between negative peer experiences and social-cognitive appraisals of relationships (London et al., 2007; Storch et al., 2003), there remains a need to understand how fear of negative evaluation and rejection sensitivity contribute to loneliness. As discussed, adolescence is a critical period of requiring positive social evaluations and if peer inclusion is not met, there is greater chance of them experiencing loneliness (Laursen & Hartl, 2013). It is understood that friendship quantity is negatively related to loneliness in early adolescence (Kingery et al.,

2011). In strengthening previous evidence of an association between high FNE and high loneliness across adolescents (Cavanaugh & Buehler, 2016), a more recent study utilized growth models to find that initial levels of FNE were positively associated with initial levels of loneliness, and the development of FNE was positively related to increases in loneliness in adolescence (Geukens et al., 2020). Furthermore, research demonstrates the presence of indirect associations between aversive peer experiences and loneliness via rejection sensitivity, such that greater relational aggression predicted increased ratings of rejection sensitivity which then predicted higher reports of loneliness (Zimmer-Gembeck, 2014). These findings support the notion that not only do peer experiences influence social-cognitive appraisals of relationships, but also that negative appraisals contribute to greater feelings of loneliness in adolescents.

### **The Role of Fear of Negative Evaluation and Rejection Sensitivity in linking Peer Networks and Loneliness**

An aim of this study was to evaluate the ways in which size of friendship and dislike networks contribute to feelings of loneliness in early compared to mid-adolescence through social-evaluative concerns of negative evaluation and rejection. As discussed, there is evidence that shows an existing direct relationship between peer experiences and appraisals of social relationships (McLachlan et al, 2010; Teachman & Allen, 2007) and adolescent loneliness (Schwartz-Mette et al., 2020). Likewise, research indicates direct associations between social-cognitive appraisals and adolescent loneliness (London et al., 2007). Few studies, however, have evaluated the mediating role

of social-cognitive appraisals on the indirect association of size and quantity of peer networks on loneliness in adolescence.

By having a greater number of friendship nominations and smaller dislike nominations, adolescents may not experience as much fear of negative evaluation or rejection sensitivity because their peer relationships meet their expectations. As discussed, lower levels of FNE and rejection sensitivity appear to be predictive of lower levels of loneliness. On the other hand, adolescents with a higher indegree of dislike nominations may develop more sensitivity to rejection and a greater fear of being negatively evaluated. It is likely that harboring such negative social-cognitive appraisals about one's peer relationships can predict more loneliness in those individuals. Extensive research is suggested, and thorough analyses are required, however, the current study aids in the understanding of how social-cognitive appraisals help explain the relationship between friendship and dislike networks with loneliness in early adolescence and mid-adolescence.

### **Gender Differences in Associations between Peer Networks, Social-Cognitive Appraisals and Loneliness in Adolescence**

While examining the associations between peer networks, social-cognitive appraisals and adolescent loneliness, there have been a variety of findings as to how girls and boys differ in experiencing these associations (Maes et al, 2019; Rose & Rudolph, 2006). Research regarding peer network constructs, such as peer rejection or friendship quality often reports that adolescent girls value friendship intimacy and quality more (Rose & Rudolph, 2006) and are more effected by peer rejection than adolescent boys

are, either by experiencing greater FNE or emotional distress including loneliness (LaGreca & Lopez, 1998). However, further explorations have indicated that adolescent boys report more loneliness, less perceived acceptance and lower friendship quality than adolescent girls (Zhang et al., 2015). Meta-analytic reviews, on the other hand, suggest that existing gender differences for experiencing loneliness in adolescence are rather negligible overall, although boys reportedly experience slightly more than girls (Maes, et al., 2019). High levels of FNE were found to be more detrimental to mental health in adolescent girls who are higher in their peer network position, but in adolescent boys who are lower in peer network position (Kornienko & Santos, 2014).

Furthermore, research that focuses on rejection sensitivity more specifically has indicated that adolescent boys experience greater increases in rejection sensitivity in response to peer rejection than girls do (London et al., 2007). In partial support of this previous finding, other research reports that adolescent boys aged 16 and 17 years old have higher rejection sensitivity levels than girls of the same age, which suggests these gender differences might be influenced by certain factors of age. This variability provides better reason to further evaluate whether there are gender differences present in the associations between friendship and dislike networks, social-cognitive appraisals and loneliness in sixth and ninth graders.

### **Differences between Early versus Middle Adolescents in Associations between Peer Networks, Social-Cognitive Appraisals and Loneliness**

Adolescence is a period consisting of a vast range of ages and developmental milestones and challenges (Peplau & Perlman, 1982). Due to developmental differences,

it is important to consider how factors such as peer dislike, friendships, social-cognitive appraisals and loneliness affect individuals at certain stages of adolescence. Qualter et al. (2015) discussed how sources of loneliness differ at different ages due to individuals' belonging needs. For instance, friendship quantity may be a particularly significant source of loneliness in childhood and early adolescence, whereas friendship quality and intimacy become increasingly important as people progress from childhood to late adolescence (Qualter et al., 2015). Younger adolescents may value simply having a larger friendship network, compared to mid-to-late adolescents who may appreciate fewer, yet validating and intimate friendships.

Additionally, belonging to or being rejected from a peer group is a frequent source of loneliness in early-to-middle adolescence, but the importance of social status decreases later in adolescence into young adulthood (Qualter et al., 2015). For these reasons, the present study examined whether the effects of friendship and dislike networks on loneliness via social-cognitive appraisals are different in early versus middle adolescents. Based on existing developmental frameworks (Qualter et al., 2015) and previous findings on loneliness trajectories (Vanhalst et al., 2013), it was hypothesized that smaller friendship networks and larger dislike networks will predict negative social-cognitive appraisals and loneliness stronger in early adolescents.

