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GENDER DIFFERENCES IN CO-RUMINATION PROCESSES IN THE FRIENDSHIPS OF LATE ADOLESCENTS: RELATIONS TO DEPRESSION VULNERABILITY

By

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A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

(in Clinical Psychology)

The Graduate School

The University of Maine

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GENDER DIFFERENCES IN CO-RUMINATION PROCESSES IN THE FRIENDSHIPS OF LATE ADOLESCENTS: RELATIONS TO DEPRESSION VULNERABILITY

By Helen J. Day

Dissertation Advisor: Dr. Cynthia A. Erdley

An Abstract of the Dissertation Presented
In Partial Fulfillment of the Requirements for the
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The primary aim of this study was to investigate gender differences in problem content and dyadic problem talk duration as potential contributors to previously documented depressogenic effects of co-rumination in late adolescence. Participants (*N* = 176 undergraduate students) included pairs of same-gender female (n = 37), same-gender male (n = 15), and cross-gender (n = 36) friends who completed self-report measures assessing individual depressive symptom severity, as well as within-dyad co-rumination habits and friendship quality. Dyads also participated in an observational problem talk task, which asked each dyad member to identify a current personal problem and discuss it with their friend during a 16-minute videotaped session. Each participant's identified problem was coded for inclusion of interpersonal and dependent content, and videotaped conversations were coded for the total time each dyad spent discussing problems and the total time each dyad member spent discussing their own problem (own-problem talk) and their friend's problem (friend-problem talk).

Consistent with existing depression literature, results indicated that females reported greater depressive symptom severity than males. Female dyads also reported the most co-rumination and engaged in the longest total problem talk, and both male and female participants reported engaging in more co-rumination when their dyad partner was female. However, own-

and friend-problem talk did not vary by gender, and neither co-rumination nor total, own-, or friend-problem talk duration were predictive of depressive symptoms. Although female gender did not predict problem content, and problem content was not associated with depressive symptoms, interpersonal problem content predicted increased own-problem talk.

These findings are in contrast to the overwhelming majority of research that has found co-rumination to be predictive of depressive symptoms, and provide no direct support suggesting that problem content and problem talk duration contribute to the depression gender gap. However, results do indicate that problem talk, a key component of co-rumination, is most likely to be prolonged when at least one dyad member is female, and when the problem being discussed has interpersonal content. The current results thus suggest that cumulative rather than interactive effects of gender and problem content may impact the co-rumination habits of late adolescents.

DEDICATION

To my parents, who nurtured secure attachment relationships, supplied endless social provisions, and successfully shepherded me through my own adolescence intact. I could not have done this without your unconditional love and affection, endless instrumental aid, and constant reassurance of worth.

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CHAPTER ONE

INTRODUCTION

Overview

Rates of depression have consistently been found to be twice as high in women as in men (Essau, Lewinsohn, Seeley, & Sasagawa, 2010; Hankin & Abramson, 2001; Kuehner, 2003). Interestingly, during childhood, rates of depression are typically comparable between boys and girls. However, during adolescence, rates of depression remain stable in males while increasing drastically in females. This disparity remains consistent throughout adulthood (Hankin & Abramson, 2001). Additionally, compared to males, females are found to suffer more numerous individual depressive episodes during their lifetime, and these episodes tend to be of longer duration and greater severity than those documented in males (Essau et al., 2010). Thus, females are at significantly greater risk not only for depression overall, but also for longer and more severe episodes of depression.

However, despite a wealth of research on depression, it is not yet clear why females are subject to this increased risk. It is additionally perplexing within the context of social development during adolescence, when this gender disparity emerges. Forming intimate same-gender friendships with peers during adolescence is consistently associated with positive socioemotional outcomes (Buhrmester, 1990), while failure to meet this developmental milestone predicts later loneliness and depression (Nangle, Erdley, Newman, Mason, & Carpenter, 2003; Vitaro, Boivin, & Bukowski, 2009). Because adolescent girls are more dyad-oriented than boys and are significantly more likely to develop close same-gender friendships (Rose & Rudolph, 2006), it could be expected that they would be less likely than their male peers to develop later internalizing problems. Instead, the opposite occurs.

Recent research has suggested that these apparently conflicting findings of females enjoying more intimate and supportive friendships yet also experiencing higher levels of depression may be partly explained by a form of social interaction termed *co-rumination*, defined as the excessive discussion of personal problems within a relationship. Co-rumination is proposed to encompass both the positive effects of intimate exchange and the deleterious effects of depressive rumination (Rose, 2002). That is, the intimate exchange involved in discussing personal problems leads friends to report increased intimacy and relationship quality. However, repeatedly ruminating out loud with a friend increases depressed mood, which over time leads both friends to experience more depressive symptoms. Supporting this, findings from various research groups have demonstrated that co-rumination in same-gender female friendships consistently predicts both increased intimacy and increased depressive symptoms concurrently (Tompkins, Hockett, Abraibesh, & Witt, 2011) and longitudinally (Rose, Carlson, & Waller, 2007). Interestingly, although adolescent males also co-ruminate with same-gender friends, it is often to a lesser extent and associated only with greater friendship intimacy, with no apparent effect on depressive symptoms (Calmes & Roberts, 2008). In contrast, co-rumination was recently found to be a significant factor in predicting depression contagion between friends (Schwartz-Mette & Rose, 2012), confirming its role in accounting for the greater levels of socialization of depression between female adolescent dyads.

Thus, it appears that co-rumination is involved in explaining the significant gender differences in the rate and severity of depression. However, it is unclear why co-rumination seems to operate differently in female friendships than male friendships. Importantly, available research has focused primarily on younger adolescent relationships (e.g., Hankin, Stone, & Wright, 2010; Rose, 2002). This limits the exploration of the impact of gender, since children at

this age form close friendships almost exclusively with same-gender peers, while cross-gender friendships become increasingly common during mid and late adolescence (Kuttler, La Greca, & Prinstein, 1999). One recent investigation found that while female college students reported co-ruminating in same-gender friendships more than males, both genders reported comparable rates of co-rumination with cross-gender friends (Barstead, Bouchard, & Shih, 2013). This suggests that in late adolescence, the gender of both friends may influence co-rumination. Regardless, co-rumination predicted depression symptoms only in females. It is currently not understood why comparable co-rumination rates predict increased depression symptoms for females only.

One possibility is the content of discussion. Evidence demonstrates that co-rumination about interpersonal problems, but not non-interpersonal problems, predicts subsequent increases in depressive symptoms (Bouchard & Shih, 2013; Hankin et al., 2010; Nicolai, Laney, & Mezulis, 2013). To date, however, little research has examined gender differences in co-rumination content. Thus, perhaps females discuss interpersonal content more than males when co-ruminating, leading them to be more susceptible to depression contagion. In addition, it is unknown whether gender differences exist in the amount of time spent discussing one's own problems, rather than a friend's problems, when co-ruminating. It could be that in cross-gender friendships that report co-rumination, there are gender differences in how much adolescents actively contribute to the discussion of their own problems versus those of their friend. Because existing literature has not addressed potential gender differences in how adolescents co-ruminate, these possibilities have yet to be explored.

The current study addresses these gaps in the literature using highly robust methods. Assessing co-rumination in older adolescents provides an important extension of the existing literature and enables the comparison of male and female same-gender friend dyads to cross-

gender dyads, which are both common and an important source of social support during this developmental period (Kuttler et al., 1999). A key methodological strength of this research is the assessment of co-rumination using both a well-validated questionnaire and a laboratory observation procedure in which partners are asked to discuss personal problems. Additionally, both members of each dyad completed self-report measures of friendship quality, depressive symptoms, and mood before the observation procedure. This multi-method, multi-informant approach provides a uniquely informative contribution to the literature. Results might help clarify why females are disproportionally impacted by depression, and how social processes contribute to this phenomenon.

Defining Depression

The construct "depression" generally refers to the experience of depressed mood, anhedonia, hopelessness, and urges to withdraw from one's usual activities. Beyond this broad characterization, however, defining depression has been the subject of contentious debate, and the term has been used to describe everything from depressed mood and affect, to behavioral and emotional syndromes, to a categorical psychiatric diagnosis (Compas, Ey, & Grant, 1993). One major source of disagreement is how to account for the remarkable range of variability in number and severity of depressive symptoms. The recently revised Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; American Psychiatric Association, 2013) organizes what are considered clinically relevant experiences of depression into individual diagnostic categories (e.g. Major Depressive Disorder, Dysthymia), a model that is based on the assumption that these disorders are best conceptualized as distinct taxa. These diagnostic categories set an all-or-nothing threshold for the number of defined symptoms required to meet criteria for a given disorder. However, these categories have a considerable number of

overlapping symptoms, making them difficult to differentiate from one another. In addition, many who experience depression symptoms and accompanying impairment do not meet diagnostic criteria for a defined depressive disorder.

As a result, some have argued that depression should be conceptualized as a single, continuous dimension (Klein, 2008). Results of research aimed at resolving this issue have been mixed. Several taxometric analyses have found evidence for an underlying categorical structure (Richey et al., 2009; Ruscio, Zimmerman, & Young, 2007; Solomon, Ruscio, Seeley, & Lewinsohn, 2006), while a growing number have revealed evidence supporting a dimensional structure (Baldwin & Shean, 2006; Hankin, Fraley, Lahey, & Waldman, 2005; Prisciandaro & Roberts, 2005; Slade, 2010), including in samples from non-Western countries (e.g., Guo, Chen, & Ren, 2014; Okumura, Sakamoto, & Ono, 2009). Dimensional models have also been found to have better predictive validity above and beyond categorical models (Prisciandaro & Roberts, 2009).

Epidemiological literature has added to this debate by investigating the possible impairment and outcomes associated with subthreshold depression. It is well-established that depressive disorders are associated with significant concurrent functional impairment, and increased risk of later mental illness (including depression recurrence) and psychosocial impairment (Judd, Paulus, Wells, & Rapaport, 1996; Melvin et al., 2013; Reinherz, Giaconia, Hauf, Wasserman, & Silverman, 1999). Notably, however, subsyndromal depression has also been thoroughly established as a significant risk factor for poor functional outcomes, including increased risk of major depression and substance use disorders, suicidal ideation, suicide attempts, social problems, financial strain, work impairment, poor health status, increased use of health resources, and overall quality of life (Goldney, Fisher, Dal Grande, & Taylor, 2004; Judd,

Akiskal, & Paulus, 1997; Judd et al., 1996; Lewinsohn, Solomon, Seeley, & Zeiss, 2000) at a greater rate than that seen in non-depressed samples. As a result, both major depressive disorder and subsyndromal depression pose significant public health risks and should be considered when investigating depression experiences. In the present study, which utilizes a normative sample, depression is treated as a continuous variable in order to include the full range of depression experiences.

These public health risks are particularly important when considering women's health. One of the most consistent epidemiological findings in depression literature is that throughout adolescence and adulthood, females are significantly more likely than males to experience depression symptoms and major depressive episodes at a rate of approximately 2 to 1 (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Kuehner, 2003; Piccinelli & Wilkinson, 1999), a finding that has been replicated across cultures (Kessler & Bromet, 2013; Weissman et al., 1996). Among those with major depressive disorder, women are also more likely than men to experience longer, more numerous, and more severe episodes (Essau et al., 2010). Understanding the mechanisms of depression onset and maintenance is thus highly relevant to women's health.

Importantly, this gender disparity is consistently found to emerge during mid- to late adolescence (Essau, Conrandt, & Petermann, 2000; Hankin et al., 1998; Hankin & Abramson, 2001). Prior to this period, rates of depression are comparable between boys and girls (Essau et al., 2000). For this reason, adolescence is a critical period for depression research, and in particular depression in women. While the depression gender gap continues across the lifespan, focusing on the adolescent years could help to elucidate why women are twice as susceptible to this disease and its impairing outcomes as men.

Adolescence

Adolescence is a period of dramatic biological, cognitive, and social development, during which individuals lay the groundwork for their adult identities. The extent of these changes has made it a primary focus of researchers attempting to clarify the traits and mechanisms of typical and maladaptive development. Culturally, adolescence is a relatively new concept: prior to the 20th century, it was generally believed that children transitioned directly to adulthood, an attitude that was in line with the stark contrast between "childhood" and "adulthood" societal roles at the time. It was not until G. Stanley Hall in 1904 introduced the idea of a prolonged transition period from "child-like" to "adult-like" characteristics that the idea of adolescence took hold (Cravens, 2006).

Despite the volume of research targeting this developmental stage that has been produced since, there remains substantial debate over how adolescence should be defined. The biological, cognitive, and social transitions from childhood to adulthood are gradual and highly variable both within and between cultures, and as a result, it has been difficult to arrive at a professional consensus regarding the age range encompassed by adolescence (Spear, 2010). Many consider adolescence to encompass the second decade of life (Petersen, Silbereisen, & Sorensen, 1996), while others argue that late adolescence continues up until age 25 (Baumrind, 1987). More recently, Arnett (2000) has proposed a separate transitional phase termed "emerging adulthood." This stage is proposed to encompass approximately the ages 18 to 25, during which most individuals are no longer entirely dependent upon their parents, but have also not completely adopted the responsibilities of true adulthood. As a result, Arnett argues, emerging adults are provided with a unique amount of freedom with which to explore their identity.

In support of emerging adulthood as a unique phase are several cultural shifts that have taken place within the last half of the 20th century and beyond. For example, the number of students enrolling in post-secondary education has increased significantly, and with it the number of individuals delaying their entry to the workforce. The average age of first marriage also continues to increase for both males and females, as does the percentage of individuals in their late teens and early 20s who continue to live with their parents (Arnett, 2000). However, some have argued that defining emerging adulthood entirely by social trends does not qualify as a developmental stage (Spear, 2010).

The present study focuses on the experiences of college undergraduate students that might contribute to gender differences in depression. Within this population, development in certain areas associated with adolescence (e.g., executive function skills, cross-gender friendships, autonomy from parents, initial onset of psychopathology) are still very much ongoing. As a result, the current study will use the term "late adolescence" to refer to the ages most typical of college students, i.e. approximately 18 to 22 years. In order to simplify references to preteen and teenage phases of adolescent development, the terms "early adolescence" and "mid adolescence" will be used to refer to approximate age ranges 10 to 13 years and 14 to 17 years, respectively. These designations are in line with those used by Furman and Buhrmester (1992) when assessing the full range of adolescent development.

Crucially for the present study, adolescence is the developmental period with the highest rates of onset of psychological disorders (Spear, 2010). The typical onset range of many various forms of psychopathology spans the entire range of adolescence (Powers & Casey, 2015): many anxiety disorders tend to onset in early adolescence around age 11 to 13 years, while substance use disorders reach their peak onset in late adolescence (Kessler et al., 2005). Although the

greatest risk for first-onset of depression occurs during adulthood, the rate of depression onset increases dramatically during mid and late adolescence, from approximately from ages 15 to 24 years (Lewinsohn, Duncan, Stanton, & Hautzinger, 1986). Importantly, it is during this period that the rate of depression in females first begins to outstrip that of males (Hankin & Abramson, 2001). As a result, focusing attention on the adolescent period can provide unique insight into how and why depression emerges, and in particular why it emerges so much more frequently in females than in males. The following is an overview of the major biological, cognitive, and social changes occurring during adolescence that may contribute to making it a particularly sensitive period for the onset of depression.

Biological Changes

Puberty is a biological process typically spanning around 5 to 6 years (Archibald, Graber, & Brooks-Gunn, 2003). During this period of development, both males and females experience drastic physical changes, including significant skeletal growth, increases in and redistribution of body fat and muscle, alterations of hormonal and endocrine systems, and the maturation of secondary sexual characteristics and reproductive organs (Marshall & Tanner, 1986). The onset and cessation of puberty is typically earlier in girls than in boys, and within both genders there is significant normative variation in the timing and duration of pubertal changes. Girls typically experience a growth spurt and breast budding between the ages of 8 to 13 years, with average menarche at age 13. In boys, testicular growth onsets around age 9 to 11 years, while peak rate of skeletal growth and voice changes typically occur between ages 13 to 15; initial facial hair growth continues well into late adolescence (Archibald et al., 2003). In recent years, researchers have documented a trend toward even earlier pubertal onset in girls, but not boys; for example,

average age of menarche decreased by approximately a full year over the 20th century (Mcdowell, Brody, & Hughes, 2007).

Several aspects of these physical changes arguably contribute to a sensitive period for the onset of depressed mood in adolescence, especially in girls. In one direct pathway, the changes in hormone levels occurring in puberty have been associated with increases in depressed affect in adolescent girls (Angold, Costello, Erkanli, & Worthman, 1999; Brooks-Gunn & Warren, 1989). Additionally, how adolescents feel about these physical changes can impact their mood. Adolescent boys tend to report viewing their increased height and muscle mass obtained during puberty positively, possibly because these changes tend to bring their physique more in line with the Western male physical ideal. In contrast, girls frequently report negative reactions to their increased height and body fat, with the latter corresponding with reporting a desire to be thinner, and in some cases, the development of eating disorders (Archibald et al., 2003; Graber, Brooks-Gunn, Paikoff, & Warren, 1994). Girls also tend to report experiencing teasing and bullying from peers following the onset of secondary sex characteristics (Brooks-Gunn, Newman, Holderness, & Warren, 1994). Peers' response to boys' development of secondary sex characteristics has not been studied as extensively, but boys may be less susceptible to peer victimization because the development of their secondary sex characteristics is less visible to others (Archibald et al., 2003). Extreme variability in timing of pubertal development can also impact psychosocial adjustment. Early onset of pubertal maturation in girls has been identified as a risk factor for serious mental illness across the lifespan, including depression, substance abuse, suicidality, and conduct disorder, and late pubertal onset in girls is associated with depression (Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997). In boys, late maturation compared to peers is a risk

factor for school problems and internalizing symptoms (Caspi & Moffitt, 1991; Graber et al., 1994, 1997).