### **Differences between Early versus Middle Adolescents in Associations between Peer Networks, Social-Cognitive Appraisals and Loneliness**

To further understand the effects of peer relationships, social-cognitive appraisals and loneliness in adolescence, we aimed to explore the ways these associations may

differ in adolescents of different ethnic-racial backgrounds. There is a dearth of research that has examined a combination of these constructs in adolescence; however, the existing literature may provide a foundation to build upon. Regarding loneliness in adolescence, prior research suggests that ethnic minority youth feel lonelier than adolescents in the ethnic majority due to direct experiences with racial discrimination and victimization (Madsen et al., 2016; Priest et al., 2014). Conversely, meta-analytic results indicate that ethnic-racial differences in adolescents who experience peer victimization are small and insignificant (Vitoroulis & Vaillancourt, 2015). Nevertheless, negative peer experiences including rejection, discrimination and victimization can contribute to negative mental health outcomes in adolescence, such as loneliness and depression (Majeno et al., 2018; Priest et al, 2017). As such, more research is necessary to clarify the existence of racial differences in associations between peer networks, social-cognitive appraisals and loneliness during adolescence. Thus, the current study conducted exploratory analyses to address the gap and to capitalize on the understanding of how friendship and dislike networks contribute to loneliness via social-cognitive appraisals in ethnic-racially diverse youth.

## CHAPTER TWO

The present study examined the associations among peer network experiences, such as size of friendship and dislike networks, and adolescent loneliness by focusing on the role of social-cognitive appraisals, including fear of negative evaluation (FNE) and rejection sensitivity (RS), as mechanisms through which peer networks affect loneliness. Research demonstrates the likelihood of negative peer experiences predicting negative social-cognitive appraisals (McLachlan, 2010; Teachman, 2007). Other research provides support that greater levels of FNE and rejection sensitivity likely contributed to elevated levels of internalizing symptoms (Cavanaugh & Buehler, 2016; Kornienko & Santos, 2014; London, 2007). The existing literature provides a foundation to better the understanding of how peer experiences relate to adolescent loneliness. Examining the mediating role of social-cognitive appraisals is novel and has potential to advance our understanding of the mechanisms during adolescence. Thus, the present study evaluated the role of fear of negative evaluation and rejection sensitivity as mediators in the relationship between friendship and dislike networks and loneliness in early and middle adolescence.

Due to previously documented gender differences in these associations (Maes et al., 2019; Rose & Rudolph, 2006), we examined how gender moderated the associations between peer networks, social-cognitive appraisals and loneliness. Consistent with prior



research, we expected for these associations to be stronger in adolescent girls. Furthermore, because of the inconsistencies in findings regarding ethnic and racial differences in social-cognitive appraisals linking peer networks and adolescent loneliness (Madsen et al., 2016; Vitoroulis & Vaillancourt, 2015), we explored ethnic-racial differences in these associations. As a result of the known association between negative peer experiences and elevated loneliness (Parkhurst & Asher, 1992; Priest et al., 2014), we predicted these associations will be stronger in ethnic-racial minority youth. Finally, given that our sample consisted of adolescents in sixth and ninth grades, representing early and middle adolescence, we also explored age-related differences due to the changing nature of the salience of peer relationships and loneliness (e.g., Vanhalst et al., 2013; Qualter, 2015).

## **Methods**

### ***Participants***

Participants consisted of 714 middle and high school students from a public-school district in the Southwestern U.S. 279 6<sup>th</sup> graders and 435 9<sup>th</sup> graders participated in the study. Participants were 49% male and 51% female. The mean age was 13.7 years old ( $SD = 1.54$ , range: 10-16 years). Ethnic/racial composition of the sample was as follows: 28% European-American, 7% African American, 50.8% Hispanic/Latino, 1.3% Asian, and 2% American Indian or Alaska Native. The study procedures were approved by the Arizona State University's institutional review board.

Participants were recruited from two 6<sup>th</sup> grades from two middle schools and two 9<sup>th</sup> grades from two high schools from a large public-school district located in

southwestern U.S. metropolitan city. Middle school A was composed of 361 students, 50.1% boys and 49.9% girls; 4.2% American Indian/Alaska Native, 0% Asian, 9.1% Black, 79.2% Hispanic, 0% Native Hawaiian/Pacific Islander, 5.5% White, 1.9% Two or More Races; 79% of students were eligible to receive free and reduced lunch. Middle school B was composed of 1,020 students, 50.7% boys and 49.3% girls; 2.9% American Indian/Alaska Native, 1.1%Asian, 6.2% Black, 71.4% Hispanic, 0% Native Hawaiian/Pacific Islander, 15.2% White, 3.1% Two or More Races; 56% of students were eligible to receive free and reduced lunch. High school A was composed of 929 students, 48.9% boys and 51.1% girls; 0.23% American Indian/Alaska Native, 1.5%Asian, 4.4% Black, 36.6% Hispanic, .32% Native Hawaiian/Pacific Islander, 51% White, 5.9% Two or More Races; 30.8% of students were eligible to receive free and reduced lunch. High school B was composed of 1,712 students, 50.6% boys and 49.3% girls; .76% American Indian/Alaska Native, 2.4%Asian, 7.6% Black, 43% Hispanic, .58% Native Hawaiian/Pacific Islander, 39.7% White, 5.8% Two or More Races; 38.9% of students were eligible to receive free and reduced lunch.

### ***Procedure***

Parental consent was obtained for all study participants. Students were sent home parental consent letters in both English and Spanish. Students' received \$10 for returning their signed parental consents, regardless of the parents' decision to allow their adolescent to participate or not participate in the study. School teachers reminded students to remind parents to return signed parental consent letters, regardless of decision, and were provided with \$50 and two movie tickets to express the researchers'

appreciation for their efforts in reminding students to return consent forms. Participating students provided assent prior to completing their surveys.

The assessment took place in December 2019 and early January 2020.

Participants completed self-reported questionnaires during their regular school hours over two class periods (approximately 90 minutes in total). School staff and research project assistants were available to answer any questions as participants completed their surveys.

### ***Measures***

#### *Friendship and Rejection Networks*

To measure the friendship network, participants were asked to nominate up to 10 friends of either gender from their grade (“Please list the names of your 10 FRIENDS from your grade, with whom you spend a lot of time doing different activities and whom you can count on when you need help”). To measure peer rejection or the dislike network, participants were asked to nominate up to 10 individuals of either gender from their grade (“Please list the names of your 10 people from your grade, whom you LIKE THE LEAST”). These data were used to compute indices of network position. *Friendship network popularity* was measured by the number of incoming friendship nominations (friendship indegree). *Friendship network activity or gregariousness* was measured by the number of outgoing friendship nominations (friendship outdegree). *Rejection by peers* was measured by the amount of indegree dislike nominations received by others (rejection indegree). Lastly, *rejection of other peers* was measured by the amount of outgoing nominations of those the participant disliked (rejection outdegree).