Although many of the changes discussed above are completed before adolescents reach the typical age of college attendance, normative biological changes resulting from puberty can have a significant impact on mood into late adolescence and beyond, particularly in women. For many post-pubertal females, the luteal phase of the menstrual cycle is associated with a variety of distressing symptoms, including depressed mood, mood lability, headaches, and fatigue. Typically referred to as premenstrual syndrome (PMS), this constellation of symptoms affects approximately 85% of menstruating females (Dickerson, Mazyck, & Hunter, 2003). An extreme form of this syndrome termed Premenstrual Dysphoric Disorder (PMDD) was added to the DSM-5 (American Psychiatric Association, 2013), and includes symptoms that overlap with Major Depressive Disorder and Dysthymia (e.g., depressed mood, difficulty concentrating, feelings of hopelessness, hypersomnia or insomnia). There is also evidence that a majority of women with depression may experience a premenstrual exacerbation of depressive symptoms, a phenomenon that is associated with increased duration of depressive episodes (Kornstein et al., 2005). Females in late adolescence are therefore still susceptible to depression symptoms as a result of pubertal changes.

Cognitive Changes

Adolescent development is characterized by trends toward increased self-direction and self-regulation (Steinberg, 2005). A complete accounting of the neurological mechanisms underlying this change is beyond the scope of this paper; in brief, adolescent neurological development is a period of increased myelination of nerve axons, allowing for faster communication between, and thus increased integration of, various brain regions.

Simultaneously, selected areas of the brain undergo synaptic pruning, limiting unnecessary or underused neural connections and increasing overall cognitive efficiency (Spear, 2010). As a result of these changes, both males and females develop improved executive functioning skills (e.g., deductive reasoning, information processing, planning, and abstract thought) across the adolescent period. These improvements are accompanied by parallel demands in the academic setting: adolescence encompasses the transitions to middle school, high school, and college, where students are increasingly expected to develop independence in time management, organization, and self-directed work. Importantly, although most literature on adolescent cognitive development has focused on the pre-teen and teenage years, cortical maturation has consistently been shown to continue throughout the typical college years. For example, certain aspects of executive functioning have been found to not reach maturity until ages 19 to 21 years (Chiron et al., 1992; Gogtay et al., 2004; Luna, Garver, Urban, Lazar, & Sweeney, 2004). Thus, cognitive development may continue to impact adolescent functioning among college students.

Adolescents also typically demonstrate concurrent deficits in psychosocial cognitive abilities during this same period. In response to hormonal changes associated with puberty, which interact with the limbic and paralimbic brain regions, adolescents become highly sensitive to social and emotional stimuli. They are increasingly motivated by immediate rewards, particularly social rewards (Peper & Dahl, 2013). Because of this, adolescents show deficits in impulse control, delay of gratification, and emotion regulation. They also experience increases in susceptibility to peer influence and risk-taking behavior, despite performing similarly to adults on measures of logical reasoning (Steinberg, 2005, 2007). Changes in social cognition also co-occur: in one longitudinal study following adolescents from age 13 to 18, both males and females showed overall increases in perspective taking across adolescence, although males' development

was delayed compared to females'. However, while females demonstrated stable levels of empathetic concern, males' empathetic concern temporarily decreased in early adolescence, before slowly increasing in later adolescence (Van der Graaff & Branje, 2014).

The extent of the cognitive upheaval taking place during normative adolescence also creates many opportunities for maladaptive changes to occur. Steinberg (2007) has suggested that adolescence may be a sensitive period for both normative and maladaptive patterns of development, creating the potential for disruptions in normal maturation to lead to poor outcomes later on. Additionally, even normative cognitive development may place adolescents at increased risk: the psychosocial patterns reviewed here correspond with findings that adolescents are more susceptible to stressful life events and are particularly sensitive to social stressors. This may lead them to feel negative moods in response to stress more acutely, or respond to stress in ways that unintentionally serve to exacerbate their distress, potentially placing them at greater risk for the development of mood disorders. Indeed, evidence suggests that adolescents are more emotionally labile compared to both children and adults, possibly because neurological regions associated with emotion regulation skills undergo significant structural and functional changes during this period (Ahmed, Bittencourt-Hewitt, & Sebastian, 2015; Powers & Casey, 2015). Increased sensitivity to stress and immature emotion regulation abilities may partially account for why adolescence is a sensitive period for the onset of psychopathology in general and depression in particular.

Social Changes

Given the increased cognitive sensitivity to social reward typically seen in adolescents, it is unsurprising that the social landscape of adolescence undergoes dramatic changes. Although parents are usually the primary source of social support and intimacy during childhood, same-

gender friends become a source of these social provisions beginning in pre-adolescence, and typically surpass parents as the primary source of support by mid to late adolescence (Furman & Buhrmester, 1992). At the same time that adolescents are developing increasingly intimate dyadic friendships, conflict between adolescents and the parents increases (McGue, Elkins, Walden, & Iacono, 2005). Cross-gender friendships and romantic relationships also begin to appear during adolescence, and are reported as a significant source of intimacy and support by late adolescence (Furman & Buhrmester, 1992). In late adolescence, those who attend college must simultaneously maintain close friendships from high school and build new friendships on campus (Oswald & Clark, 2003; Swenson, Nordstrom, & Hiester, 2008). Thus, over the course of this period the adolescent social landscape becomes increasingly broad, diverse, and self-managed.

Navigating this rapidly changing social landscape is a complex task, and a wealth of research indicates that the relative success or failure to do so is closely associated with socioemotional outcomes throughout adolescence and into adulthood. For example, rejection by one's peer group is consistently associated with poor outcomes, and not having friends increases one's risk of loneliness and depression (Buhrmester, 1990; Nangle et al., 2003; Pedersen, Vitaro, Barker, & Borge, 2007). Timing of social development is also important: forming romantic relationships in early adolescence before it may be developmentally appropriate can predict poor emotional and behavioral outcomes (Brendgen, Vitaro, Doyle, Markiewicz, & Bukowski, 2002). The broader social networks typically developed during this period also create more opportunities for experiencing interpersonal stress, and these stressful life events can increase the risk of the onset of depression (Kendler, Karkowski, & Prescott, 1999; Monroe, Rohde, Seeley, & Lewinsohn, 1999). For example, during the transition to college, friendships made in high

school often decrease in their contribution of key social provisions such as relationship satisfaction and rewards (Oswald & Clark, 2003). Failing to form new, high quality college friendships can impair the success of adolescents' adjustment to college, both socially and academically (Buote et al., 2007). Thus, normative adolescent social development provides simultaneous increases in sources of support and increased opportunity for social stress. The unique role of friendship as a source of both support and stress will be reviewed at length in a later section.

Etiology of the Depression Gender Gap

Numerous factors have been proposed to account for the gender gap in depression prevalence, typically focused on adolescence, the period when this disparity emerges. Crucially, no single factor is able to account for this disparity on its own. Etiological models of depression postulate that initial episodes emerge due to the combination of biological, psychological, and social factors (Hankin & Abramson, 2001; Hyde, Mezulis, & Abramson, 2008). Most likely, the enhanced risk seen in females is the result of the compounding of numerous gender differences within each of these three domains.

Biological Vulnerability Models

Genetics. There is well-established support for a hereditary component of depression risk. In results from twin studies, depression is consistently found to be moderately heritable (Kendler, Gatz, Gardner, & Pedersen, 2006; Sullivan, Neale, & Kendler, 2000). Additionally, there is some evidence that heritability plays a larger role in adolescent and adult depression than in child depression (Franic, Middledorp, Dolan, Ligthart, & Boomsma, 2010), suggesting an increased role of genetic risk coinciding with the developmental period during which the gender gap in depression emerges. In support of the hypothesis that heritability plays a role in the

emergence of this gender gap, results of a large longitudinal twin study demonstrated significantly higher heritability of depression in women compared to men (Kendler et al., 2006). However, this finding has not been consistently replicated, and a more recent review reported that overall gender differences in heritability of depression are small to negligible (Franic et al., 2010). Results investigating potential genetic markers of depression have been similarly mixed (for a review, see Lacerda-Pinheiro et al., 2014). Thus, overall findings for a gender-specific genetic risk for depression remain to be clarified.

Hormones and pubertal changes. The gender gap in depression emerges around the time when most adolescents are undergoing puberty, a process during which both boys and girls experience significant but distinct hormonal changes. For this reason, many have proposed that hormonal fluctuations may play a role in the rise in female rates of depression at this age. Most studies investigating potential links between hormone levels and depression in adolescents have focused specifically on the two sex steroid hormones testosterone and estradiol (a form of estrogen). Levels of these hormones differ between males and females: both males and females experience an increase in estradiol during puberty, which then decreases in late puberty in males but remains periodically elevated in females in accordance with their menstrual cycle. Males also experience a significant rise in testosterone, while females experience only a slight elevation (DeRose, Wright, & Brooks-Gunn, 2006). Pubertal status (defined via Tanner stage) has been found to predict the emergence of the gender gap in depression prevalence better than age alone, supporting the hypothesis that pubertal hormone fluctuation may be involved (Angold, Costello, & Worthman, 1998). Follow-up analyses demonstrated that specific levels of testosterone and estradiol accounted for this effect, above and beyond Tanner stage (Angold et al., 1999). However, replications have produced mixed results, and effect sizes of the influence specific to

hormone levels have been small and often overshadowed by the effects of social factors (DeRose et al., 2006).

Indeed, some researchers have proposed that the effect of pubertal changes on depression onset in females is indirect, via the social outcomes associated with puberty's physical development. For example, pubertal timing has been shown to have a negative effect on girls, with early onset of puberty compared to their peers being associated with a higher risk of internalizing problems (Ge, Conger, & Elder, 1996), potentially because earlier development of breasts and hips may increase the risk of experiencing sexual harassment or bullying (Hyde et al., 2008). Others have proposed a pathway to depressed mood via body dissatisfaction, because the curvier and heavier physical development that results from puberty is at odds with the thin Western beauty ideal for women. In support of this, females tend to report greater dislike of the physical changes associated with puberty compared to their male peers (Siegel, Yancey, Aneshensel, & Schuler, 1999), and body dissatisfaction in turn has been linked with increases in depressive symptoms (Allgood-Merten, Lewinsohn, & Hops, 1990). More research is needed to integrate these findings and test specific pathways from pubertal changes to depression; however, research thus far suggests that the hormonal and physical changes of puberty alone are insufficient to account for the drastic increase of depressive symptoms in adolescent girls. Instead, it seems most likely that these changes may pose a risk factor when interacting with social experiences.

Environmental Vulnerability Models

Negative life events are a well-established risk factor for depressive symptoms and the onset of depressive episodes, in both adulthood and adolescence (Grant et al., 2003; Kendler et al., 1999). Adolescence is a period of increased stress, and this elevated stress has been proposed

to play a role in the rise in rates of depression seen during this developmental stage. Many studies assessing negative events by gender find that females report more negative life events than males, beginning after the onset of puberty (Rudolph & Hammen, 1999). Thus, it may be that increased exposure to negative life events, beginning in adolescence, is a factor in promoting the gender gap in depression.

Interpersonal stress. A large cannon of research indicates that girls and women experience more interpersonal stress events than boys and men, and that this difference is associated with increased rates of depression. Beginning after the onset of puberty, adolescent girls are especially likely to report negative dependent interpersonal events.(Ge, Lorenz, Conger, Elder, & Simons, 1994; Rudolph & Hammen, 1999; Shih, Eberhart, Hammen, & Brennan, 2006). This increased rate of dependent interpersonal events is strongly associated with concurrent depression (Rudolph & Hammen, 1999; Windle, 1992), and has been found to mediate the gender gap in depression (Davies & Windle, 1997). In a longitudinal diary study, peer-related stressors partially accounted for adolescent girls' greater depressive symptoms (Hankin, Mermelstein, & Roesch, 2007). Some have argued that this difference is due to females' greater interpersonal orientation: females tend to have larger social networks than males beginning around adolescence, and thus have greater opportunities for interpersonal stress (Kessler & Mcleod, 1984). Additionally, evidence indicates that when females experience interpersonal stress, they are more likely than males to react to this stress more strongly or with depressogenic responses (Christakos, 2004; Rudolph & Hammen, 1999), possibly because females are more likely to see interpersonal relationships as central to their self-concept (Feingold, 1994).

Trauma and abuse. Childhood maltreatment and abuse is a well-established risk factor of both childhood- and adult-onset depression. Males and females are equally likely to have experienced physical abuse and neglect during childhood, and reviews of the impact of general childhood adversity have not found childhood abuse overall to contribute to adolescent and adult gender differences in depression (e.g., Kessler, Davis, & Kendler, 1997). However, epidemiological studies have consistently found that childhood sexual abuse disproportionately affects females (Cutler & Nolen-Hoeksema, 1991; Jaffee et al., 2002; Whiffen & Clark, 1997). This difference has been implicated in contributing to the gender differences in depression emerging in adolescence. For example, Cutler and Nolen-Hoeksema (1991) found that 35% of the gender difference in depression rates could be accounted for by females' higher rate of childhood sexual abuse. A history of childhood sexual abuse has also been found to fully mediate the association between gender and depression (Whiffen & Clark, 1997). In adulthood, women are more likely to report being victims of interpersonal violence, including sexual assault and rape, a trend that has been shown to partially account for gender differences in rates of adult depression (Dunn, Gilman, Willett, Slopen, & Molnar, 2012). Thus, an increased risk for traumatic events likely places women at greater risk for the onset of an initial depressive episode.

Cognitive Vulnerability Models

Attribution style. Abramson and colleagues' hopelessness theory of depression proposes that the attributions one makes regarding experiences can confer depression risk (Abramson, Metalsky, & Alloy, 1989). Specifically, individuals with a negative attribution cognitive style (also called hopelessness attribution style) tend to make negative assumptions regarding the causality of life events, characteristics of the self, and consequences of their actions, which places them at an increased risk of developing depression. Numerous studies have demonstrated

the ability of this attribution style to predict subsequent increases in depressive symptoms in both adults and adolescents, particularly when used in response to stressful events (for reviews, see Hankin & Abramson, 2001; Hyde et al., 2008). Hankin and Abramson (2001) report mixed evidence for gender differences in attribution style, but argue that support for higher rates of negative attribution style in females have been found when care is taken to use a measure of attribution style with high internal reliability. Furthermore, negative attribution style has been shown to mediate gender differences in depression (Hankin & Abramson, 2002). Thus, there is some evidence suggesting that negative attribution style may be a particularly salient mechanism for the development of depression in females.

Rumination. Nolen-Hoeksema's seminal response style theory (Nolen-Hoeksema, 1991) posited that the way depressed individuals respond to their depressed mood can prolong the duration of their mood, creating a depressive cycle. In particular, she proposed rumination as a key mechanism in this process. Rumination refers to repetitively and passively focusing on depressed mood and other depressive symptoms, and speculating about potential causes and consequences of those symptoms. Engaging in rumination in response to depressed mood, Nolen-Hoeksema proposed, would exacerbate dysphoria and lead to the onset and maintenance of major depressive episodes. She further predicted that women would be more susceptible to using rumination as a response style, and that this susceptibility would partially account for women's higher rates of depression compared to men.

This theory has been largely borne out in the literature from subsequent decades. Rumination has emerged as a significant predictor of the onset of depressed mood and major depressive disorder (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Nolen-Hoeksema, 2000). Additionally, rumination has been shown to be a relatively stable trait, meaning that those who

use rumination as a response style are likely to do so consistently (Nolen-Hoeksema, Morrow, & Fredrickson, 1994). Rumination also demonstrably contributes to the depression gender gap: Females are consistently and significantly more likely to report ruminating in response to depressed mood, and rumination is a significant mediator of the association between gender and depression, both in adolescence (Hilt, McLaughlin, & Nolen-Hoeksema, 2010; Jose & Brown, 2007) and adulthood (Nolen-Hoeksema, Larson, & Grayson, 1999). However, while some studies have found rumination to be predictive of longer, more severe depressive episodes in women (e.g., Nolen-Hoeksema et al., 1994), the association between rumination and episode duration has not been consistent (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008 for a review). In response, Hilt and Nolen-Hoeksema (2014) suggested that rumination may contribute to the higher incidence rate of depression in women by making it more likely females will transition from depressed mood to a clinically significant depressive disorder. That is, because females are more likely than males to ruminate in response to depressed mood, more women than men may experience an initial onset of a depressive episode; however, among those who experience this initial onset, rumination does not directly contribute to episode duration (although it may do so indirectly; Nolen-Hoeksema et al., 2008 for a review).