#### *Fear of Negative Evaluations*

Fear of Negative Evaluation (FNE) was measured as a component of the *Social Anxiety Scale for Children* (LaGreca et al., 1988) that included 8 items evaluating participants' concerns of others' evaluations of them (e.g., "I feel that kids are making fun of me" and "I worry about what other children say about me"). Mean scores are calculated, with higher values indicating greater levels of FNE. The resulting composite had strong internal consistency (Cronbach's alpha reliability was 0.95).

#### *Rejection Sensitivity*

Rejection Sensitivity was measured from a short version of Downey et al.'s (2013) *Children's Rejection Sensitivity Questionnaire*. There were 8 items total and the scores were averaged with higher values indicating greater rejection sensitivity. The resulting composite had strong internal consistency (Cronbach's alpha reliability was 0.85).

#### *Loneliness*

Loneliness was measured from *A Short Scale for Measuring Loneliness* taken from Hughes, Waite, Hawkey & Cacioppo (2004). The scale consisted of 4 items (e.g., "I feel left out" and "There is no one I can turn to") and was rated from 1 (hardly ever) to 3 (often). The scale was averaged with higher values indicating greater loneliness. The resulting composite had strong internal consistency (Cronbach's alpha reliability was 0.79).

#### **Plan of Analysis**

Four hypotheses were evaluated in the current study. The first hypothesis was that fear of negative evaluation and rejection sensitivity mediated the association between

peer relationships and adolescent loneliness, such that a smaller size of friendship networks and a greater size of dislike networks predicted higher levels of FNE and/or rejection sensitivity which then predicted elevated loneliness in 6<sup>th</sup> graders and 9<sup>th</sup> graders. In order for this mediation effect to be examined, a mediational analysis in SPSS PROCESS macro (Hayes, 2013) was performed.

The second set of hypotheses was that there would be gender differences present in the associations between peer networks, social-cognitive appraisals and loneliness, with adolescent girls high in FNE and rejection sensitivity experiencing more loneliness than boys high in the social-cognitive appraisals of interest. In order to examine whether gender served as a moderator in the association between social-cognitive appraisals and loneliness, simple slope analyses were performed via SPSS PROCESS macro (Hayes, 2013).

Next, it was hypothesized that grade would serve as a moderator in these associations, such that early adolescents would experience them stronger compared to middle adolescents, due to the focus on size of friendship and dislike networks. These associations were explored by conducting simple slope analyses via SPSS PROCESS macro (Hayes, 2013).

Finally, it was predicted that race would moderate the association between peer networks, social-cognitive appraisals and loneliness. In this case, it was expected that ethnic minority youth would experience these associations stronger than those in the ethnic majority, possibly as a result of greater rejection networks. In order to examine whether race served as a moderator in the association between social-cognitive appraisals

and loneliness, simple slope analyses were performed via SPSS PROCESS macro (Hayes, 2013).

## CHAPTER THREE

### Descriptive Statistics

The current sample consisted of 279 6<sup>th</sup> graders and 435 9<sup>th</sup> graders (51% female).

Table 1 provides the means, standard deviations, and correlations for the main variables as well as the friendship and rejection networks.

Table 1. Descriptive Statistics

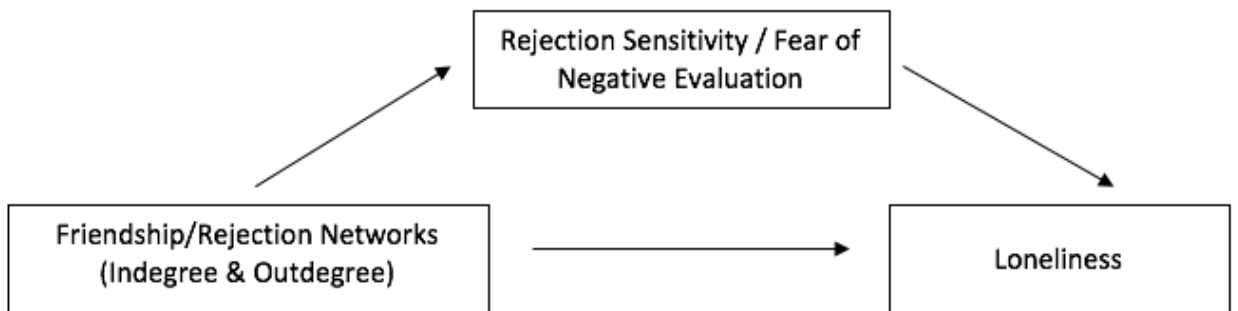
Variable	<i>n</i>	<i>M(Range)</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Loneliness	557	1.51	.54	—									
2. Rejection Sensitivity	676	17.6	16.6	.25**	—								
3. Fear of Negative Evaluation	546	2.25	1.19	.56**	.37**	—							
4. Friendship Network Indegree	714	5.09 (0-10)	3.36	-.13**	-.06	-.06	—						
5. Friendship Network Outdegree	714	5.09 (0-10)	2.65	-.10*	-.03	.02	.37**	—					
6. Rejection Network Indegree	714	1.09 (0-10)	1.63	.10*	.01	.06	.12**	.02	—				
7. Rejection Network Outdegree	714	1.09 (0-10)	2.01	.03	-.05	.03	.15**	.28**	.12**	—			
8. Gender	699	0.50	.500	.18**	.18**	.22**	.03	.08*	-.02	.06	—		
9. Grade	714	0.61	.488	.05	.42**	.02	-.08	-.11*	.01	.01	.04	—	
10. Hispanic/Latino Background	714	0.51	0.50	-.02	-.04	-.02	.02	.11**	-.04	-.03	.02	-.14*	—
11. White Background	714	0.28	0.45	-.03	.01	.01	-.02	-.04	.01	.05	-.04	.21**	-.63**

*Note.* \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## Mediation Models

First, we examined the first set of hypotheses that rejection sensitivity (RS) and fear of negative evaluation (FNE) mediated the link between friendship and dislike network size (indegree and outdegree) and loneliness. To do so, several mediational models were conducted using PROCESS MACRO's "Model 4" (Hayes, 2013).

Figure 1. Mediation Model Peer Network Associations with Loneliness via Social-Cognitive Appraisals



### *Rejection Sensitivity as a Mediator of the Friendship Network Indegree – Loneliness Association*

In Step 1 of the mediation model, the regression of friendship network popularity (friendship indegree) and loneliness, ignoring the mediator, was significant,  $b = -.019$ ,  $t(549) = -2.84$ ,  $p < .01$ . Step 2 showed that the regression of friendship network popularity on the mediator, rejection sensitivity, was significant,  $b = -.434$ ,  $t(549) = -2.02$ ,  $p < .05$ . Step 3 of the mediation demonstrated that the mediator rejection sensitivity,



while controlling for friendship network popularity, was a significant predictor of loneliness,  $b = .008$ ,  $t(549) = 5.71$ ,  $p < .001$ . Step 4 showed that, while controlling for rejection sensitivity, friendship network popularity was a significant predictor of loneliness,  $b = -.016$ ,  $t(549) = -2.42$ ,  $p < .05$ . The bootstrapped estimates revealed a significant mediation effect, 95% CI [-.0063, -.0004]. Thus, rejection sensitivity was a significant mediator of the association between friendship network popularity (indegree) and loneliness. This model provided a good fit to the data ( $F(2, 547) = 20.5$ ,  $p < .001$ ). An  $R^2$  of 0.07 suggests that the model explains 7% of variance in the outcome.

#### ***Rejection Sensitivity as a Mediator of the Friendship Network Outdegree – Loneliness Association***

A similar analysis was computed to evaluate rejection sensitivity as a mediator in the potential relationship between friendship network gregariousness (friendship outdegree) and loneliness. In Step 1 of the mediation model, the regression of friendship network gregariousness and loneliness, ignoring the mediator, was significant,  $b = -.021$ ,  $t(549) = -2.36$ ,  $p < .05$ . Step 2 showed that the regression of friendship network gregariousness on the mediator, rejection sensitivity, was significant,  $b = -.545$ ,  $t(549) = -1.96$ ,  $p = .05$ . Step 3 of the mediation demonstrated that the mediator rejection sensitivity, while controlling for friendship network gregariousness, was a significant predictor of loneliness,  $b = .008$ ,  $t(549) = 5.71$ ,  $p < .001$ . Step 4 showed that, while controlling for rejection sensitivity, friendship network gregariousness was a significant predictor of loneliness,  $b = -.017$ ,  $t(549) = -1.94$ ,  $p = .05$ . The bootstrapped estimates revealed a significant mediation effect, 95% CI [-.0082, -.0001]. Thus, rejection sensitivity was a

significant mediator of the association between friendship network gregariousness (outdegree) and loneliness. This model provided a good fit to the data ( $F(2, 547) = 19.5$ ,  $p < .001$ ). An  $R^2$  of 0.067 suggests that the model explains 6.7% of variance in the outcome.

***Fear of Negative Evaluation as a Mediator of the Friendship Network Indegree – Loneliness Association***

Fear of negative evaluation (FNE) was then examined as a mediator using PROCESS Macro (Hayes, 2013). In Step 1 of the mediation model, the regression of friendship network popularity and loneliness, while ignoring the mediator, was significant,  $b = -.021$ ,  $t(538) = -3.09$ ,  $p < .01$ . Step 2 showed that the regression of friendship network popularity on the mediator, FNE, was not significant,  $b = -.022$ ,  $t(538) = -1.42$ ,  $p < .155$ . Step 3 of the mediation process demonstrated that FNE, while controlling for friendship network popularity, was a significant predictor of loneliness,  $b = .253$ ,  $t(538) = 15.5$ ,  $p < .001$ . Step 4 showed that, while controlling for FNE, friendship network popularity was not a significant predictor of loneliness,  $b = -.016$ ,  $t(538) = -2.75$ ,  $p < .01$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0123, .0015]. Thus, fear of negative evaluation was not a significant mediator of the association between friendship network popularity and loneliness.

***Fear of Negative Evaluation as a Mediator of the Friendship Network Outdegree – Loneliness Association***

A similar analysis was computed to evaluate fear of negative evaluation as a mediator in the potential relationship between friendship network gregariousness

(outdegree) and loneliness. In Step 1 of the mediation model, the regression of friendship network gregariousness and loneliness, while ignoring the mediator, was significant,  $b = -.024$ ,  $t(538) = -2.73$ ,  $p < .01$ . Step 2 showed that the regression of friendship network gregariousness on the mediator, FNE, was not significant,  $b = .0071$ ,  $t(538) = .3594$ ,  $p = .7195$ . Step 3 of the mediation process demonstrated that FNE, while controlling for friendship network gregariousness, was a significant predictor of loneliness,  $b = .256$ ,  $t(538) = 15.8$ ,  $p < .001$ . Step 4 showed that, while controlling for FNE, friendship network gregariousness was a significant predictor of loneliness,  $b = -.026$ ,  $t(538) = -3.55$ ,  $p < .001$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0089, .0120]. Thus, fear of negative evaluation was not a significant mediator of the association between friendship network gregariousness and loneliness.

#### ***Rejection Sensitivity as a Mediator of the Rejection Network Indegree – Loneliness Association***

Next, rejection sensitivity and FNE were examined as mediators in the link between *rejection by peers* (rejection indegree) and loneliness. The first analysis included loneliness as the dependent variable, rejection indegree as the independent variable and rejection sensitivity as the mediator. In Step 1 of the mediation model, the regression of rejection indegree and loneliness, while ignoring the mediator, was significant,  $b = .034$ ,  $t(549) = 2.55$ ,  $p = .01$ . Step 2 revealed that the regression of rejection indegree on the mediator, rejection sensitivity, was not significant,  $b = -.154$ ,  $t(549) = -.368$ ,  $p < .713$ . Step 3 of the mediation process demonstrated that rejection sensitivity, while controlling for rejection indegree, was a significant predictor of loneliness,  $b = .008$ ,  $t(549) = 5.99$ ,  $p$

< .001. Step 4 showed that, while controlling for rejection sensitivity, rejection indegree was a significant predictor of loneliness,  $b = .035$ ,  $t(549) = 2.72$ ,  $p < .01$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0073, .0039]. Thus, rejection sensitivity was not a significant mediator of the association between rejection by peers and loneliness.