Social Risk Factors

Interpersonal theory of depression. Coyne's (1976) interpersonal theory of depression posits that individuals with depressed mood interact with others in ways that increase their likelihood of being rejected by others. Specifically, Coyne suggested that an individual who experiences feelings of worthlessness will reach out to others for reassurance that he or she is valued. However, because these feelings of worthlessness prevent the individual from believing words of kindness from a friend or loved one are truly sincere, he or she continues to attempt to

elicit reassurance. Eventually, this repeated reassurance-seeking behavior can become frustrating to the loved one, who may begin to withdraw from the relationship, thus confirming the depressed individual's sense of worthlessness and further exacerbating his or her depressive symptoms. This behavior has been termed *excessive reassurance seeking* by subsequent researchers, and has consistently been linked with rejection experiences in depressed individuals. For example, individuals who engage in excessive reassurance seeking are more likely than others to be negatively evaluated by a same-gender roommate (Joiner, Alfano, & Metalsky, 1992), be rejected by a same-gender roommate (Joiner & Metalsky, 1995), experience interpersonal rejection (Joiner, 1999), and even be negatively evaluated by a dating partner (Katz & Beach, 1997) or spouse (Benazon & Coyne, 2000). Excessive reassurance seeking has also been shown to predict depressive symptoms in college students, through its association with stressful social events (Potthoff, Holahan, & Joiner, 1995), and has emerged as a specific risk factor for depression within an adolescent clinical inpatient sample (Joiner, Metalsky, Gencoz, & Gencoz, 2001). Potential gender differences in excessive reassurance seeking have been minimally investigated; however, some initial findings indicate that excessive reassurance seeking may uniquely predict increases in girls' depressive symptoms (but not boys') via its association with negative social experiences (Prinstein, Borelli, Cheah, Simon, & Aikins, 2005).

Research has since extended Coyne's (1976) original theory to include another mechanism linking depressed mood and interpersonal rejection termed *negative feedback seeking*. Coined by Swann and colleagues (Swann, Wenzlaff, Krull, & Pelham, 1992), it describes a tendency of individuals with depression to prefer the company of individuals who think poorly of them, in order to receive interpersonal feedback that matches their poor self-perception. In line with this theory, depressed students reported preferring friends and dating

partners who evaluated them negatively, and were significantly more likely than non-depressed students to actively seek negative feedback from these people and, consequently, more likely to be rejected (Swann et al., 1992). This process has since been shown to be a consistent predictor of depressive symptoms (Borelli & Prinstein, 2006; Joiner & Metalsky, 1995; Pettit & Joiner, 2001). As with excessive reassurance seeking, most research has neglected the question of whether this process accounts for gender differences in depression onset. However, in a longitudinal analysis with adolescents in grades 6 to 8, Borelli and Prinstein (2006) reported that although negative feedback seeking occurred at similar rates in both boys and girls, it was a particularly strong predictor of depression in girls. Thus, initial findings from Prinstein and colleagues suggest that excessive reassurance seeking and negative feedback seeking may each play a role in the adolescent onset of gender differences in depression; however, further replication is needed.

More recently, Rose (2002) has proposed a construct that combines the cognitive elements of Nolen-Hoeksema's response style theory with Coyne's interpersonal theory of depression. Termed *co-rumination*, this construct refers to the excessive discussion of personal problems within a close, dyadic relationship. Like rumination, it is associated with increased depression over time, and like negative feedback seeking and excessive reassurance seeking, co-rumination is a social response thought to be performed when feeling distress. However, co-rumination is unique in requiring the active participation of another person: if the excessive problem talk of one person is not responded to with engagement and encouragement, it will likely not continue (Rose et al., 2014). Because both members of a dyad are participating in co-rumination, both may experience subsequent increases in depression symptoms, a process

referred to as *depression contagion.* Co-rumination and its role in depression contagion between friend dyads will be discussed in greater detail in a later section.

Stress Generation Model. In her research on stress generation in depressed women, Hammen (1991) took interpersonal theories of depression a step further by suggesting that depressed individuals contributed directly to their own depressive symptoms. Specifically, Hammen's stress generation model posits that depressed individuals are more likely than others to act in ways that directly create stressful interpersonal situations in their lives, which in turn produce stress and exacerbate their own symptoms. Hammen (1991) followed women with unipolar depression over the course of one year to investigate the number and quality of "interpersonal stress events" they experienced, compared to women with bipolar disorder and control groups. Findings revealed that women diagnosed with unipolar depression not only experienced significantly more interpersonal event stress than all other groups, but also tended to report more dependent events (i.e., events to which they contributed) than others. Thus, Hammen reasoned, the depressed women in her sample were not simply unlucky, but actually contributed to the number of stressful interpersonal events that they experienced, which in turn likely further exacerbated their depressed state. This pathway from depression to self-generation of interpersonal stress has since been replicated in both adult and adolescent samples (see Hammen, 2006 for a review).

Although most studies have neglected to compare results based on gender, some preliminary evidence suggests that interpersonal stress generation effects may be more salient for females than for males. As previously described, females consistently report experiencing more dependent, interpersonal events than males, and these events are linked with increases in depressive symptoms (Rudolph & Hammen, 1999). Longitudinal work by Rudolph and

colleagues has lent support for a gender-specific transactional interpersonal life stress model: in a sample of children and adolescents, depressive symptoms predicted interpersonal stress, which subsequently predicted increases in depressive symptoms in girls, but not boys (Rudolph et al., 2000; Rudolph, Flynn, Abaied, Groot, & Thompson, 2009). Furthermore, this generation of interpersonal stress partially accounted for girls' continuity in depressive symptoms over time. These findings have been replicated in another large sample of adolescents (Calvete, Orue, & Hankin, 2013). In married adults, interpersonal stress generation effects on depression were found in wives, but not husbands (Davila, Bradbury, Cohan, & Tochluk, 1997). Some evidence suggests that interpersonal stress generation may function as a mediator of the association between sociotropy (high investment in interpersonal relationships) and depression in women (Barstead et al., 2013; Shih, 2006). However, other researchers have not found gender differences in interpersonal stress generation effects (see Liu & Alloy, 2010 for a review).

Integrated models. Hankin and Abramson (2001) proposed a cognitive vulnerability-transactional model that integrated many of these risk factors in an attempt to account for the emergence and maintenance of depression, particularly in women. Their model posits that preexisting vulnerabilities (such as genetics and environmental adversity) interact with the experience of negative life events, leading to an initial negative affect. This negative affect is a normative response to stressful events; however, in the presence of cognitive vulnerabilities such as rumination, it is more likely to lead to an onset of depression. This depression in turn increases the likelihood of negative life events occurring, by influencing the way individuals interact with others, resulting in a cycle that will exacerbate and maintain depression as long as it is in motion. The authors argue that because women are more susceptible to specific vulnerabilities at several points in this model, such as the occurrence of negative life events,

rumination, and childhood sexual abuse, this cycle is more likely to occur in females than males. Initial tests of this model using a cross-lagged design and a large sample (n=1,187) of adolescents provided preliminary support for transactional, bidirectional effects between initial depressive symptoms, cognitive vulnerabilities, and stress generation (Calvete et al., 2013).

Hyde, Mezulis, and Abramson (2008) extended Hankin and Abramson's model beyond interpersonal stress generation to propose the most comprehensive integrated model of depression etiology and maintenance to date. Hyde and colleagues argued that rather than simply additive in effect, risk factors have interactive and transactional effects across development. They proposed that risk factors in affective, biological and cognitive domains interact not only with stressful life events, but also with each other. For example, early pubertal timing can contribute to negative life events (e.g., bullying), which can then trigger depressed mood and a ruminative response style. Importantly, this model also proposes a mechanism for the extent and timing of gender differences in depression. The authors suggest that gender differences in affective, biological and cognitive vulnerability factors at various points in development interact with additional gender differences in negative life events. Because many of these vulnerabilities and life events peak during or coincide with adolescence, significant gender differences in depression also emerge around this time. Much of the research on which this model is based is cross-sectional or narrow in scope, and as such the statistical viability of Hyde et al.'s (2008) model remains to be tested. Nevertheless, this model provides the most comprehensive accounting of the differential additive and interactive effects of depressive risk factors by gender.

Friendship

It is clear from the literature reviewed thus far that social interactions play an important role in the onset and maintenance of depression. Stressful social events can precipitate the onset

of an initial depressive episode, and the ways in which one interacts with others when depressed can serve to exacerbate his or her own depressive symptoms. It is also clear that peer friendships are the defining social relationships of adolescence, with adolescents increasingly using friends more than parents as a source of social support (Buhrmester & Furman, 1987). Adolescents spend a greater amount of time with friends, and the friendships they do form become increasingly intimate with age (Berndt, 1982). Because of this centrality, understanding adolescent depression requires an understanding of the context of adolescent friendship. This section will provide a brief overview of the features and functions of friendship during adolescence, as well as discuss what is known about the role of friends and friendship features in the onset and maintenance of depression during this developmental period.

Features and Functions of Friendship

Friendship refers to a close, reciprocated, dyadic relationship (Hartup, 1996). An influential meta-analysis by Newcomb and Bagwell (1995) identified many important defining features of friendship. Compared to non-friends, friends interact with each other more often, and these interactions tend to involve more positive engagement (e.g., laughing, talking, smiling, and cooperating). Although friends experience conflict approximately as often as non-friends, they are more likely to engage in effective conflict resolution than non-friends, with a greater use of negotiation rather than power assertions. As a result, the outcomes of conflict resolution between friends tend to be more equitable, which likely contributes to the maintenance of the friendship over time. Finally, friends tend to be similar to each other across various domains, via the effects of both selection and socialization. Individuals tend to select friends who are demographically (e.g., ethnicity, age, gender) and behaviorally (e.g., activity preferences, attitudes toward school, delinquency) similar to themselves (Berndt, 1982; Boivin & Vitaro, 1995; Dishion, Andrews, &

Crosby, 1995). Friends also tend to become more similar to each other over time (Berndt, 1982; Dishion, Spracklen, Andrews, & Patterson, 1996; Giletta et al., 2011).

The importance of peer friendships, particularly during adolescence, can be illustrated by the extent to which they meet certain social provisions during this developmental period. Sullivan (1953) provided the first formal theory of the functions served by close social relationships across development. According to his model, certain specific interpersonal needs emerge at different points across development, and different social relationships are best suited to meet these needs at various times. For example, the need for companionship arises during childhood, and is initially met by parents. However, parents are later supplanted by same-gender peers as the primary source of companionship across late childhood and early adolescence (Buhrmester & Furman, 1987). Peers also meet the need for acceptance, which arises in late childhood (Sullivan, 1953). The need for intimacy emerges in preadolescence and increases into adolescence (Buhrmester, 1990; Buhrmester & Furman, 1987), and the level of reported intimacy of same-gender friendships increases tremendously over this same time period (Berndt, 1982). Although most friendship literature has focused on children and early to mid-adolescents, friends play an increasingly important role throughout late adolescence as well. During this developmental period, many adolescents move out of their parents' home and develop increased independence in their social lives. Although parents typically continue to be central attachment figures (Fraley & Davis, 1997), peers serve as the primary source of key social provisions, such as companionship and intimacy (Carbery & Buhrmester, 1998). In addition, while same-gender close friendships continue to be most common, by late adolescence many identify platonic cross-gender friends as their primary sources of companionship and intimacy: In a survey of college students, Barstead and colleagues reported that approximately 23% of male participants

identified a female friend as their closest confidant, while approximately 10% of females' closest confidant was male (Barstead et al., 2013). Furthermore, by mid-adolescence, many males report receiving certain social provisions (e.g., esteem support) from their female friends significantly more than their male friends (Kuttler et al., 1999). Overall, friends tend to be perceived as the most frequent providers of social support by mid-adolescence, and remain so along with romantic partners and mothers into late adolescence (Furman & Buhrmester, 1992).

Adolescent friendships vary greatly in the extent to which they meet these and other key provisions, leading to important differences in the quality of dyadic peer relationships. The assessment of friendship quality involves determining how much a relationship consists of both positive and negative social features, processes, or provisions (Berndt, 2002). For example, along with companionship, affection, and intimacy, friends may provide a reliable alliance (i.e., being consistently loyal or available), or enhancement of worth (i.e., affirmations of one's competence or value). Friends can also provide tangible support, in the form of instrumental aid (i.e., helping to complete a specific task or solve a problem). In addition, even high quality friendships can include negative features such as conflict and criticism. As a result, assessing both negative interaction features in addition to support provisions is necessary for achieving a complete picture of a relationship. One frequently cited example that accomplishes this is Furman and Buhrmester's (1985) Network of Relationships Inventory (NRI), a self-report measure that assesses seven support provisions, two negative interaction features, and relative power between the two members of a dyad. This measure has been used to assess relationship quality of individuals across the entire span of adolescence (Furman & Buhrmester, 1992), as well as for different types of primary support relationships (e.g., parents, friends, romantic partners; Furman

& Buhrmester, 1985), allowing for the assessment of changes in the typical primary sources of these provisions across developmental periods.

Assessment of friendship quality in same-gender friendships has revealed some significant and consistent gender differences across adolescence. For example, females tend to develop intimate same-gender friendships earlier than males, and report significantly greater intimacy in their same-gender friendships across adolescence (Berndt, 1982; Brendgen, Markiewicz, Doyle, & Bukowski, 2001; Buhrmester & Furman, 1987). Females also tend to rate their same-gender friendships as significantly more supportive than males do (Furman & Buhrmester, 1992). In an assessment of both positive and negative friendship features, Brendgen and colleagues (2001) reported that same-gender female friendships were characterized by higher levels of many positive aspects of friendship, including intimacy, harmonious interactions, and overall quality, as well as fewer negative aspects. These gender differences are apparent not only in adolescents' self-report of friendship quality, but in their interactions with friends as well: Brendgen and colleagues observed that girls displayed more positive behaviors (e.g., positive affect, responsiveness) and fewer negative behaviors (e.g., criticism, conflict) than boys when interacting with friends, which led them to propose that female adolescent friendships may be of higher quality because their interactions are more harmonious (Brendgen et al., 2001).

Cross-gender Friendships

The overwhelming majority of friendship literature addresses exclusively same-gender friendships. This gap is due in large part to the well-established finding that children begin to self-segregate by gender as early as the age of 4, and have a near-exclusive preference for same-gender peers throughout childhood (Maccoby, 1990). Indeed, those who form cross-gender friendships at a young age compared to their peers may be at risk for negative developmental

outcomes such as substance abuse and conduct problems (Arndorfer & Stormshak, 2008; Molloy, Gest, Feinberg, & Osgood, 2014). During adolescence, however, cross-gender friendships start to become a normative component of peer social networks. A longitudinal design following 6th grade students through 10th grade found that significant increases in the proportion of cross-gender peers in one's social network each year was the norm, not the exception (Poulin & Pedersen, 2007). This trend has been noted consistently in both longitudinal and cross-gender designs (Arndorfer & Stormshak, 2008; Feiring, 1999; Kuttler et al., 1999). By late adolescence, cross-gender friendships are the norm: Among 12th graders, the proportion of adolescents reporting at least one close cross-gender friend is 47% (Kuttler et al., 1999). In a sample of college students, 93% report having at least one close cross-gender friend (Horner, 1995), while another college-aged sample reported that 42% of their friendships were with members of the opposite gender (Lenton & Webber, 2006). In addition,15% of a late adolescent sample reported that the person they considered to be their "closest confidant" was a cross-gender friend (Barstead et al., 2013). Thus, although same-gender peers remain the most common choice for friends throughout adolescence, cross-gender friendships clearly become increasingly normative during this period.

As interest in cross-gender friendships has increased, some gender differences in their prevalence have been identified. For example, females tend to integrate cross-gender friendships into their social networks at an earlier age than males (Molloy et al., 2014). Because female social networks are on average larger than males' social networks, by late adolescence girls tend to report both a greater number of cross-gender and same-gender friends (Feiring, 1999). However, when asked to select a closest confidant, late adolescent males were significantly more likely than females to identify a cross-gender friend (Barstead et al., 2013). Thus, although

females report forming more cross-gender friendships than males, they may be perceived as close or best friendships more often by males.

Like same-gender friends, cross-gender friends are a significant source of important social provisions. In a cross-sectional investigation of 6th through 12th grade students, Lempers and Clark-Lempers (1993) found that both same-gender and cross-gender adolescent friendships consisted of the same range of both positive (e.g., intimacy, companionship, reliable alliance, affection) and negative (e.g., conflict, punishment) friendship attributes. Although they did not find significant between-grade differences in the extent to which cross-gender friends were relied upon for these provisions, a similar cross-sectional design found that reported intimacy in cross-gender friendships increased significantly by grade from early to mid-adolescence (Sharabany, Gershoni, & Hofman, 1981). Notably, both studies reported that same-gender friends were a greater source of social provisions, both positive and negative, at every grade level. In a college student sample, Monsour (1992) reported significant overlap in how adolescents described intimacy (e.g., self-disclosure, emotional expressiveness, trust) in their cross-gender and same-gender friendships. This suggests that cross-gender friendships include many of the same attributes as same-gender friendships, but may provide them to varying degrees.

In addition to provisions that overlap with same-gender friendships, some literature suggests that cross-gender friendships contribute unique relationship characteristics. For example, mid-adolescents have identified obtaining a unique perspective (McDougall & Hymel, 2007), learning about the opposite gender, and meeting members of the opposite gender (Hand & Furman, 2008) as unique benefits of cross-gender friendships, and some have argued that cross-gender friendships provide a way for adolescents to practice interacting with the opposite gender, a skill that is necessary in many adult contexts (Connolly, Craig, Goldberg, & Pepler, 1999;

Hand & Furman, 2008). In contrast, having issues with relationship expectations (i.e., managing others' assumptions that the relationship is not platonic) has been identified as a unique drawback to cross-gender friendships (McDougall & Hymel, 2007).

Importantly, although romantic or sexual attraction does sometimes occur in cross-gender friendships (Reeder, 2000), this appears to be the exception rather than the rule, and mid- to late-adolescents consistently report that platonic cross-gender friendships are normative and functionally distinct from heterosexual romantic relationships (Connolly et al., 1999; Horner, 1995; McDougall & Hymel, 2007). Although the friendship literature has largely ignored non-heterosexual orientations, initial findings suggest that gay and lesbian late-adolescents form cross-gender friendships at a higher rate than their heterosexual peers (Baiocco et al., 2014). Therefore, despite sharing some commonalities with both same-gender friendships and heterosexual romantic relationships, cross-gender friendships are functionally distinct.

Gender differences have also emerged in the extent to which these provisions are reported in adolescent cross-gender friendships. Males and females report comparable levels of intimacy in their cross-gender friendships in early adolescence (Sharabany et al., 1981); however, by late adolescence females report greater intimacy than males in both their same- and cross-gender friendships. Although it is not entirely clear why males and females would perceive their friendships with each other differently in this way, some have suggested that it is related to the consistent finding that females are more socially oriented and place greater importance on their personal relationships than males (Kuttler et al., 1999). Interestingly, males report receiving greater esteem support from their cross-gender friendships than their same-gender friendships, i.e., these friendships made them feel better about themselves and their accomplishments. Additionally, in a sample of college students, males reported experiencing more closeness in

their cross-gender friendships than their same-gender friendships (Reeder, 2003). As a result, it appears that male and female adolescents tend to experience cross-gender friendships differently, particularly in comparison to their same-gender friendships.

Friendship and Normative Development

Successfully forming close, high quality friendships has been linked with many important developmental outcomes. Berndt (1999) proposed that adolescents' development can be influenced by their friends via two primary pathways. First, because friends become more similar to each other over time, adolescents can be influenced by their friends' characteristics. Second, adolescents can be influenced by the features of their friendships; that is, the quality of a friendship can impact developmental outcomes. The following section will provide a brief overview of some of the ways in which these two pathways can influence adolescents' social, educational, and emotional adjustment.

Perhaps most directly, peer friendships provide an important context in which to develop social competence. Beginning in early childhood, forming reciprocated friendships is associated with higher social competence both concurrently and one year later, including initiating peer interactions more frequently (Vaughn et al., 2000). During adolescence, the intimacy of friendships begins to have implications for development. Buhrmester (1990) reported that self-reported friendship intimacy was significantly associated with measures of social competence adjustment (e.g., higher self-esteem) in early adolescents, but not pre-adolescents. The relationship between friendship quality and social competence is likely bidirectional: having close reciprocated friendships can provide greater opportunities to interact with peers and practice important social skills such as conflict resolution, while having higher social competence may make one a more attractive social partner.

In addition to providing more opportunities for positive social experiences, friends can protect against negative peer experiences, such as peer rejection and victimization. For example, having friendships of higher quality in early adolescence has been found to be associated with concurrent lower rejection sensitivity (McLachlan, Zimmer-Gembeck, & McGregor, 2010), and spending more time with friends in adolescence predicted decreases in rejection sensitivity two years later (Masten, Telzer, Fuligni, Lieberman, & Eisenberger, 2012). Peer victimization, in particular, is a relatively common and chronic experience in childhood and adolescence, with serious developmental ramifications including increases in the risk of both internalizing and externalizing problems. However, in a one-year longitudinal study of preadolescents, peer victimization was not predictive of these issues for those who had at least one reciprocal best friendship (Hodges, Boivin, Vitaro, & Bukowski, 1999). For adolescents who experience peer rejection or victimization, friends may provide an invaluable source of support and comfort to help cope with these negative experiences. Thus, close friendships not only provide greater opportunity for positive peer experiences in adolescence, but also can mitigate some of the negative effects of adverse peer experiences.

Another key aspect of adolescent development influenced by peer friendships is school adjustment. Higher quality friendships are associated with more successful school transition experiences beginning with grade school (Ladd, Kochenderfer, & Coleman, 1996), and this trend continues throughout adolescence. For example, Berndt and Keefe (1995) demonstrated that both friends' characteristics and friendship quality can have longitudinal effects on the school adjustment of early adolescents in middle school: changes in academic achievement over one year (both increases and decreases) were predicted by the grades of an adolescent's friends. Similarly, adolescents whose friends were more disruptive increased their own disruptive

behavior over time, with girls being most influenced by their closest friends in this regard. Friendship features were also influential, with adolescents whose closest friendships had more positive features becoming more involved in school over the year, while those whose friendships had more negative features instead increased in disruptive behavior. Other research has found that having friends in early adolescence is also associated with better grades and test scores, indicating that the ability to form friendships has direct implications for academic success (Wentzel & Caldwell, 1997).

While research regarding the role of friendships in high school adjustment is more limited, friendship has a long-recognized impact on adolescent functioning in college. Social factors, including social isolation, have been found to be stronger predictors of college adjustment and retention than academic adjustment (Gerdes & Mallinckrodt, 1994; Pascarella & Terenzini, 1979). This is particularly true for friendships, including both preexisting friendships and those made after the transition to college. For example, having a close, high-quality friendship prior to beginning college can predict better adjustment outcomes during the first few weeks at college; however, forming new friendships at college is more predictive of positive outcomes thereafter (Swenson et al., 2008), possibly in part because hometown friendships tend to decrease in their fulfillment of social provisions over time (Oswald & Clark, 2003). Crucially, the quality of these new friendships matters: in a study of Canadian first-year university students, the quality of college friendships was a significant predictor of both social and academic adjustment, along with level of attachment to the university, even after controlling for initial levels of adjustment (Buote et al., 2007).

Given the above findings, it is unsurprising that friendship formation has a direct influence on the emotional adjustment of adolescents as well. Lower quality friendships have

been consistently associated with an increased susceptibility to depression (La Greca & Harrison, 2005; Preddy, Fite, Wimsatt, Vitulano, & Gaertner, 2013), and having intimate friendships is associated with less anxiety and depression, and higher self-esteem (Buhrmester, 1990; Vitaro, Boivin, & Bukowski, 2009). Recent research has demonstrated that participating in a friendship with positive quality is associated with significantly fewer depressive symptoms, even among those with increased genetic risk for depression (Brendgen, Vitaro, Bukowski, & Dionne, 2013). This suggests that adolescent friendship, and in particular high quality friendship, may serve as a powerful protective force against the development of depression. Furthermore, multiple studies have demonstrated a developmental cascade linking a lack of friendship to later depression via mediating pathways (Nangle et al., 2003; Pedersen et al., 2007). For example, among a sample of children assessed longitudinally through early adolescence, peer rejection in middle childhood was associated with depression in adolescence via an increased risk of lower friendedness in adolescence (Pedersen et al., 2007). This suggests that friendship has a more direct association with depression than peer rejection. In college samples, aspects of friendship have been found to be associated with common symptoms of depression. For example, maintaining best friendships from home may help to buffer feelings of loneliness after the transition to college (Oswald & Clark, 2003), while conversely, friendsickness (i.e., grief for and preoccupation by the separation from hometown friends) may predict increased loneliness and lower self-esteem during the college transition (Paul & Brier, 2001). Although more research with this population is needed, findings thus far indicate that successfully forming and maintaining high quality friendships is a crucial developmental task with significant implications across the full period of adolescence.

The Dark Side of Friendship

Importantly, assessing the quality of a given friendship is not sufficient to predict developmental outcomes over time. As previously stated, because friends tend to become more similar to one another over time, the identity of each friend also contributes to developmental trajectories. Unfortunately, this means that socially undesirable aspects of individuals can be passed along to their friends, a phenomenon sometimes referred to as the "dark side" of friendship. A highly robust example of this is the process called *deviancy training,* a term coined by Dishion and colleagues (1996) to describe how dyads of delinquent boys tend to develop even more delinquent behavior over time. Delinquent adolescent friend dyads tend to respond positively to conversation about deviant activities, providing positive reinforcement for deviant talk. Crucially, deviant talk predicts increases in delinquent behavior over time, even when controlling for initial levels of delinquency (Dishion et al., 1996). Specific behaviors found to be predicted by deviancy training include substance use, risky sexual behavior, and number of police arrests (Dishion & Owen, 2002; Patterson, Dishion, & Yoerger, 2000).

Friend characteristics have also been linked to school adjustment. For example, Berndt and Keefe (1995) found that the grades of adolescents' friends predicted changes in the adolescents' grades over time, and the disruptive behavior of adolescents' friends predicted changes in the extent of their disruptive behavior. Interestingly, significant increases in disruption were primarily found in students whose friendships also had many positive features. This suggests that high quality friendships may be most influential, even when promoting socially undesirable behavior, a finding that has been replicated by other researchers (see Berndt, 1999). Berndt (2002) has suggested that this may be because close friends spend more time together, and thus have more time to practice and reinforce each other's behavior.

The influence of close, high-quality friendships is particularly relevant to the depression literature. Just as friends of delinquent adolescents tend to be similarly delinquent, friends of depressed adolescents tend to experience similar levels of depression. As the result of a socialization process called depression contagion, adolescents whose friends have initially higher levels of depressive symptoms experience an increase in their own depressive symptoms over time. Depression contagion was initially illustrated by Coyne (1976) in a simply designed experiment, in which female college students spoke on the phone for 20 minutes with a female stranger who was either clinically depressed or not depressed. Following these brief conversations, the college students who spoke with a depressed woman reported significantly more depressed, anxious, and hostile mood than those who spoke with a control. In addition, they were more likely to report that they would not like to interact with that person again. While the content of the conversations was not empirically analyzed, Coyne did note that depressed women seemed much more likely than controls to share personal, intimate information at a level that was subjectively judged to be more than what is socially acceptable disclosure with a stranger, something that previous studies had noted caused others to judge an individual poorly. This is a significant observation in the context of previously described research highlighting the overall greater rates of intimate disclosure in female friendships compared to their male counterparts.

Since Coyne's initial observation, the depression contagion effect has been demonstrated over time between college roommates (Joiner, 1994; Joiner & Katz, 1999) and dating couples (Katz, Beach, & Joiner, 1999). More recently, depression contagion has been empirically investigated in adolescent friendships. Several studies have established that adolescents who are friends with a peer or group of peers who have initially higher levels of depressive symptoms

will experience an increase in their own depressive symptoms over time (Conway, Rancourt, Adelman, Burk, & Prinstein, 2011; Prinstein, 2007). Additionally, Giletta and colleagues (2011) demonstrated that the self-reported closeness of the friendship may impact the contagion effect of depressive symptoms. When newly-formed friendships were compared to more well-established, stable friendships, only the new friendships demonstrated a significant difference in initial depressive symptom levels, although both types of friendships showed significant depression contagion effects over time. Significantly, this effect was found only in female friendships, and only in friendships that were rated as being "true" best friends (Giletta et al., 2011). Thus, depression contagion in adolescence appears to be most likely between female, best friend dyads.

Co-Rumination

Beginning in adolescence, females tend to develop more intimate friendships with same-gender peers than males do (Buhrmester, 1990). The research reviewed thus far has clearly demonstrated that close, intimate, dyadic friendships can be a protective force against the development of depressive symptoms. However, it is during this same developmental period that females become twice as likely as their male peers to suffer from depression. Thus, two very robust findings appear to be in direct opposition to each other. The key to resolving this issue may lie in a mutual dyadic process called *co-rumination*. First described by Rose (2002), co-rumination is defined as the excessive discussion of personal problems within a dyadic relationship. Rose proposed that co-rumination sits at the intersection of depressive rumination and self-disclosure. Self-disclosure is a normative dyadic process in friendships that builds intimacy over time, via sharing and validating personal experiences with a peer. In contrast, depressive rumination is an individual, internal process that contributes over time to the

development and maintenance of pathology. Co-rumination, like self-disclosure, describes the disclosure of personal experiences with a friend; however, like rumination, these experiences are typically negative and are continually rehashed with an excessive focus on negative affect. If, like self-disclosure and rumination, co-rumination between female friends predicts increases in both reported intimacy and depressive symptoms, this construct could be the key to explaining why adolescent girls experience these apparently contradictory outcomes.

To test this hypothesis, Rose (2002) developed the Co-Rumination Questionnaire, a 27-item self-report measure that continues to be the gold standard assessment of this construct. The measure was designed with three items each assessing one of nine total content areas: 1) problem discussion frequency, 2) discussing problems at the expense of other activities, 3) extent of encouragement by respondent's friend to continue discussing problems, 4) extent of encouragement by respondent to continue discussing problems, 5) how much the same problem is discussed repeatedly, 6) speculating about causes of the problem, 7) speculating about consequences of the problem, 8) speculating about aspects of the problem that are not well understood, and 9) focusing on negative affect. Each item is rated on a 1 to 5 Likert scale, and a total score is created by averaging across all responses. In this way, a respondent can be placed along a spectrum of maladaptive problem talk.

Rose (2002) conducted an initial investigation of this scale's relationship to adolescent friendship quality and depressive symptoms with a coed sample of 608 3rd, 5th, 7th, and 9th graders, using both depression and anxiety symptoms as outcome variables. Results appeared to support her conceptualization of the construct: Co-rumination predicted both types of internalizing symptoms when controlling for self-disclosure while the reverse was not true, and also predicted positive friendship quality and closeness while controlling for rumination while

the reverse was also not true. These findings suggest that co-rumination does truly sit at the intersection of rumination and normative self-disclosure. Co-rumination also successfully predicted the expected concurrent dual outcomes: on the one hand, adolescents who self-reported co-ruminating the most also tended to report the highest friendship quality and closeness, suggesting that ruminating out loud with a friend can bring benefits to the relationship. On the other hand, these same adolescents also tended to report experiencing more internalizing symptoms, suggesting that this same process can bring drawbacks for the individual.

Importantly, these dual effects appeared to be more or less pronounced depending upon a participant's age and gender. Adolescents (7^{th} and 9^{th} graders) reported co-ruminating significantly more than children (3^{rd} and 5^{th} graders). Additionally, girls reported co-ruminating significantly more than boys, with the gender differences most pronounced in the older cohort. As expected, girls also reported experiencing significantly more internalizing symptoms than boys. When these trends were investigated using regression analyses, gender and co-rumination interacted to predict internalizing symptoms. This finding suggests that the effect of co-rumination depends upon one's gender; specifically, that among those participants who reported higher levels of co-rumination, girls were more likely to also report higher levels of internalizing symptoms. Furthermore, co-rumination emerged as a mediator of the association between gender and internalizing symptoms, suggesting a model whereby gender predicts internalizing symptoms through its association with co-rumination. That is, because adolescent girls are more likely to co-ruminate, this co-rumination leads to increased internalizing symptoms.

Although cross-sectional, these results together suggest that co-rumination may indeed help to explain why adolescence is a period of both increased friendship intimacy and increased risk for depressive symptoms in females, but not males. First, the findings suggest that co-

rumination does increase during the transition to adolescence. Second, they indicate that while co-rumination is associated with increases in friendship quality and closeness across the board, females are more likely than males to report co-ruminating. Third and finally, they imply that females are more likely to report symptoms of depression in part because of their engagement in co-rumination. Overall, Rose's (2002) initial publication on co-rumination provided compelling justification for looking more closely at the role of co-rumination in adolescent development.

To move towards demonstrating order of effects, subsequent studies have endeavored to determine whether these findings can be replicated longitudinally. Rose and colleagues (Rose et al., 2007) elected to use a sample and design similar to Rose's (2002) initial investigation, with the addition of a 6-month follow-up. As expected, baseline co-rumination significantly predicted self-reported friendship quality and feelings of closeness at follow-up in both genders. However, baseline co-rumination appeared to have some unique effects on girls: For girls, but not boys, baseline co-rumination predicted increases in symptoms of both depression and anxiety. That is, baseline co-rumination predicted benefits at follow-up for both genders, while girls alone seemed to suffer personal drawbacks from the same process.

The authors also published findings that provide a potential clue as to the process of developing depressive symptoms over time. In girls, while baseline co-rumination predicted changes in depressive symptoms and friendship quality over time, baseline friendship quality and depressive symptoms also predicted increases in co-rumination over time. This suggests a feedback loop, whereby female friends in higher quality relationships are more likely to engage in co-rumination, which in turn leads to increases in depressive symptoms and friendship quality, which then encourages the friends to continue to co-ruminate together even more. This proposed process mirrors the ruminative feedback loop described by Nolen-Hoeksema (1991), in which an

individual responds to depressed mood by ruminating, which in turn maintains or worsens his or her depressed mood, increasing the likelihood of continued rumination. If a similar process is involved in co-rumination, it could help to explain not only the generation and maintenance of depressive symptoms in adolescence, but also the contagion of depressive symptoms between friends.

Indeed, follow-up analyses from the same lab have suggested that this is the case. Using an actor-partner interdependence model with data collected from a sample of 274 child and adolescent friend dyads over 6 months, Schwartz-Mette and Rose (2012) found a significant depression contagion effect that did not differ by age group. Notably, co-rumination acted as a mediator of this effect in adolescents (grades 7 & 9) but not in children (grades 3 & 5) meaning that co-rumination acted as one mechanism by which depressive symptoms were "caught" by friends beginning in adolescence. Importantly, normative self-disclosure did not mediate this effect, indicating that simply sharing problems with a friend does not confer the same risk as repeatedly rehashing and speculating about problems. These findings further buttress the theory that co-rumination is a process that exacerbates and maintains depressive symptoms over time, beginning during the transition to adolescence.