***Rejection Sensitivity as a Mediator of the Rejection Network Outdegree – Loneliness Association***

Rejection sensitivity was then examined as a mediator in the link between *rejection of other peers* (rejection outdegree) and loneliness. This next analysis included loneliness as the dependent variable, rejection network outdegree as the independent variable and rejection sensitivity as the mediator. In Step 1 of the mediation model, the regression of rejection outdegree and loneliness, while ignoring the mediator, was not significant,  $b = .008$ ,  $t(549) = .701$ ,  $p = .4833$ . Step 2 revealed that the regression of rejection outdegree on the mediator, rejection sensitivity, was not significant,  $b = -.492$ ,  $t(549) = -1.39$ ,  $p = .1638$ . Step 3 of the mediation process demonstrated that rejection sensitivity, while controlling for rejection of other peers, was a significant predictor of loneliness,  $b = .008$ ,  $t(549) = 5.97$ ,  $p < .001$ . Step 4 showed that, while controlling for rejection sensitivity, rejection outdegree was not a significant predictor of loneliness,  $b = .0117$ ,  $t(549) = 1.077$ ,  $p = .2819$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0092, .0014]. Thus, rejection sensitivity was not a significant mediator of the association between rejection of other peers and loneliness.

***Fear of Negative Evaluation as a Mediator of the Rejection Network Indegree – Loneliness Association***

Similarly, fear of negative evaluation (FNE) was examined as a mediator in the relationship between *rejection by peers* (rejection indegree) and loneliness. In Step 1 of the mediation model, the regression of rejection indegree and loneliness, while ignoring the mediator, was significant,  $b = .032$ ,  $t(538) = 2.43$ ,  $p < .05$ . Step 2 showed that the regression of rejection indegree on the mediator, FNE, was not significant,  $b = .039$ ,  $t(538) = 1.32$ ,  $p < .186$ . Step 3 demonstrated that FNE, while controlling for rejection indegree, was a significant predictor of loneliness,  $b = .254$ ,  $t(538) = 15.5$ ,  $p < .001$ . Step 4 showed that, while controlling for FNE, rejection indegree was a significant predictor of loneliness,  $b = .023$ ,  $t(538) = 2.03$ ,  $p < .05$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0070, .0255]. Thus, fear of negative evaluation was not a significant mediator of the association between rejection by peers and loneliness.

***Fear of Negative Evaluation as a Mediator of the Rejection Network Outdegree – Loneliness Association***

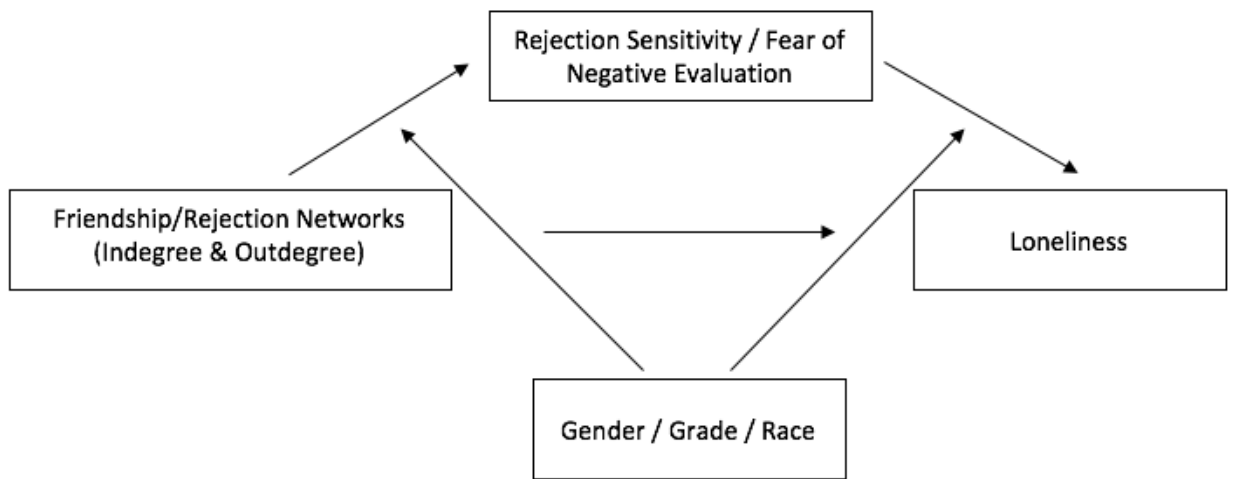
The final mediation model examines whether FNE is a mediator of the association between *rejection of other peers* (rejection outdegree) and loneliness. In Step 1 of the mediation model, the regression of rejection outdegree and loneliness, while ignoring the mediator, was not significant,  $b = .008$ ,  $t(538) = .695$ ,  $p = .487$ . Step 2 showed that the regression of rejection outdegree on the mediator, FNE, was not significant,  $b = .0131$ ,  $t(538) = .526$ ,  $p = .599$ . Step 3 demonstrated that FNE, while controlling for rejection of

other peers, was a significant predictor of loneliness,  $b = .255$ ,  $t(538) = 15.6$ ,  $p < .001$ . Step 4 showed that, while controlling for FNE, rejection of other peers was not a significant predictor of loneliness,  $b = .005$ ,  $t(538) = .483$ ,  $p = .629$ . The bootstrapped estimates revealed a non-significant mediation effect, 95% CI [-.0081, .0159]. Thus, fear of negative evaluation was not a significant mediator of the association between rejection of other peers and loneliness.

### **Moderated Mediation Models**

Next, we examined the second set of hypotheses about whether gender, grade, and ethnicity/race moderated the mediated association between rejection sensitivity and fear of negative evaluation on loneliness via friendship network popularity, gregariousness, rejection by peers and rejection of other peers. To test the moderated mediation models, PROCESS “Model 58” was analyzed with friendship and rejection network (indegree and outdegree) as the independent variables and loneliness as the outcome variable.

Figure 2. Moderated Mediation Model



***Gender as a Moderator of the Friendship Network Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.481, .1781]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity and loneliness was not conditional on gender in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0724, .0441]. Thus, the extent to which FNE accounted for the link between friendship network popularity and loneliness was not conditional on gender in the first path of the model.

***Gender as a Moderator of the Friendship Outdegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.53, .6146]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network gregariousness and loneliness was not conditional on gender in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0881, .0642]. Thus, the extent to which FNE accounted for the link between friendship network gregariousness and loneliness was not conditional on gender in the first path of the model.

***Gender as a Moderator of the Rejection Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

Similar analyses were conducted to examine gender as a moderator of the mediational relationship between rejection network indegree and rejection sensitivity on loneliness. First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-2.990, .3955]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection by peers* and loneliness was not conditional on gender in the first path of the model.



Second, fear of negative evaluation was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1984, .0379]. Thus, the extent to which FNE accounted for the link between *rejection by peers* and loneliness was not conditional on gender in the first path of the model.