Not all of the above findings have been replicated successfully. For example, in a one-year follow-up of 7th and 8th grade girls, Starr and Davila (2009) found that, while co-rumination was associated with concurrent depressive symptoms, it did not significantly predict changes in depressive symptoms over time. There are a few potential explanations for this discrepancy. First, as the authors point out, their sample size (n=83) was much smaller than that used by Rose and colleagues, so it is possible that the expected effect is not detectible in smaller samples. Second, the authors used the Center for Epidemiological Studies-Depression (CES-D) scale,

while previous investigations had used the Children's Depression Inventory (CDI). Some authors have claimed that the CDI assesses broad negative affect, rather than specific depressive symptoms; in contrast, the CES-D was designed to assess DSM-IV symptoms of a major depressive episode. Because major depressive episodes are less common than general negative affect, it may be that the longitudinal depressive effect of co-rumination could not be detected using the CES-D with a comparatively small sample.

Results from Hankin, Stone, and Wright (2010) help to clarify this issue. To account for differences in specificity among measures of depression and anxiety symptoms, the authors assessed four separate aspects of internalizing symptoms: general depressive symptoms (using the CDI), specific anhedonic depressive symptoms (also using the CDI), specific symptoms of anxiety, and general emotional distress. The target sample included 350 adolescents, aged 11-17 years, assessed in multiple waves over the course of five months. Using this more comprehensive collection of outcome measures, the authors found that baseline co-rumination did in fact predict changes in all assessed variants of internalizing symptoms over time, and furthermore, that the effect of co-ruminating on internalizing symptoms accumulated over time. Interestingly, in contrast to the effects reported by Rose (2002), gender did not interact with co-rumination to predict changes in internalizing symptoms, even though girls in their sample did report significantly more frequent co-rumination than boys. The authors suggested that their comparatively moderate sample size might have made it more difficult to detect an effect of gender. Regardless, the results presented by Hankin and colleagues add robust support to the conclusion that co-rumination is indeed able to predict changes in depressive symptoms over time.

The next step in improving the clinical utility of co-rumination research was to investigate its association not just with internalizing symptoms in general, but in particular with clinical diagnoses of depressive disorders. This potential association was first investigated retrospectively, with a sample of 81 children and adolescents between the ages of 8 and 12 years (Stone, Uhrlass, & Gibb, 2010). Structured clinical interviews administered to both the participant and his or her parents were used to assess a lifetime history of depressive disorders, making this the first study to measure outcomes with a method other than self-report questionnaires. As hypothesized by the authors, higher current rates of co-rumination were significantly associated with a history of at least one depressive episode. However, the authors found no significant gender differences in rates of co-rumination, and gender did not significantly mediate the association between co-rumination and having a history of a depressive disorder. These unexpected null results can perhaps be explained by the context of the sample that was used: because this sample was taken from a larger study on maternal depression, each participant was the offspring of a mother with a diagnosis of a depressive disorder. This means that the sample used was already at higher biological risk than the general population to develop a depressive disorder, before taking into account the children's gender. While this characteristic of the sample is useful for investigating associations of depression with other factors, it may have had the effect of washing out the effect of gender. Furthermore, the sample used skews young compared to those used in past investigations of co-rumination. Because of the inclusion of young children, a demographic where there is known to be no gender differences in rates of depression, it is perhaps not surprising that gender differences were not found in this investigation. Regardless of these shortcomings, this study is significant in being the first to demonstrate a direct association of co-rumination with clinical levels of depression.

The next question was whether co-rumination could prospectively predict clinical levels of depressive disorders, and if so, whether it could also be implicated in the process of exacerbating or maintaining clinical depression. Stone and colleagues (Stone, Hankin, Gibb, & Abela, 2011) addressed this question by assessing 106 early adolescents (ages 11-15) at multiple waves over the course of two years. Notably, this sample was several years older than the sample used in the group's previous investigation, encompassing the years during which depression becomes more frequent in girls than boys. As before, clinical interviews were employed to assess depressive disorders, with first onset of a depressive disorder, and duration and severity of depressive disorders used as specific outcomes.

Results revealed that adolescent girls on average reported co-ruminating significantly more than their male peers. While co-rumination did not significantly correlate with depression, it did predict time from baseline to depression onset in those youth who had no previous history of a depressive disorder. Furthermore, among those youth who developed depressive disorders at follow-up, co-rumination was associated with longer, more severe depressive episodes. These results align with the hypothesis that co-rumination is a process that serves to exacerbate and maintain depressive symptoms over time, in this case being associated with exacerbation to the point of developing a clinically significant depressive disorder. This study also supported the hypothesis that co-rumination has a differential effect by gender: while gender did not significantly moderate the impact of co-rumination on time from baseline to depression onset, it did significantly mediate the association between gender and time to depression onset. That is, the tendency of girls to have a shorter duration than boys from baseline to first onset of a depressive disorder can in part be explained by a pathway from female gender, to increased likelihood of co-ruminating, to increased likelihood of shorter time to depressive disorder onset.

These findings, added to the context of previous literature, demonstrate converging evidence that co-rumination is a process with accumulating effects over time. Co-rumination has consistently been able to significantly predict changes in depressive symptoms, and has also been predicted by depressive symptoms, suggesting a bi-directional cycle in which depressive symptoms can be maintained or exacerbated over time. Evidence for this process has been found even when accounting for baseline depressive symptoms, and individual rumination. While only a few studies have included outcome measures of friendship characteristics, those that have consistently have found that co-rumination also predicts increases in positive friendship characteristics over time in both boys and girls. Interestingly, a few studies have reported that while the positive friendship benefits are seen in both boys and girls, the individual drawbacks of increasing depressive symptoms tend to be experienced more by girls than boys. Many of these findings need to be replicated and confirmed, but there is enough evidence to suggest that co-rumination could in fact be a mechanism by which females are more likely to develop depressive symptoms than males.

Although the gender disparity in depression begins in the onset of adolescence, it continues throughout the lifespan. To date, the majority of research on co-rumination has been limited to early-to-middle adolescents with same-gender close friends. Thus, the research reviewed here cannot speak to whether co-rumination serves the same role beyond the teen years. Additionally, research thus far has primarily assessed either the general tendency to co-ruminate, or how much an individual co-ruminates with a specific same-gender friend. This limitation is appropriate within the context of early and middle adolescence, a period during which boys and girls begin to develop more intimate peer friendships, primarily with same-gender friends. However, during the transition to late adolescence/emerging adulthood, cross-

gender friends become increasingly common (Kuttler et al., 1999). As a result, assessing co-rumination during late adolescence may call for requiring participants to report on a wider social network.

Accordingly, in the first assessment of co-rumination in college students, only one-third of participants who were asked to identify the person with whom they have the most intimate relationship selected a same-gender best friend (Calmes & Roberts, 2008). This investigation revealed that while previously found gender differences in co-rumination were still evident in college students who co-ruminated with a same-gender best friend, for those who were most intimate with a different partner (e.g., romantic partner, other-gender best friend, or parent), rates of co-rumination were similar between males and females. However, regardless of confidant choice, co-rumination continued to predict internalizing difficulties in females only, while it predicted relationship satisfaction in both females and males.

In a separate college sample (Barstead et al., 2013), females reported more co-rumination than males when co-rumination was assessed with a same-gender friend, but no gender differences in the rate of co-rumination were found when assessed with other partners. When participants were allowed to self-identify their "closest confidant," same-gender best friends were the most commonly selected (40%), followed by romantic partners (22%), cross-gender friends (15%), and mothers (13%). Interestingly, males were more likely than females to select a cross-gender friend as their most intimate partner, while females were more likely than males to select a same-gender close friend. This suggests that females may be most attractive as intimate exchange partners for both males and females. Additionally, while levels of co-rumination for females were consistent across all types of partners, males were likely to co-ruminate more if their partner was not a same-gender best friend. Because all remaining partner options for males

were female (i.e., opposite-gender best friends, significant others [assuming heterosexuality], and mothers), this suggests that co-rumination is most likely to occur when at least one of the members of a dyad is female.

Despite the fact that gender differences in co-rumination disappeared when assessed with participants' closest confidant, gender differences in association of co-rumination with depressive symptoms remained. Similar to Calmes and Roberts (2008), Barstead and colleagues (Barstead et al., 2013) reported that co-rumination with self-identified closest confidant was positively correlated with depressive symptoms in females, but not significantly correlated in males. Barstead and colleagues did not assess relationship characteristics, so it is not known whether co-rumination was differently associated with positive relationship outcomes as was found by Calmes and Roberts.

The research with late adolescents presented here is limited, but illuminates some intriguing potential trends. By allowing for developmentally appropriate flexibility in selection of co-rumination partner, these studies indicate that unlike early or mid-adolescents, late-adolescent males report co-rumination at comparable rates to their female peers. They also appear to continue to reap the same benefits of increases in positive relationship quality as their female peers. However, late adolescent females seem to be uniquely burdened with the primary potential drawback of co-rumination, that is, increases in depressive symptoms over time. If this pattern holds up in subsequent replication, it appears that co-rumination may continue to help to account for the gender disparity in depressive symptoms into the transition to adulthood.

While there is convincing preliminary evidence that the potential drawbacks of co-rumination are disproportionately felt by females, it is still unclear why this would be the case. If males and females do co-ruminate with their chosen confidants at comparable rates, one could

speculate that there may be differences in *how* they co-ruminate. Specifically, it could be that males and females differ in what they co-ruminate about (i.e., content of problem talk), and/or how much time they spend actively co-ruminating about their or their friend's problems (i.e., duration of problem talk). Support suggesting the former is found in investigations of the relationship of co-rumination with different types of stressors. Previous depression literature has demonstrated that depressive symptoms are reciprocally associated with interpersonal (versus non-interpersonal), dependent (versus independent) events, especially in females (e.g., Hammen, 1991). In line with these findings, investigations with adolescents have reported that co-rumination predicts the generation of interpersonal (but not non-interpersonal), dependent (but not independent) stressors (Hankin et al., 2010), and that co-rumination about dependent and interpersonal events predicts later depressive symptoms (Nicolai et al., 2013). If females are more likely to experience interpersonal, dependent stressors, it may be that they are more apt to co-ruminate about such events, which may in turn increase the likelihood of developing or maintaining depressive symptoms. However, to date, no research has compared males and females on the tendency to co-ruminate about certain kinds of problem content.

Likewise, little attention has been paid to investigating potential differences between co-ruminating partners in the extent of their engagement in the conversation. This is largely due to measurement limitations, as nearly every investigation thus far has assessed co-rumination exclusively via self-report questionnaire. However, a recent publication from Rose and colleagues (Rose et al., 2014) provided clues to how problem talk is maintained within a co-ruminating dyad. Using a sample of adolescents, the authors videotaped 16-minute conversations between same-gender friend dyads and coded them for each element of co-rumination (e.g., rehashing, speculating, dwelling on negative affect, encouragement of problem talk, and total

time spend discussing problems) to create a total co-rumination score for each dyad. Results revealed that members of dyads who co-ruminated were significantly more likely to respond to their friend's problem talk with engaged responses, which in turn increased the likelihood that their friend would respond with more problem talk. However, no results were reported regarding potential gender differences in co-rumination engagement, and to date no published studies have used observational methods when investigating co-rumination in coed college-age samples. It could be that females are more apt to actively engage in co-rumination, which could in part help account for why co-rumination is more likely to be associated with depressive symptoms in females than males, even when rates of co-rumination are comparable.

Overview and Aims

The literature summarized thus far clearly indicates that depression is a serious public health burden that disproportionately affects females beginning in adolescence, a period characterized by significant biological, cognitive, and social transitions. The most recent, comprehensive theories attempting to explain this gender-specific susceptibility posit that it arises from the transactional interactions among various affective, biological, cognitive, and environmental risk factors (Hankin & Abramson, 2001; Hyde et al., 2008). These include both pre-existing vulnerabilities (e.g., genetics, environmental adversity) and risk factors accumulated across the lifespan (e.g., affective, cognitive, and social risk factors), which together can produce depression when met with a catalyst (e.g., stressful life event). Females are more likely to encounter many forms of each of these types of risk factors, and many of these risk factors emerge for the first time during adolescence, thus setting the stage for a preponderance of depression in females compared with males beginning during adolescence.

Co-rumination is significant in that it is a uniquely integrative illustration of this model: it is a process through which affective, cognitive, and social factors are combined and interact with negative life events to produce the onset and/or maintenance of depression over time (Rose, 2002). Specifically, it is similar to depressive rumination in being a cognitive response to depressed affect, and is additionally social in that it is dependent upon both members of the dyad to participate. It is also a process that helps to explain the gender gap in depression. Females are more likely than males to experience stressful life events in the interpersonal domain (Calvete et al., 2013; Rudolph et al., 2000), and to respond to these stressful events with rumination (Hilt et al., 2010; Jose & Brown, 2007; Nolen-Hoeksema et al., 1999). They are also more likely than males to have close, intimate friendships (Buhrmester & Furman, 1987). As a result, it is unsurprising that adolescent females have consistently been found to co-ruminate with their close same-gender friends more frequently than males, and that this increased co-rumination is associated with heightened risk for depression. Co-rumination is therefore uniquely situated to help account for one of the most persistent puzzles in the depression literature.

Despite these promising findings, research on co-rumination is still in its infancy, and its role in the emergence and maintenance of the depression gender gap requires further clarification. In a recent brief report, Stone and Gibb (2015) argue that although co-rumination is generally found to be more common in females, it is associated with heightened depression risk in both males and females. This suggests that co-rumination does not differently affect males and females, and perhaps does not play as active a role in the depression gender gap as originally proposed. Indeed, the three studies Stone and Gibb cite in support of this position have each failed to find interaction effects of gender and co-rumination in predicting depression in early and middle adolescents (Hankin et al., 2010; Stone et al., 2011, 2010). Thus, moderation results

suggest that co-rumination appears not to interact with gender to predict the emergence of increased risk of depression found in female adolescents compared to male adolescents.

In contrast, however, the most replicated finding in the literature is a mediational role of co-rumination. Numerous studies have demonstrated that co-rumination mediates the relationship between gender and depression in early (Rose, 2002; Rose et al., 2007), middle (Rose et al., 2007; Tompkins et al., 2011), and late adolescence (Calmes & Roberts, 2008). That is, females have consistently been shown to co-ruminate more than males, and this tendency increases their relative risk of depression. Similarly, co-rumination has also been shown to mediate gender differences in time to initial onset of depression (Stone et al., 2011).

The most robust demonstration of co-rumination's mediational role comes from Rose, Carlson, and Waller (2007), who investigated co-rumination in middle adolescents with a large sample (n=813) and longitudinal design. Results provided support for a pattern previously established in cross-sectional designs (Rose, 2002); namely, that co-rumination produced socioemotional tradeoffs in females but not males. That is, co-rumination predicted increases in both depression and friendship quality in girls, which then both predicted subsequent co-rumination. In contrast, while depression also increased the likelihood of co-rumination in boys, co-rumination predicted subsequent increases in friendship quality only, and not depression. The majority of co-rumination studies have not included assessments of features of friendship quality, which limits the generalizability of these findings. However, overall this pattern of significant mediation indicates that the relationship between gender and depression is in part explained because co-rumination in females increases their risk of depression. That is, co-rumination may be a stronger risk factor for depression in females than in males. To date, however, it is unclear why females are disproportionately affected by this process.

Multi-Method Approach

Having established that female adolescents tend to report co-ruminating with same-gender friends more than male adolescents, the next step in understanding how females may be more susceptible to the depressogenic effects of co-rumination is assessing potential differences in *how* males and females co-ruminate. Advancement in this area has been limited, however, due to an overreliance on self-report data via the Co-Rumination Questionnaire (Rose, 2002). Although this assessment measure is useful in determining the general extent to which an adolescent perceives co-rumination occurring in his or her close dyadic relationships, it does not allow researchers to observe individual differences in co-rumination at the dyadic level.

Fortunately, Rose and colleagues (Rose et al., 2014) have recently developed an observational paradigm to assess co-rumination. By coding elements of the language used in dyadic conversations between same-gender friends, they demonstrated that co-rumination is maintained within a dyad in part due to how an adolescent responds to his or her friend's problem talk (i.e., giving an engaged vs. disengaged response). However, gender differences in observational co-rumination were not reported in this initial study. As a result, it remains to be determined whether and how males and females differ in specific aspects of their co-ruminative conversations. To address this, the present study included a laboratory problem talk task modeled after the paradigm developed by Rose and colleagues, in addition to assessing co-rumination via the well-established Co-Rumination Questionnaire (Rose, 2002). These observed problem talk conversations were used to determine the extent to which dyads engaged in problem talk, which is a defining component of co-rumination. This multi-method approach allowed participants' self-report of their co-rumination habits to be compared to their observable behavior, thus adding further validity to the exploration of this dyadic process.

Inclusion of Cross-Gender Friendships

An additional area of needed development is expanding understanding of how co-rumination functions in cross-gender friendships. The overwhelming majority of research on co-rumination has looked exclusively at same-gender friendships. However, cross-gender friendships are known to become an increasingly normative and important source of support during mid and late adolescence (Barstead et al., 2013; Kuttler et al., 1999). Assessing cross-gender friendships may not only provide a more comprehensive account of how adolescents co-ruminate in their close friendships, but also offer a unique opportunity to assess gender differences in co-rumination at the dyadic level. In the few studies where cross-gender friendships were included, males were shown to co-ruminate as frequently as females when their partner was female, but co-rumination continued to be associated with increased depression symptoms only for females. This finding has additionally been replicated by an initial study in the current program of research, which assessed co-rumination in first-year college students with their closest same- or cross-gender friend from their hometown (Day, Dieter, & Erdley, 2015). These findings indicate that understanding the unique risk co-rumination appears to pose for females would be facilitated by looking at gender differences in co-rumination not only between male and female same-gender friend dyads, but also within cross-gender friend dyads. The present study addressed this by recruiting both same-gender and cross-gender friendship pairs from a population of late adolescents. Doing so not only lent support to the primary aim of elucidating potential gender differences in how adolescents co-ruminate, but also enabled the examination of these processes in a late adolescent sample, thus adding to the understanding of co-rumination in this age range.

Problem Talk Content

Based on existing literature, there are two aspects of co-rumination that are most likely to differ between males and females. The first of these is the content of conversations about personal problems, or problem talk. As previously reviewed, stress-generation models of depression have linked depression symptoms with interpersonal-dependent problems, i.e., problems in one's social life for which one bears some responsibility (Hammen, 1991; Rudolph et al., 2000). This is in line with interpersonal theories of depression, which state that those with depression tend to behave in ways that lead others to reject them. Interpersonal-dependent problems have been shown to have reciprocal links not only with depression symptoms, but also with depressive rumination: in an investigation with late adolescents, depressive rumination was found to predict increases in interpersonal-dependent stress, and both depressive rumination and interpersonal-dependent stress predicted subsequent increases in depression symptoms (Flynn, Kecmanovic, & Alloy, 2010). Interpersonal dependent stress did not emerge as a significant mediator of this association.

Preliminary evidence suggests that co-rumination may have a similar, if not stronger, association with interpersonal-dependent stressors: in a longitudinal study with middle adolescents (Hankin et al., 2010), co-rumination at baseline predicted the generation of interpersonal-dependent stressors four months later (but not non-interpersonal or independent stressors). In addition, interpersonal-dependent stressors served as a mediator of the prospective association between co-rumination at baseline and increases in internalizing symptoms at follow-up. There is also evidence to suggest more clearly that it is not simply experiencing interpersonal-dependent stressors, but co-ruminating about them that has a depressogenic effect. A daily diary study of middle adolescents found that both depressive rumination and co-rumination about interpersonal-dependent events (but not noninterpersonal or independent

events) predicted increases in depressive symptoms eight weeks later (White & Shih, 2012). The authors noted that entering gender as a potential moderator did not influence their results; however, given that interactional effects between gender and co-rumination have not typically been found, this is not surprising, and potential mediational pathways were not tested by gender. Given that females tend to report experiencing more interpersonal stress than males, it is reasonable to predict that co-ruminating about interpersonal-dependent stressors in particular may be more common in females than males, and that this potential difference could help to explain the pathway from co-rumination to depression. The present study therefore assessed the content of the problems discussed by each participant as either interpersonal or non-interpersonal, and dependent or independent, allowing for the comparison of problem talk content between males and females at both the intra- and inter-dyadic level.

Problem Talk Duration

The second area of potential co-rumination gender differences is the duration of problem talk. Thus far, the literature has assessed only the self-perception of the extent to which co-rumination takes place within a dyad. The Co-Rumination Questionnaire asks respondents to report how "true" it is that various subjective examples of co-rumination occur, such as spending "most of our time" talking about problems, or spending "a lot of time" trying to understand a problem. Rose et al. (2014) were the first to objectively measure the duration of samples of problem talk between friends, as part of the total co-rumination score for each dyad. Although this study assessed aspects of friends' interaction that tend to prolong co-rumination (i.e., providing "engaged" versus "disengaged" responses in response to problem talk), the duration of problem talk itself has not been used as a variable that may help differentiate the co-rumination of males and females. Given that females engage in intimate self-disclosure more frequently than

males (Buhrmester & Furman, 1987), and intimate self-disclosure is a key component of co-rumination (Rose 2002), differences in how long males and females spend talking about problems with their friends could be a key component in understanding the differential effect of co-rumination on males and females.

Problem talk duration could be particularly relevant to understanding co-rumination in cross-gender friendships. Barstead and colleagues (Barstead et al., 2013) provided some initial evidence that in late adolescents, the extent of co-rumination depends on the gender of both members of a dyad. Investigation of the interaction between subjects' gender and the gender of their self-identified closest confidant revealed a marginally significant moderation effect: although females' self-reported co-rumination remained consistent regardless of the gender of their closest confidant, males were significantly more likely to report higher co-rumination when their closest confidant was a female friend. This finding is important in that it provides an exception to the general trend found in early and middle adolescent same-gender friends that females consistently report co-ruminating significantly more than males (Hankin et al., 2010; Rose, 2002; Rose et al., 2007; Tompkins et al., 2011). Understanding why equivalent engagement in co-rumination is not necessarily associated with equivalent increases in depression could provide significant clues into why co-rumination leads to depressogenic effects primarily in females.

To this end, the present study assessed problem talk duration with an observational paradigm in both same-gender and cross-gender friends. This was done by assessing the total amount of time each dyad spent engaging in problem talk, and then further determining how much time each individual spent talking about his or her own problem, and how much time talking about his or her friend's problem. The total problem talk score for each dyad allowed for

the replication of testing interaction effects of partners' genders in predicting how much time they actually engage in problem talk. In addition to this replication, assessing the individual contribution of each friend to the dyad's total amount of problem talk allowed for a much more nuanced look at how co-rumination may differ among male, female, and cross-gender dyads. Given that males are less likely than females to engage in intimate self-disclosure with their same-gender friends (Buhrmester & Furman, 1987), it is currently unclear whether males with a close female friend report levels of co-rumination on par with female dyads because they are themselves more likely to engage in intimate disclosure with a female friend than with a male, or because they encourage the self-disclosure of their female friend. Therefore, assessing to what extent males and females co-ruminate about their own problems versus their friend's problems could shed light on a potential difference in how males and females co-ruminate.

Summary of Aims

Defined broadly, the primary aims of this study were to explore potential differences in how females and males co-ruminate, and whether these differences help to account for previously established gender differences in the extent to which co-rumination creates a risk for depression. To accomplish these aims, this investigation first made use of both self-report and observed assessments of dyadic problem talk. This multi-method approach allowed for both possible replication of previous findings regarding the general extent of problem talk within a dyad, and innovative assessment of individual differences in how problem talk takes place between co-ruminating friends. This investigation also assessed both same-gender friend dyads and cross-gender friend dyads, the latter of which are common in late adolescence but only very rarely included in co-rumination research. These methodological choices allowed the primary

aims to be addressed in a way that is unique compared to the existing literature, and enabled both replication and extension of previous findings.

This methodology also allowed for the assessment of two specific sources of potential gender differences in co-ruminative problem talk: content (i.e., interpersonal-dependent problems versus noninterpersonal, independent problems) and duration (i.e., number of observed minutes) of problem talk. The selection of these variables was based on previous findings that male and female adolescents tend to differ in the extent to which they experience interpersonal-dependent stressors and discuss personal problems. However, neither variable has yet been assessed in cross-gender friendships using a multi-method approach. Doing so enabled the present study to make specific, unique contributions to the understanding of the function co-rumination potentially plays in maintaining the gender gap in depression.

Hypotheses for the Present Study

Replication of Previous Findings

Hypotheses 1a and 1b: Gender differences in reported co-rumination. In replication of previous research, it was hypothesized that female participants would self-report significantly higher rates of co-rumination on the Co-Rumination Questionnaire than male participants (Hypothesis 1a). Likewise, it was hypothesized that same-gender female and cross-gender friend dyads would produce significantly higher observed co-rumination scores than same-gender male dyads (Hypothesis 1b). That is, self-reported co-rumination would be more prevalent in cross-gender and female same-gender dyads compared to male same-gender dyads.

Hypotheses 1c, 1d, and 1e: Socioemotional tradeoffs of co-rumination. In line with findings reported by Rose and others (Calmes & Roberts, 2008; Rose, 2002; Rose et al., 2007), it was predicted that co-rumination would be associated with adjustment trade-offs in females, but

not males. Specifically, it was hypothesized that regardless of dyad type, co-rumination would statistically predict higher concurrent friendship quality in both males and females (Hypothesis 1c), but would predict higher concurrent depressive symptoms in females only (Hypothesis 1d). It was also predicted that both measures of co-rumination would mediate the association between gender and depression symptoms, such that gender would statistically predict depression symptom elevations via its association with co-rumination, resulting in a significant indirect effect (Hypothesis 1e).

Problem Talk Content

Hypothesis 2a: Associations between problem content and gender. Based on past findings (e.g., White & Shih, 2012), it was hypothesized that females would identify an interpersonal-dependent problem significantly more often than males (Hypothesis 2a).

Hypothesis 2b and 2c: Associations among problem content, co-rumination, and depressive symptoms. It was hypothesized that identifying an interpersonal-dependent problem would be significantly and positively associated with concurrent depressive symptoms, regardless of gender or dyad type (Hypothesis 2b). It was also predicted that problem talk content would significantly moderate the association between co-rumination and depression, such that the effect of co-rumination on depressive symptoms would be stronger for those who choose to discuss an interpersonal-dependent problem than those who discuss a non-interpersonal, independent problem, regardless of gender or dyad type (Hypothesis 2c).

Problem Talk Duration

Hypothesis 3a: Dyad-level mean differences in total problem talk. It was predicted that total problem talk duration would vary by participant group. Specifically, it was predicted that same-gender female dyads and cross-gender dyads would demonstrate comparable average

durations of problem talk, and same-gender male dyads would demonstrate significantly shorter problem talk durations on average compared to both same-gender female and cross-gender dyads.

Hypothesis 3b: Gender differences in own- and friend-problem talk. To date, no research has been published regarding the relative duration of own-problem talk versus other-problem talk within a dyad. To explore these potential differences, exploratory analyses were performed examining the possible interaction effects of each partner's gender in predicting total problem talk, own-problem talk, and other-problem talk.

Hypothesis 3c: Problem content and problem talk duration. It was hypothesized that interpersonal and dependent problem content would be associated with increased own-problem talk.

Hypothesis 3d: Effects of problem talk on depressive symptoms and positive friendship quality. It was predicted that duration of problem talk would be significantly associated with depressive symptoms, such that total problem talk, own-problem talk, and other-problem talk would significantly predict concurrent depressive symptoms as measured by the BDI-II.

Integrated Model

Hypothesis 4: The final hypothesis proposed to explore potential 3-way interaction effects in the prediction of depression. It was hypothesized that co-rumination content, duration, and gender would interact to predict concurrent depression symptoms. More specifically, it was expected that the highest rates of depression would be predicted by the presence of female gender, interpersonal-dependent problem content, and high dyad total problem talk duration.

CHAPTER 2

METHODS AND PROCEDURES

Participants

Participants consisted of 176 undergraduate students (*N* = 88 dyads) between the ages of 18 and 25 years recruited through the University of Maine Department of Psychology subject pool, as well as students recruited from the general University of Maine student population. Participants were recruited in pairs into one of three dyad types: same-gender female (*n* = 36 dyads), same-gender male dyads *(n*=15 dyads), and cross-gender (*n* = 37 dyads).

Prior to recruitment, G*Power3 (Faul, Erdfeler, Lang, & Buchner, 2007) was used to determine approximate sample size needed for desired power (0.90) for assessing the potential interaction effects of study variables via multilevel modeling (MLM). In order to maximize power while keeping the total sample size feasible for recruitment, this estimate was made assuming a moderate effect size (0.15). The analysis resulted in a suggested sample size of 108 to achieve the desired power (i.e., 36 of each dyad type). Because hypothesis testing used dyadic data analysis via MLM, these numbers reflected the number of suggested dyads and was doubled to reflect the total number of participants needed to achieve the desired effect size (i.e., 216). An attempt was made to over-sample in order to account for dyads who met exclusion criteria and potential technical errors in administering the study protocol. Although the recruitment goal was met for the same-gender female and cross-gender dyad groups, despite targeted recruitment efforts, recruitment of male same-gender dyads was much slower than was anticipated based on pilot research. Limited time necessitated the halting of male participant recruitment at *N*=15 dyads. Implications of this reduced sample size will be addressed in the Limitations section.

Recruitment. Individuals responded to recruitment notices either through the University of Maine Department of Psychology subject pool or through notices posted on electronic boards accessible by the student body and flyers posted around campus. Interested individuals first completed a screening questionnaire to determine their eligibility to participate via Qualtrics (2016), an online survey software system (Appendices G and H). Participants recruited from the subject pool received course credit for their involvement in the study, and those from the general student population received a $15 gift certificate to a local store.

Inclusion criteria. Participation was limited to individuals between the ages of 18 and 25 years. All participants were recruited with a close, platonic same- or cross-gender friend who was willing to participate in the study session with them. Because close friendships were the focus of this study, both members of each dyad were required to describe their participating friend as a "close" or "best" friend on the Demographics and Personal History Questionnaire (see Appendix J) to be included in the final sample. This step sought to ensure that participant dyads were established rather than emerging friendships. Additionally, both participants of each dyad were required to report that they had never had a romantic relationship with their participating friend, and that he or she was not a family member, in order to select for exclusively platonic non-familial friendships.

Self-Report Measures

Screening questionnaire. Information regarding eligibility criteria (i.e., age, closeness of friendship, presence of past or current romantic relationship, presence of familial relationship), was collected using a self-report questionnaire designed specifically for this project. Two versions of the questionnaire were created, one for participants recruited through the University

of Maine Department of Psychology subject pool (see Appendix G) and one for participants recruited through the general student population (see Appendix H).

Demographics and Personal History Questionnaire. (See Appendix H). Information regarding eligibility criteria (e.g., closeness of friendship, presence of past or current romantic relationship, presence of familial relationship), participant characteristics (e.g., age, sex, ethnicity) and friendship history (e.g., duration of friendship) was collected using a self-report questionnaire designed specifically for this project. The items regarding eligibility criteria were identical to items included in the Screening Questionnaire. Because only one participant of each dyad completed the Screening Questionnaire on behalf of both participants, it was necessary to obtain the self-report of each participant individually during the study session.

Depression symptoms. (See Appendix K). In order to assess self-reported depressive symptoms, participants completed the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996). This scale is a 21-item self-report screening questionnaire designed to assess the severity of depressive symptoms. Each item is rated on a four-point scale ranging from 0 to 3 where 0 reflects no symptoms and 3 reflects severe symptoms. The BDI-II includes an item assessing suicidality, which reflects the suicidality symptom included in the DSM-5 diagnosis of Major Depressive Disorder (American Psychiatric Association, 2013). Some researchers have opted to remove this item when administering the BDI-II in research settings, for fear that asking about suicidal ideation will potentially cause harm to participants (Williams, Connolly, & Segal, 2001). However, extensive research has demonstrated that inquiring about suicidality has no effect on the presence of suicidal ideation, even among high-risk populations (Dazzi, Gribble, Wessely, & Fear, 2014; Mathias et al., 2012) or when assessed repeatedly (Law et al., 2015). Therefore, the current investigation included the suicidality item in order to use the version of the

questionnaire with the most empirical evidence of validation. A risk assessment procedure (see below: Risk Assessment) was in place to follow up with any participants who endorsed suicidality on the BDI-II, or whose responses indicated the possible presence of moderate or severe depression.

The BDI-II has consistently demonstrated good reliability and validity and is one of the most widely used measures to assess symptoms of depression. Internal consistency has been found to be strong in both outpatient clinical samples (Chronbach's $\alpha = .92$; Steer, Ball, Ranieri, & Beck, 1997) and college students (Chronbach's α's = .83-.90; Barstead, Bouchard, & Shih, 2013; Calmes & Roberts, 2008; Storch, Roberti, & Roth, 2004). The BDI-II has also been found to have high test-retest reliability ($r = .96$, Sprinkle et al., 2002). In addition, the BDI-II has been assessed to have good construct validity, correlating highly with other self-report measures of depression in clinical outpatient (Beck et al., 1996; Steer et al., 1997) and college student samples (Storch et al., 2004) as well as clinician-rated structured interviews (Sprinkle et al., 2002). A review of the psychometric properties of the BDI found it to be good at discriminating between depressed and non-depressed individuals (Richter, Werner, Heerlein, Kraus, & Sauer, 1998).

Friendship quality. (See Appendix L). Participants were asked to assess the quality of their friendship with the friend participating with them in the study using The Network of Relationships Inventory: Social Provision Version (NRI-SPV; Furman & Buhrmester, 1985). This questionnaire has ten scales, with three items for each scale. It assesses seven support features (e.g., companionship, instrumental aid, intimate disclosure), two negative interaction features (i.e., conflict, antagonism), and relative power. Each participant was asked to think about his/her participating friend when rating each of 30 items on a 5-point scale, ranging from 1

(*little or none*) to 5 (*the most*). The questions in the relative power subscale are rated on a 5-point scale, ranging from 1 (*s/he always does*) to 5 (*I always do*). Whereas the original questionnaire asked about feelings of liking or loving (given that a variety of relationships, including relationship with mother and romantic partner, were assessed), the NRI was used in the present study to examine only friendships, so the response options were modified to ask only about feelings of liking. Furman and Buhrmester (1985) reported satisfactory internal consistency (Chronbach's $\alpha = .80$).