***Gender as a Moderator of the Rejection Outdegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.337, 1.370]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection of other peers* and loneliness was not conditional on gender in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1266, .0640]. Thus, the extent to which FNE accounted for the link between *rejection of other peers* and loneliness was not conditional on gender in the first path of the model.

***Gender as a Moderator of the RS/FNE – Loneliness Path of the Mediation Model***

PROCESS “Model 58” was used to analyze moderated mediation for the second path of the mediation models evaluating friendship and rejection network indegree and outdegree on loneliness. First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped

estimates revealed non-significant moderated mediation effects, 95% CI [-.0087, .0087]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on gender in the second path of each of the models.

Second, fear of negative evaluation was entered as the mediator (M) variable and gender remained as the moderator (W) variable. Bootstrap estimates revealed a non-significant moderated mediation effect for each model, (friendship indegree-loneliness, 95% CI [-.0167, .1050]; friendship outdegree-loneliness, 95% CI [-.0231, .0170]; rejection indegree-loneliness, 95% CI [-.0568, .0153]; rejection outdegree-loneliness, 95% CI [-.0327, .0161]). Thus, the extent to which FNE accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on gender in the second path of the each of the models.

***Grade as a Moderator of the Friendship Network Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.6721, .9479]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity and loneliness was not conditional on grade in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-

significant moderated mediation effect, 95% CI [-.0181, .1065]. Thus, the extent to which FNE accounted for the link between friendship network popularity and loneliness was not conditional on grade in the first path of the model.

***Grade as a Moderator of the Friendship Outdegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.7666, 1.369]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network gregariousness and loneliness was not conditional on grade in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0694, .1016]. Thus, the extent to which FNE accounted for the link between friendship network gregariousness and loneliness was not conditional on grade in the first path of the model.

***Grade as a Moderator of the Rejection Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and gender was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.579, 1.6881]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection by peers* and loneliness was not conditional on grade in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1604, .0910]. Thus, the extent to which FNE accounted for the link between *rejection by peers* and loneliness was not conditional on grade in the first path of the model.

***Grade as a Moderator of the Rejection Outdegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.441, 1.201]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection of other peers* and loneliness was not conditional on grade in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0971, .1058]. Thus, the extent to which FNE accounted for the link between *rejection of other peers* and loneliness was not conditional on grade in the first path of the model.

***Grade as a Moderator of the RS/FNE – Loneliness Path of the Mediation Model***

Next, grade was evaluated as a moderator of the associations between the mediators (rejection sensitivity and fear of negative evaluation) and loneliness. First, rejection sensitivity was entered as the mediator (M) variable and grade was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant

moderated mediation effect, 95% CI [-.0021, .0154]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers, and loneliness was not conditional on grade in the second path of each of the models.

Second, fear of negative evaluation was entered as the mediator (M) variable and grade remained as the moderator (W) variable. Bootstrapped estimates revealed a non-significant moderated mediation effect for each model, (friendship indegree-loneliness, 95% CI [-.0040, .0271]; friendship outdegree-loneliness, 95% CI [-.0191, .0280]; rejection indegree-loneliness, 95% CI [-.0461, .0329]; rejection outdegree-loneliness, 95% CI [-.0244, .0265]). Thus, the extent to which FNE accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers, and loneliness was not conditional on grade in the second path of the models.

***Ethnic-Racial Background as a Moderator of the Friendship Network Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.8675, .8247]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Rejection sensitivity remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1599, 1.680]. Thus, the extent to which rejection sensitivity

accounted for the link between friendship network popularity and loneliness was not conditional on being White in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0493, .0694]. Thus, the extent to which FNE accounted for the link between friendship network popularity and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Fear of negative evaluation remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0140, .1134]. Thus, the extent to which FNE accounted for the link between friendship network popularity and loneliness was not conditional on being White in the first path of the model.

### ***Ethnic-Racial Background as a Moderator of the Friendship Outdegree – RS/FNE***

#### ***Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-1.971, .2169]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network gregariousness and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Rejection sensitivity remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.2420, 2.231]. Thus, the extent to which rejection sensitivity

accounted for the link between friendship network gregariousness and loneliness was not conditional on being White in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1077, .0476]. Thus, the extent to which FNE accounted for the link between friendship network gregariousness and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Fear of negative evaluation remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0589, .1114]. Thus, the extent to which FNE accounted for the link between friendship network gregariousness and loneliness was not conditional on being White in the first path of the model.

***Ethnic-Racial Background as a Moderator of the Rejection Indegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.4825, 2.842]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection by peers* and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Rejection sensitivity remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-2.011, 1.827]. Thus, the extent to which rejection sensitivity

accounted for the link between *rejection by peers* and loneliness was not conditional on being White in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0383, .1938]. Thus, the extent to which FNE accounted for the link between *rejection by peers* and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Fear of negative evaluation remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1357, .1294]. Thus, the extent to which FNE accounted for the link between *rejection by peers* and loneliness was not conditional on being White in the first path of the model.

***Ethnic-Racial Background as a Moderator of the Rejection Outdegree – RS/FNE Path of Mediation Model for Loneliness as the Outcome***

First, rejection sensitivity was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-2.174, .6112]. Thus, the extent to which rejection sensitivity accounted for the link between *rejection of other peers* and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Rejection sensitivity remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.2267, 2.687]. Thus, the extent to which rejection sensitivity



accounted for the link between *rejection of other peers* and loneliness was not conditional on being White in the first path of the model.

Second, fear of negative evaluation was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.1060, .0909]. Thus, the extent to which FNE accounted for the link between *rejection of other peers* and loneliness was not conditional on being Hispanic/Latino in the first path of the model.

Fear of negative evaluation remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0336, .1707]. Thus, the extent to which FNE accounted for the link between *rejection of other peers* and loneliness was not conditional on being White in the first path of the model.

#### ***Ethnic-Racial Background as a Moderator of the RS/FNE – Loneliness Path of the Mediation Model***

First, rejection sensitivity was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated mediation effect, 95% CI [-.0018, .0214]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on being Hispanic/Latino in the second path of the models.

Rejection sensitivity remained as the mediator (M) variable and being White was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant moderated

mediation effect, 95% CI [-.0173, .0181]. Thus, the extent to which rejection sensitivity accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on being White in the second path of the models.