Co-rumination. Participants were asked to rate to what extent they tended to talk about problems with the friend who was participating in the study by completing the Co-Rumination Questionnaire (CRQ; See Appendix M; Rose, 2002). The 27-item scale is divided into 9 content areas: frequency of discussing problems (e.g., "We spend most of our time together talking about problems that my friends or I have."), discussing problems instead of engaging in other activities (e.g., "If one of us has a problem, we will talk about the problem rather than talking about something else or doing something else."), encouragement by the focal individual of the friend's discussing problems (e.g., "After my friends tell me about a problem, I always try to get them to talk more about it later."), encouragement by the friend of the focal individual's discussing problems (e.g., "When I have a problem, my friends always try really hard to keep me talking about it."), discussing the same problem repeatedly (e.g., "We talk about problems that my friends or I are having almost every time we see each other.") speculation about causes of problems (e.g., "We talk for a long time to figure out all of the different reasons why the problem might have happened."), speculation about consequences of problems (e.g., "We try to figure out every one of the bad things that might have happened because of the problem."), speculation about parts of the problem that are not understood (e.g., "We spend a lot of time trying to figure

out parts of the problem that we can't understand."), and focusing on negative feelings ("We talk a lot about how bad the person with the problem feels."). Each item is given a rating from 1 (*not at all true*) to 5 (*really true*). Rose (2002) reported high internal consistency of the measure Chronbach's α = 96). This questionnaire has been used extensively with college-age participants (Barstead et al., 2013; Byrd-Craven, Granger, & Auer, 2010; Calmes & Roberts, 2008).

Problem identification. (See Appendix N). Participants were asked to identify a problem of theirs that they would like to discuss with their friend, using the Problem Generation and Salience Questionnaire (PGSQ; Rose, 2005). This is a 7-item measure that asks the respondent to rate various aspects of the salience of this problem (e.g., "How important is this problem?") on a scale from 1 (*Not at all*) to 5 (*Very*). This questionnaire has been used with college-age participants prior to administering the "problem talk" task that was employed in this study, described below (Byrd-Craven et al., 2010; Byrd-Craven, Geary, Rose, & Ponzi, 2008; Rose et al., 2014).

Procedure

Screening. Participants from the introductory psychology course subject pool signed up for a study session via SONA, a web-based scheduling program. A brief overview of the study including eligibility information was published on SONA, and interested students were directed to a link to the Qualtrics screening questionnaire that asked for basic demographic information relevant to determining whether they met inclusion criteria, as well as their contact information and the contact information for the friend who intended to participate with them. The questionnaire was designed such that individuals who responded in a manner that indicated they were ineligible to participate (e.g., by indicating an age outside of the accepted range) were redirected to a screen informing them that they were ineligible to participate and thanking them

for their time. Individuals who responded in a manner that indicated eligibility were redirected to a screen that provided them with a password that would allow them to access the SONA study schedule to sign up for an available laboratory session.

Participants from the general student population were recruited via flyers and university electronic message boards. They were directed to complete a different version of the screening questionnaire, which additionally asked them to indicate times that they would be available to participate. They were then assigned a study session based on their indicated availability.

Laboratory session. Participants completed a single data collection session lasting approximately 45 minutes. This session was divided into two stages. During the first stage, upon arrival a target student and his/her accompanying friend were provided with a printed copy and verbal summary of the Informed Consent (see Appendix I) and given time to read it. Each participant was then taken to a private room with a computer to complete all self-report questionnaires (Demographics and Personal History Questionnaire, BDI-II, NRI-SPV, CRQ, and PGSQ) online, via the Internet survey tool Qualtrics.

During the second stage of data collection, the target participant and his/her friend were brought together and videotaped having two separate conversations. First, in order to become accustomed to interacting in front of the camera, each pair of friends completed a 5-minute "warm up" task, during which they were asked to plan a social event together. Next, following the protocol used by Rose et al. (2014), each pair was instructed to recall the personal problem they had reported on the PGSQ during the previous phase. They were told that they had a total of 16 minutes to discuss each friend's problem, and were asked to spend as much or as little time as they liked discussing each problem. They were instructed that, should they finish discussing their problems before the time was up, they could discuss another topic or play with a jigsaw puzzle

that was provided. Both the "warm up" task and the problem discussion task were monitored live, and recorded on the video camera in order to later code these conversations for total, own-, and friend-problem talk duration. At the conclusion of the session, each target participant and his/her friend were provided with a written thank-you statement for their participation, as well as referral information to counseling services (see Appendix O). Those who had an elevated score on the BDI-II (i.e., 29 or above, n = 6) or who indicated the presence of mild, moderate, or severe suicidal ideation on the BDI (n = 15) were privately provided with the follow-up risk assessment as described below.

Risk assessment. A research staff member reviewed the survey responses of both participants immediately following the survey phase of the study. If a participant's responses on the BDI-II indicated the presence of moderate or severe depression (i.e., BDI-II scores ≥ 29), the research staff member privately discussed his/her responses with the participant during the debriefing phase. In addition to being given contact information for the University of Maine Counseling Center, the participant was asked whether he or she would like to speak with the licensed clinical psychologist affiliated with the study to discuss any concerns or receive additional support options. If so, the research staff member informed the clinical psychologist, who contacted the participant by phone.

Participants were asked directly about recent suicidality via one item included in the BDI-II. This item had four possible responses, ranging from 0 ("I don't have any thoughts of killing myself") to 3 ("I would kill myself if I had the chance"). If a participant responded to this item indicating the presence of any suicidality (i.e., selected responses 1, 2, or 3), study staff privately discussed his/her responses with the participant during the debriefing phase and conducted a brief suicide risk assessment to determine the presence of current suicidal ideation,

plan, or intent. If the participant reported current ideation but no plan or intent, he/she was debriefed in the manner described above (i.e., given contact information for the counseling center and asked whether he/she would like to follow up with a licensed psychologist). If the participant reported current suicidal plan and/or intent, the licensed clinical psychologist affiliated with the study was called to conduct an imminent risk assessment and determine whether the participant should be accompanied to the university counseling center or local emergency room.

Problem talk coding. Each 16-minute videotaped problem talk task was coded to determine five variables for each dyad: dyad problem talk duration, own-problem talk duration for each dyad member, and friend-problem talk for each dyad member. The coding strategy used here was adapted from the co-rumination scoring protocol for problem talk described by Rose and colleagues (2014). First, verbatim transcripts were generated for each video using a professional transcription service and reviewed by trained research staff for accuracy. Next, each sentence within a transcript for a given dyad was designated as either "problem talk" or "not problem talk." Finally, all text designated as "problem talk" was further designated as one of four types of problem talk: own-problem talk of dyad member A, own-problem talk of dyad member B, friend-problem talk of dyad member A, and friend-problem talk of dyad member B. This process was completed by two separate trained graduate student raters. To determine interrater reliability, percent agreement was computed between each researcher's ratings of total own-problem and friend-problem talk for 25% of the total number of dyads (i.e., 22). Percent agreement was calculated by first identifying the number of "hits" on each transcript, with hits defined as both raters agreeing on when an own- or friend-problem talk segment started or stopped. This number was then divided by the total number of "hit" opportunities in the

transcript. Finally, an average percent agreement score was calculated across all 22 own-problem talk and friend-problem talk transcripts. Average percent agreement between raters on coding own-problem talk was adequate at 88.25%, and on coding friend-problem talk average percent agreement was also adequate at 84.37%. Separate percent agreement scores were not calculated for total dyad problem talk because this variable was the combination of both own-problem talk and friend-problem talk within each dyad.

After total, own- and friend-problem talk were defined for all dyads, the total duration of each of these variables was calculated. Duration was measured by two trained undergraduate raters. Duration scores were determined by watching the video for each dyad while following along with a transcript color-coded for own-problem talk and friend-problem talk for each dyad member (i.e., four colors total). Raters used stopwatches to track and sum the time elapsed (in seconds) between the start and stop of each color-coded segment. In the occasion that dyad members talked at the same time, that time was counted towards the score of each speaker. For example, if both dyad members spoke simultaneously about speaker A's problem, the time would be counted towards speaker A's own-problem talk score, and speaker B's friend-problem talk score, in order to fully account for the time each individual dyad member participated in the conversation. Inter rater reliability was calculated using Chronbach's alpha for 22 of the total 88 dyads. Inter rater reliability was extremely robust for total problem talk ($\alpha = 0.99$), own-problem talk ($\alpha = 0.99$), and friend-problem talk ($\alpha = 0.99$).

Problem content coding. Problem content was coded by two trained graduate student raters. Each problem described by a participant was coded for interpersonal and dependent content independently, using dichotomous rating (i.e., "1" for presence and "0" for absence). As with other variables, inter rater reliability was established using 25% of the total sample (i.e., 44

participants). Cohen's Kappa was used to determine inter rater reliability as it is known to be appropriately accurate for dichotomous ratings (Wood, 2007). Coefficients were interpreted using the ranges suggested by McHugh (2012). Inter rater reliability for coding the presence of interpersonal content was strong (K = 0.80), and moderate for coding the presence of dependent content (K = 0.61).

CHAPTER THREE

RESULTS

Approach to Data Analysis

All participants in this study were nested within friend dyads. As a result, observations made at the individual participant level could not be considered independent, given that friends are more similar to each other than nonfriends (Duane Buhrmester & Furman, 1987). Supporting this, the amount of variance accounted for by the similarity between dyad members was greater than could be expected by chance on the BDI (ICC = 0.26), CRQ (ICC = 0.34), positive friendship quality composite scale of the NRI (ICC = 0.46), and negative friendship quality composite scale of the NRI (ICC = 0.37, all *p*s<0.001). Total problem talk was assigned at the dyad level, and each individual's proportion of problem talk scores was dependent upon this dyad-level variable. Therefore, traditional statistical methods requiring that data meet the assumption of independence were not appropriate for most analyses. To account for this nonindependence, most analyses were conducted using multilevel modeling, a statistical technique used in dyadic data analysis which accounts for the effect of nonindependence (Kenny, Kashy, & Cook, 2006). Each participant was nested within one friend dyad. Observations made at the individual level were considered Level 1 variables, i.e., those variables where responses differed within dyads. Observations made at the dyad level were considered Level 2 variables, i.e., those variables where the responses of both members of a dyad were identical. Investigations that included only Level 2 as both the dependent and independent variables were conducted using traditional statistical methods and did not use MLM, because all observations made at the dyad level met the assumption of independence. All analyses were conducted using IBM SPSS Statistics 25.

Preliminary Analyses

Measure reliability. The presence of potential outliers in participant responses was investigated prior to hypothesis testing. Univariate outliers were defined as z-scores greater than or equal to ±3 (Daszykowski, Kaczmarek, Vander Heyden, & Walczak, 2007). Identified outlier responses were winsorized in order to preserve power and retain participant variability as much as possible while reducing skew (Field, 2013). That is, outlier responses were changed to the next highest non-outlier response. Extreme values were identified and winsorized in negative friendship quality (n=2) and depressive symptoms (n=4).

All questionnaire variables were also investigated for reliability. Internal consistency was found to be adequate for all questionnaires and their relevant subscales (α = 0.78 to 0.97). Descriptive statistics for questionnaire measures are presented in Table 1.

Table 1. *Descriptive Statistics of Self-Report Questionnaires*

Measure	*M*	*SD*	Range	Internal Consistency (α)
BDI	8.75	7.22	0-31	0.90
CRQ	2.91	0.87	1.00-4.85	0.97
NRI-SPV, Positive Features	3.47	0.72	1.52-5.00	0.94
NRI-SPV, Negative Features	1.39	0.44	1.00-3.33	0.78

Demographic information. A total of 176 students in 88 friend dyads were recruited from the University of Maine Psychology Subject Pool and general undergraduate student body and participated in one of three groups: male friend dyads (15 dyads, n=30), female friend dyads (37 dyads, n=74) and cross-gender friend dyads (36 dyads, n=72). All participants met inclusion criteria and were included in analyses for Hypothesis 1. Due to technical errors during the recording of the observational phase of the study, the problem talk conversations of 4 dyads (2 female friend dyads, 2 cross-gender friend dyads) could not be coded. These dyads were excluded from analyses involving the problem talk or problem content variables, resulting in a

total sample of 168 participants divided into 15 male (n=30), 35 female (n=70), and 34 cross-gender (n=68) friend dyads included in analyses testing Hypotheses 2, 3, and 4.

The full sample was predominantly female (*n*= 110, 62.5%) and Caucasian (*n*=142, 80.7%). Most participants were either a sophomore (*n*=61, 34.7%) or freshman (*n*=59, 33.5%) in college. The age of participants ranged from 18 to 25 years, with a mean age of 19.9 years. All participants reported that the person participating with them was either a "best friend" (*n*=121, 68.8%) or a "good friend" (*n*=55, 31.3%), and the majority of participants reported having known their friend for one year or longer (*n*=126, 71.6%). Sample demographics descriptive statistics are presented in Table 2.

Table 2. *Sample Demographics*

Characteristic	*n*	%ile	*M*	*SD*
Age			19.9	1.54
Gender				
Male	66	37.5		
Female	110	62.5		
Other	0	0		
Race/Ethnicity				
Caucasian	142	80.7		
Asian	7	4.0		
Hispanic	7	4.0		
African American	4	2.3		
American Indian	2	1.1		
Other/Multiple	11	6.3		
Year in School				
First Year	59	33.5		
Sophomore	61	34.7		
Junior	25	14.2		
Senior	30	17.0		
Non-degree student	1	0.6		
Friendship status				
Best Friend	121	68.8		
Good Friend	55	31.3		
Friendship Duration				
1-6 months	35	19.8		
7-11 months	32	18.2		
1 year – 1 year, 11 months	51	29.0		
2 years – 2 years, 11 months	18	10.2		
3 years – 3 years, 11 months	14	8.0		
4 years – 4 years, 11 months	8	4.5		
5 years or more	17	9.7		

Hypothesis 1

The first set of analyses was conducted to attempt to replicate commonly found associations among gender, co-rumination, friendship quality, and depressive symptoms.

Hypotheses 1a and 1b: Gender differences in reported co-rumination. Existing literature has frequently found female adolescents to report significantly higher scores on the CRQ than male adolescents. Exploration of mean responses on the CRQ by gender in the current

study indicated that the average female participant response (mean = 2.99) was higher than the average male response (mean = 2.77). To determine whether this difference was significant, a multilevel model with fixed effects of gender predicting CRQ scores was run. Gender did not significantly predict co-rumination, $F(1, 164.86) = 0.02$, $p = 0.88$.

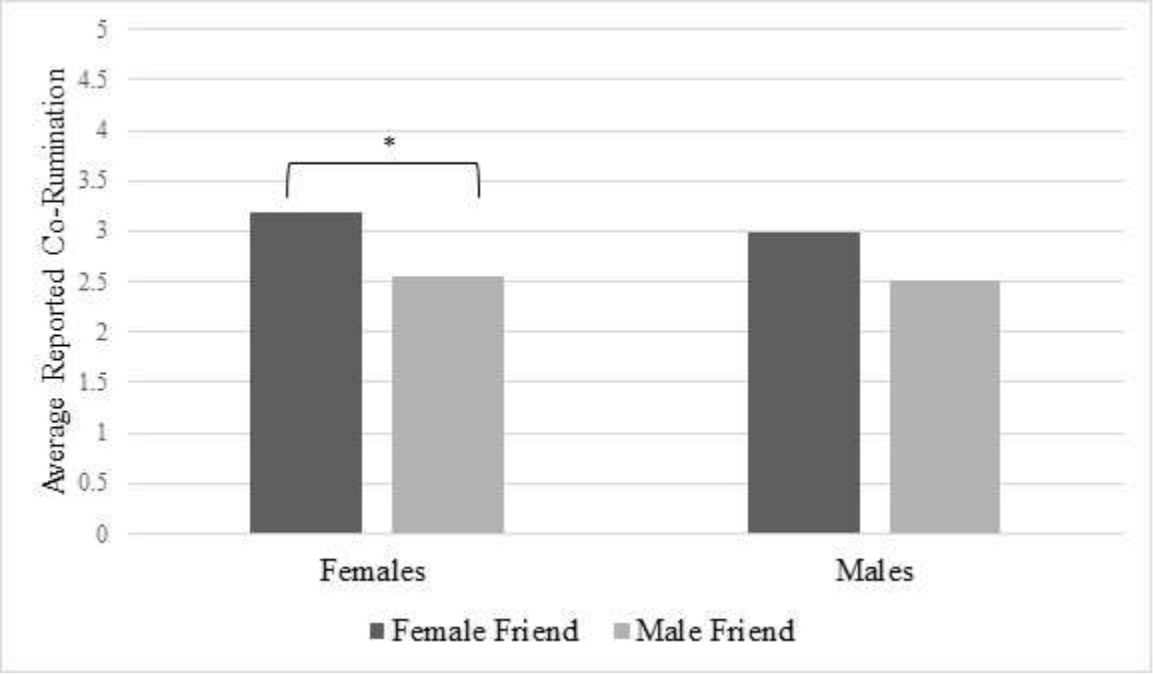
Gender effects were next investigated at the dyad level, to test the prediction that female same-gender dyads and cross-gender dyads would produce significantly higher co-rumination scores than male same-gender dyads. In order to investigate co-rumination at the dyad level, a Level-2 co-rumination variable was created for each dyad by averaging the two CRQ scores of each dyad member. Descriptive statistics (Table 3) revealed that average CRQ scores were highest in female same-gender dyads, followed by cross-gender and male same-gender dyads. A one-way ANOVA was performed to test whether differences between dyad types on CRQ scores were statistically significant. Results indicated significant differences between groups, $F(2,88.03)=6.64$, $p=.002$, $\eta^2=0.14$. Post hoc analyses were conducted using *Hochberg's GT2* pairwise test procedure due to its ability to help account for unequal sample sizes (Field, 2013), and revealed that CRQ scores of female dyads were significantly higher than those of both cross-gender ($p<.001$) and male ($p<.001$) dyads. Cross-gender and male dyad CRQ scores did not significantly differ, $p=0.27$. That is, somewhat contrary to expectations, female dyads reported significantly greater average co-rumination than either cross-gender or male dyads.