Second, fear of negative evaluation was entered as the mediator (M) variable and being Hispanic/Latino was entered as the moderator (W) variable. The bootstrapped estimates revealed a non-significant interaction between FNE and being Hispanic/Latino in the friendship indegree-loneliness (95% CI [-.0493, .0694]), friendship outdegree-loneliness (95% CI [-.0680, .0594]), rejection indegree-loneliness (95% CI [-.0706, .0584]), and rejection outdegree-loneliness (95% CI [-.0657, .0634]) associations. Bootstrapped estimates also revealed a non-significant moderated mediation effect for each model, 95% CI [-.0145, .0495]. Thus, the extent to which FNE accounted for the link between friendship network popularity, gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on being Hispanic/Latino in the second path of the models.

Fear of negative evaluation remained as the mediator (M) variable and being White was entered as the moderator (W) variable. Bootstrapped estimates revealed a non-significant interaction between FNE and being White in the friendship indegree-loneliness (95% CI [-.0631, .0764]), friendship outdegree-loneliness (95% CI [-.0668, .0720]), rejection indegree-loneliness (95% CI [-.0685, .0715]), and rejection outdegree-loneliness (95% CI [-.0705, .0703]) associations. The bootstrapped estimates also revealed non-significant moderated mediation effects, 95% CI [-.0338, .0427]. Thus, the extent to which FNE accounted for the link between friendship network popularity,

gregariousness, rejection by peers, rejection of other peers and loneliness was not conditional on being White in the second path of the models.

## CHAPTER FOUR

### Discussion

The current study aimed to explore the way that rejection sensitivity and fear of negative evaluation (FNE) explain the relationships between friendship and dislike networks and loneliness during adolescence. Rejection sensitivity and FNE are considered to be maladaptive appraisals of social relationships that increase risk of stress, depression and other interpersonal vulnerabilities, particularly in adolescents (Rudolph et al., 2016). Such negative social-cognitive appraisals were suggested to be a result of negative interpersonal experiences, including rejection from family and peers (McDonald et al., 2010). Results revealed that rejection sensitivity significantly mediated the relationship between friendship network popularity, gregariousness, and loneliness in adolescence. FNE was not found to serve as a mediator in the associations between peer networks and loneliness. Therefore, the present study advances research by providing insight into the role of rejection sensitivity and fear of negative evaluation in explaining the associations between friendship/dislike network size and loneliness in adolescence. We also explored whether gender, grade and ethnic-racial background would moderate the mediated relationship between friendship/dislike networks, social-cognitive appraisals and loneliness. Results revealed that the indirect effects of friendship/dislike networks on loneliness via RS and FNE were not conditional on either gender, grade, or ethnic-racial

background. These findings extend the understanding of the mechanisms through which peer networks contribute to loneliness during adolescence by suggesting that these processes appear to unfold in a similar manner across gender, early vs. middle adolescence, and ethnic-racial background. Examining these processes is especially relevant in a sample of middle-school and high-school students where both positive and negative peer interactions are likely.

### ***Social-Cognitive Appraisals as Mechanisms Linking Peer Networks to Loneliness***

When faced with frequent negative interpersonal experiences, including social rejection, individuals likely adopt maladaptive appraisals of social relationships; these tendencies are particularly pronounced among adolescents (Rudolph et al., 2016). The social-cognitive appraisals explored in this study were rejection sensitivity and fear of negative evaluation, which have both been linked to increases in loneliness (Gao et al., 2017; Geukens et al., 2020). Due to the associations between rejection sensitivity, FNE and increased loneliness, rejection sensitivity and FNE were examined as mediators explaining the association between friendship/dislike networks and loneliness. Rejection sensitivity was found to be a significant mechanism explaining the relationship between *friendship* networks and loneliness levels. This finding is consistent with previous research that demonstrated how rejection sensitivity mediated the relationship between greater relational aggression and increased loneliness (Zimmer-Gembeck et al., 2014). However, because the present study focused on positive aspects of peer relationships, whereas relational aggression should be conceptualized as an interpersonal stressor (Rudolph et al., 2016), our results differ in that greater friendship network popularity and

gregariousness contributed to decreased levels of rejection sensitivity which in turn predicted decreased levels of loneliness.

These results reinforce the notion that adolescents value peer acceptance (Kingery et al., 2011). Larger friendship networks suggest a greater sense of belonging and less uncertainty of one's social orientation, which fulfills the basic need to be connected to others according to evolutionary perspectives on loneliness (Goossens, 2018). Results such as these indicate that being embedded in larger peer networks may serve a protective role to adolescents, in which case clinicians and school faculty should implement intervention efforts to students with smaller network sizes and lower peer acceptance. Promoting social support networks and enhancing adolescents' interpersonal experiences could prevent them from engaging in maladaptive cognitive processes and lessen their feelings of loneliness. By restoring adolescents' sense of inclusion and support, their mental health outcomes should improve.

Surprisingly, rejection sensitivity was not found to significantly mediate the association between dislike networks and loneliness. Previous empirical research and theory have shown that rejection by peers is linked to higher levels of rejection sensitivity (London et al., 2007; McLachlan et al., 2010). Further, rejection sensitivity is suggested to correspond with negative mental health outcomes, including loneliness (Rudolph et al., 2016). For these reasons, we anticipated that rejection sensitivity would be a significant mediator. The current null findings could possibly be attributed to the sample experiencing more positive peer interactions or other forms of social support that may have buffered the effect of size of dislike networks on rejection sensitivity. This suggests

future research needs to consider interactive associations between friendship and dislike networks such that friendship networks could play a buffering role in diminishing the impact of dislike experiences and networks on adolescent loneliness. Future research should also continue to explore effect of dislike networks on rejection sensitivity in relation to loneliness, in order to clarify the nature of associations between RS and the size of rejection networks in adolescence. Given that peer rejection is such a potent interpersonal stressor during adolescence (Rudolph et al., 2016), all youth who experience rejection are likely to report increased levels of loneliness.

Additionally, contrary to our expectations, fear of negative evaluation was not a significant mediator explaining the relationship between friendship/dislike networks and loneliness in adolescence. Whereas FNE may predict loneliness on its own, as suggested by past research (Cavanaugh & Buehler, 2015; Geukens et al., 2020), it does not appear to help explain the potential relationship between size of friendship/rejection networks and loneliness. Although there were null findings regarding the role of FNE as a mediator, the present study adds to the understanding of which social-cognitive appraisals play more of a role in the connection between peer networks and loneliness.

Despite the lack of significant associations in the present study, extensive research is necessary to establish an understanding of what leads adolescents to develop fears of being negatively evaluated. Understanding contributing factors of FNE can help professionals assist with prevention and intervention efforts for students at risk of increased FNE. Because FNE is a component of social anxiety, it is possible that such a cognitive bias can negatively impact the reaffiliation motive of loneliness (Qualter et al.,

2015) and other health outcomes. Evidence suggests that FNE tends to increase throughout adolescence (Geukens et al., 2020), indicating the possibility that FNE is a result of more qualitative factors in interpersonal experiences with friends and peers (e.g., intimacy, self-disclosure, support; for a review see, Rose & Asher, 2016) rather than size of peer networks. Qualter and colleagues (2015) suggested that early to mid-adolescents are more concerned with social status and size of peer networks compared to older adolescents who value intimacy and quality of close friendships. Due to the sample of the present study consisting of early and mid-adolescents, the null findings of FNE's role could be attributed to the study's focus on a position that individual occupies in their friendship and dislike networks, which represent quantitative and not qualitative aspects of social relationships. Thus, future studies would be wise to combine both quantitative and qualitative aspects of peer relationships and close friendships to gain a comprehensive look at their role in precipitating adolescent loneliness. Previous findings indicate that less intimacy and pressures of close relationships were associated with higher levels of FNE (LaGreca & Lopez, 1998; Teachman & Allen, 2007); however, more research is required to thoroughly parse out consequences of FNE in adolescence. From there, school officials and clinicians will know which components of peer relationships to focus on when implementing intervention efforts. Properly alleviating fears of negative evaluation in adolescents may enhance their motivation to reconnect and maintain positive interpersonal experiences.

***Gender, Grade, and Ethnic-Racial Background as Moderators of Social-Cognitive Appraisal Mechanisms Linking Peer Networks to Loneliness***



The final set of hypotheses tested in this study focused on whether gender, grade, and ethnic-racial background moderated the mediational relationship between friendship/dislike networks and loneliness levels. Previous research has shown that gender, grade, and ethnic-racial background were significantly associated with loneliness (Majeno et al., 2018; Maes et al., 2019; Qualter et al., 2015). Contrary to our expectations, the findings indicated that the extent to which rejection sensitivity and FNE accounted for the link between friendship network popularity, gregariousness, rejection by peers, and rejection of other peers on adolescent loneliness was not conditional on one's gender, grade, or ethnic-racial background. There were no significant differences found in any of the mediation paths between boys and girls, 6<sup>th</sup> and 9<sup>th</sup> graders, or Hispanic/Latino and White students. This suggests that the associations between friendship/dislike networks, social-cognitive appraisals and loneliness are relevant to adolescents despite their gender, age, or race because of the growing autonomy and salience of social relationships in adolescence altogether (Dahl et al., 2018). However, future research should continue to examine whether gender, age, and ethnic-racial differences exist in adolescents' experience with interpersonal stressors, social-cognitive biases, and loneliness to further advance existing literature. Findings on gender differences in these associations are variable (Rose & Rudolph, 2006; Maes et al., 2019), and more research could clarify whether boys or girls experience loneliness as a result of peer networks and social-cognitive appraisals stronger than the other. Ethnic-racial differences in loneliness certainly need further examination, as there are no conclusive findings pertaining to adolescent loneliness and ethnicity/race in particular.

Obtaining a deeper understanding of the role of gender, grade, and ethnic-racial differences in these associations are important to the advancement of prevention and intervention efforts in schools and clinical practice. Greater knowledge on differences in these associations would allow for a more individualized and tailored intervention approach for those most at risk. Younger adolescent girls with high rejection sensitivity levels may require different strategies compared to older adolescent boys high in FNE. Likewise, understanding ethnic-racial differences would improve the cultural sensitivity in intervention efforts, such that professionals can focus efforts on the individual students' diverse needs.

### ***Limitations and Future Directions***

This study has several limitations that need to be acknowledged and they provide promising opportunities for future research. First, the current study relies on adolescents' self-reported accounts of the variables, as well as utilizing a cross-sectional design. The nature of adolescence involves interpersonal experiences and mindsets that are often fluctuating (Schwartz-Mette et al., 2020), and the current study only has record of the students' experiences at the time of data collection. Therefore, future research could strengthen the present findings by incorporating a longitudinal design and having data on friendship/dislike networks, social-cognitive appraisals and loneliness at multiple points in time.

Next, being that rejection sensitivity was the influential social-cognitive appraisal in the prediction of loneliness and the association between friendship networks and loneliness, the present study would have benefitted by breaking the rejection sensitivity

measure down into its anxious and angry components in the analyses. Rejection sensitivity is defined as the tendency to anxiously *or* angrily expect rejection (Ayduk et al., 2000), thus the measure of rejection sensitivity incorporates items that evaluate one's anxious expectations and one's angry expectations (Downey et al., 2013). By utilizing anxious and angry rejection expectation measures separately, future research would strengthen the understanding of rejection sensitivity's impact on children and adolescent's well-being.

Finally, the current study has not thoroughly considered the contribution of family or romantic relationship support when examining the role of rejection sensitivity and fear of negative evaluation in the association between peer network size and loneliness. Previous research suggests that adolescents report higher maladaptive appraisals, such as rejection sensitivity, when their parental acceptance and support is low (McLachlan et al., 2010), therefore it is possible that other sources of support could have buffered the associations between peer networks, social-cognitive appraisals and loneliness. Thus, future research should account for other sources of social support when evaluating these associations.

### ***Conclusion***

In conclusion, the goal of the current study was to explore the relationship between peer networks and loneliness with the mediating roles of rejection sensitivity and fear of negative evaluation, and the moderating roles of gender, grade and ethnic-racial background. Rejection sensitivity was found to be a significant mediator explaining the link between friendship network popularity, gregariousness and loneliness in the

adolescent sample. Also, significant interaction effects revealed that boys and 6<sup>th</sup> graders higher in rejection sensitivity levels experience significantly greater loneliness than girls and 9<sup>th</sup> graders. The results provide further insight into a mechanism by which friendship network size contributes to loneliness, as well as which individuals are more at risk of negative mental health outcomes in response to maladaptive social-cognitive appraisals. Such findings may be beneficial to student seeking prevention and intervention efforts in schools and clinical practice.

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## **BIOGRAPHY**

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