Table 3. *Dyad-level Variables by Dyad Type*

	Dyad Type					
	Female		Cross-Gender		Male	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
CRQ	3.19	0.67	2.77	0.75	2.51	0.44
NRI-SPV: Positive Friendship Features	3.73	0.55	3.29	0.62	3.23	0.50
NRI-SPV: Negative Friendship Features	1.29	0.33	1.46	0.36	1.47	0.47

Next, analyses sought to determine whether reported co-rumination of male and female participants varied depending upon dyad type. Investigation of descriptive statistics revealed that female participants in same-gender dyads (mean CRQ = 3.19) reported higher co-rumination than female participants in cross-gender dyads (mean CRQ = 2.56). A multilevel model with fixed effects of dyad type predicting CRQ scores among female participants indicated that this difference was significant, $F(1, 78.94) = 12.441$, $p=.001$. Next, the same steps were repeated with male participants excluding females. Male participants in same-gender dyads (mean CRQ = 2.52) reported less co-rumination than male participants in cross-gender dyads (mean CRQ = 2.99), and dyad type was a significant predictor of co-rumination in males, $F(1, 64) = 5.26$, $p=.025$. Thus, both male and female participants' average reported co-rumination was significantly higher when paired with a female partner (Figure 1).

Figure 1. *Average Reported Co-Rumination by Gender and Friend's Gender*



Note. *Difference is significant, $p<.05$

Finally, within-dyad gender differences were explored. Three paired t-tests were used to determine whether participants' reported co-rumination differed significantly from their partners' reported co-rumination within cross-gender, female same-gender, and male same-gender dyads respectively. Paired t-tests were chosen because by treating "dyad member" as the repeated variable, statistics that were designed to analyze repeated-measures data are appropriate for dyadic data analysis (Kenny, Kashy, & Cook, 2006). Although female members of cross-gender dyads (mean CRQ = 2.56) tended to report lower co-rumination than their male friends (mean CRQ = 2.99), this difference was not statistically significant, $t(34) = 1.77$, $p=0.09$. Similarly, no significant differences between partners' reported co-rumination was found in male dyads, $t(14) = -2.04$, $p=0.06$, or female dyads, $t(36) = 0.06$, $p=0.96$. Participants therefore tended to agree with their partners' perception of co-rumination within the dyad, regardless of dyad type.

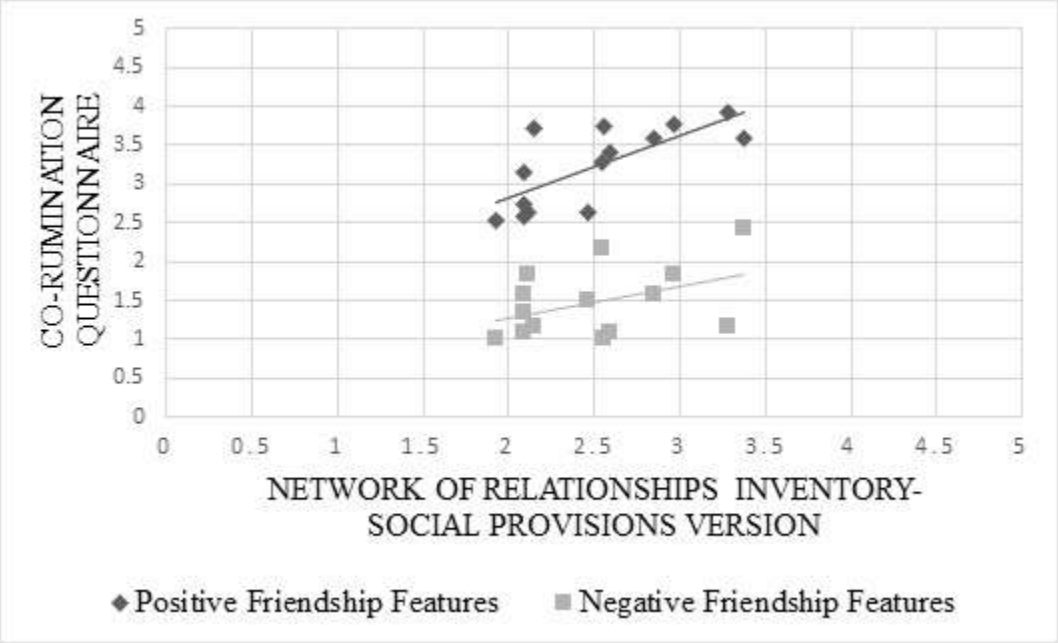
Hypothesis 1c: Associations between co-rumination and friendship quality.

Friendship quality was assessed using the NRI-SPV, which is scored by averaging responses to items contained within 10 individual subscales: 7 positive attributes, 2 negative attributes, and relative power. The scores for 6 of the 7 positive attributes were averaged to create a global Positive Friendship Quality scale (Intimate Disclosure was not included due to its content overlap with the CRQ), while the two negative attributes were averaged to create a global Negative Friendship Quality scale. Finally, in order to compare friendship quality with the dyad as the unit of analyses, dyad-level Positive Friendship Quality and Negative Friendship Quality scores were created for each dyad by averaging the responses of each dyad member ((Furman & Buhrmester, 1985). Descriptive statistics for Positive Friendship Quality and Negative Friendship Quality by dyad are summarized in Table 3.

To test the hypothesis that co-rumination would be associated with greater positive friendship quality and lower negative friendship quality, two linear regression analyses were conducted with dyad CRQ scores predicting dyad Positive Friendship Quality and Negative Friendship Quality respectively. Dyad co-rumination was significantly associated with Positive Friendship Quality, $F(1, 27.61) = 139.67$, $p<.001$, with 41% of the variance in each dyad's Positive Friendship Quality being accounted for by the dyad's reported co-rumination, $b=0.49$, $r^2=0.41$. This association remained significant when the analysis was conducted separately for female ($b=0.43$, $r^2=0.31$), male ($b=0.67$, $r^2=0.45$), and cross-gender dyads ($b=0.44$, $r^2=0.35$; all ps$<.001$). Dyad co-rumination accounted for only 1% of the variance in dyads' reported Negative Friendship Quality, b=0.59, $r^2=0.01$, and the overall model was not significant, $F(1, 0.302) = 2.34$, $p=0.12$. When the analysis was completed separately for each dyad type, the association remained nonsignificant in male ($p=0.65$; Figure 2) and cross-gender dyads ($p=0.99$;

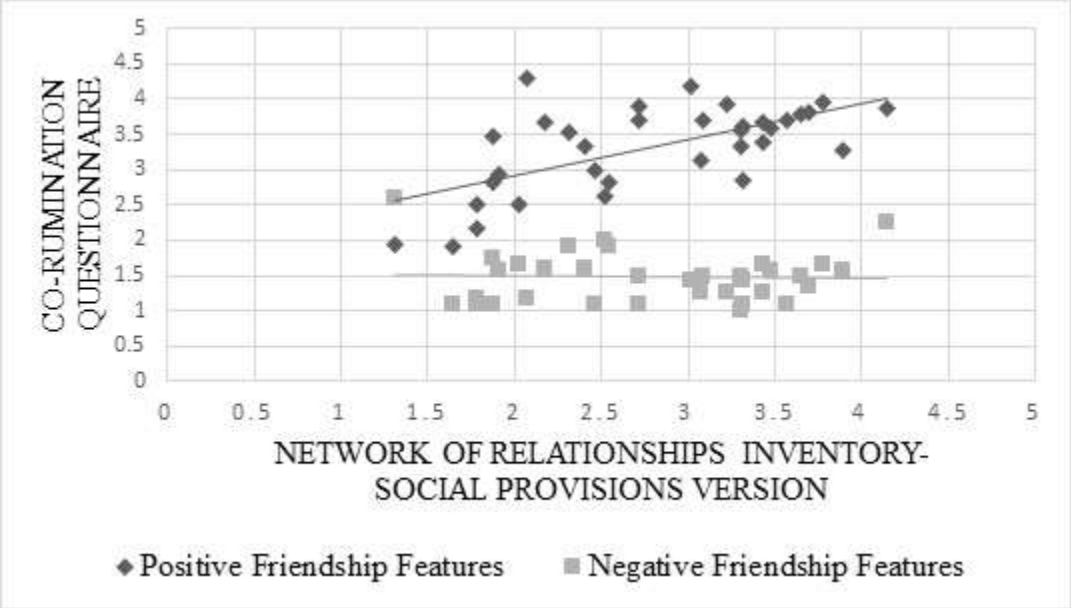
Figure 3). However, co-rumination accounted for 19% of the variance in female dyads' reported Negative Friendship Quality, b=0.22, r^2=0.19, and the overall model was significant, $F(1, 1.47) = 15.90$, $p<.001$ (Figure 4).

Figure 2. *Self-Reported Co-Rumination Predicting Positive and Negative Friendship Features in Male Dyads*



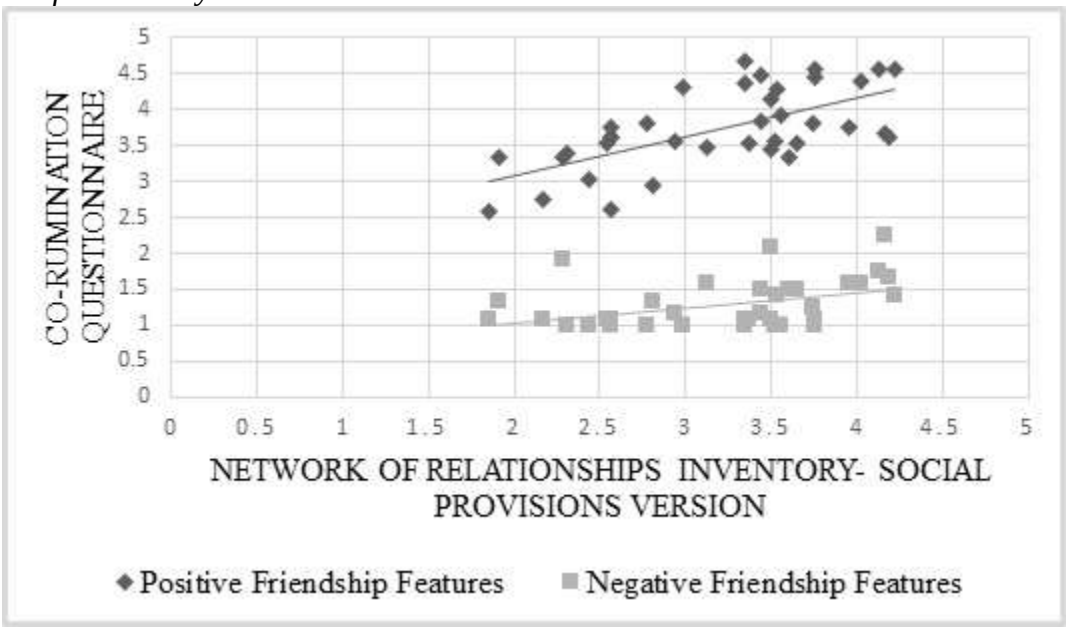
Note. CRQ was significantly associated with positive friendship features (b=0.67, r^2=0.45, $p<.001$), but not negative friendship features (b=.30, r^2=.12, p=0.65).

Figure 3. *Self-Reported Co-Rumination Predicting Positive and Negative Friendship Features in Members of Cross-Gender Dyads*



Note. CRQ was significantly associated with positive friendship features (b=0.43, r^2=0.33, p<.001), but not negative friendship features (b= -.004, r^2<.001, p=0.95).

Figure 4. *Self-Reported Co-Rumination Predicting Positive and Negative Friendship Features in Members of Female Dyads*



Note. CRQ was significantly associated with both positive friendship features (b=0.48, r^2=0.37, p<.001) and negative friendship features (b=.21, r^2=.18, p<.001).

Possible gender differences in the association between co-rumination and positive friendship quality were tested at the individual level. Multilevel model with fixed effects revealed that, in line with predictions, individual participants' self-reported co-rumination predicting positive friendship quality was significant for males $F(1, 60.88) = 35.28$, $p<.001$, and significant for females $F(1, 104.18) = 40.31$, $p<.001$. An identical model predicting negative friendship quality was not significant for males $F(1, 62.51) = 0.006$, $p=.94$, or females $F(1, 106.29) = 1.63$, $p=.21$. Overall, results followed the expected pattern, with self-reported co-rumination predicting positive aspects of friendship quality for both genders.

Hypothesis 1d: Associations between co-rumination and depressive symptoms. Standard regression models could not be used to test the association between co-rumination and depressive symptoms because depressive symptoms reported by each participant were a Level 1 variable. As a result, the hypothesis that co-rumination would be significantly and positively associated with depressive symptoms in female but not male participants was tested using a multilevel linear model with participants nested within dyads, where fixed effects of CRQ scores were entered as a predictor of BDI scores. This model was tested separately for male and female participants. The main effects were found to be not significant for both the model tested with female participants, $F(1, 105.81) = 0.59$, $p=0.44$, and with male participants, $F(1, 62.41) = 0.01$, $p=.91$.

Hypothesis 1e: Association between gender and depressive symptoms. Standard regression models were also not appropriate for investigating the association between participants' gender and depressive symptoms, as both variables are Level 1 variables. In addition, although initial hypotheses planned to test this association using a mediation analysis, the statistical software used for analyses was not able to perform this analysis while accounting

for the dyadic structure of the data. This association was therefore tested using a multilevel linear model with participants nested within dyads, where fixed effects of gender were entered as a predictor of BDI scores. The main effect of this model was found to be significant, $F(1, 169.16) = 8.34$, $p<.01$. Estimation of fixed effects indicated that higher BDI scores were significantly predicted by female gender, $b=-3.22$, $SE=1.11$, $t(164.16) = -2.89$, $p<.01$. When CRQ scores at the individual participant level were added as a predictor, the resulting model was no longer significant. Neither gender, $F(1, 141.27)=1.23$, $p=.27$, CRQ scores, $F(1, 163.00) = 0.60$, $p=.44$, nor their interaction, $F(1, 141.00) = 0.05$, $p=.82$ significantly predicted BDI scores. Therefore, female gender alone was associated with greater depressive symptoms, but gender did not interact with co-rumination to predict depressive symptoms.

Hypothesis 2

Hypothesis 2a: Associations between problem content and gender. It was predicted that problem content would be related to the gender of dyad members, such that female participants would report interpersonal/dependent problems more often than male participants. Participants' self-reported problems were coded by independent raters on two binary labels: each problem was labeled as either interpersonal or non-interpersonal, and either dependent or independent. Most participants reported problems that were non-interpersonal rather than interpersonal (non-interpersonal problems = 60.7%), while dependent problems were more common than independent problems (dependent problems = 88.7%). For hypothesis testing, problem content was coded as a four-option nominal variable according to each of the four possible coding combinations: interpersonal/dependent (n=58, 34.5%), interpersonal/independent (n=7, 4.2%), non-interpersonal/dependent (n=91, 54.2%), and non-interpersonal/independent

(n=11, 6.5%). This hypothesis was tested with a multilevel model where the fixed effects of gender predicted problem content.

However, the original, four-value version of problem content resulted in convergence issues. As a result, the problem content variable was recoded into a binary version with each participant's problem coded as either interpersonal/dependent (n=58, 34.5%) or "other" (n=109, 64.9%). The model was then re-tested using this binary version of problem content as the dependent outcome. Because both the independent and dependent variables were binomial, a generalized linear mixed model with a logit link function predicting a binary measure of problem content from participant gender was used. Results did not support the hypothesis: the fixed effect of gender was not significantly different from zero, $\beta = .4511$, $z = 1.247$, $p = .2122$.

Hypothesis 2b and 2c: Associations among problem content, co-rumination, and depressive symptoms. Next, the hypothesis that depressive symptom severity would vary based on the type of problem reported by the participant was tested using a multilevel mixed model with fixed effects of problem content predicting BDI scores. Results did not support the hypothesis, $F(3, 161.3) = .5098$, $p = .68$. Finally, Hypothesis 2c stated that problem content would interact with participants' reported co-rumination to predict concurrent depressive symptoms. A multilevel mixed model was run with fixed effects of individual participant's CRQ scores, problem content, and their interaction predicting BDI scores. Both main effects were found to be non-significant, such that BDI did not vary according to problem content ($F[3, 152.22] = .4617$, $p = .7094$) or co-rumination ($F[1, 157.69] = .1008$, $p = .7513$). Additionally, the interaction between the two variables was not significantly different from zero ($F[3, 155.15] = .3679$, $p = .7762$), indicating that the effects of problem content and co-rumination do not moderate one another.

Hypothesis 3

Hypotheses 3a-d explored differences in problem talk among male, female, and cross-gender dyads. Five problem talk scores were created for each dyad. First, the amount of time each dyad spent discussing problems together was timed to create a total problem talk score for each dyad. Next, each dyad member was timed separately for how long he or she spent talking about his/her own problem, and how long he or she spent talking about the friend's problem. Finally, in order to standardize individuals' own- and friend-problem talk across dyads with different total problem talk times, proportion scores were generated for each participant by dividing his/her own- and friend-problem talk times by the total problem talk time of the dyad. Thus, problem talk differences were explored using one dyad-level variable (total dyad problem talk) and two individual-level variables (own-problem talk and friend-problem talk). Descriptive statistics for these variables are presented in Table 4.

Table 4. *Dyad Differences in Problem Talk Duration*

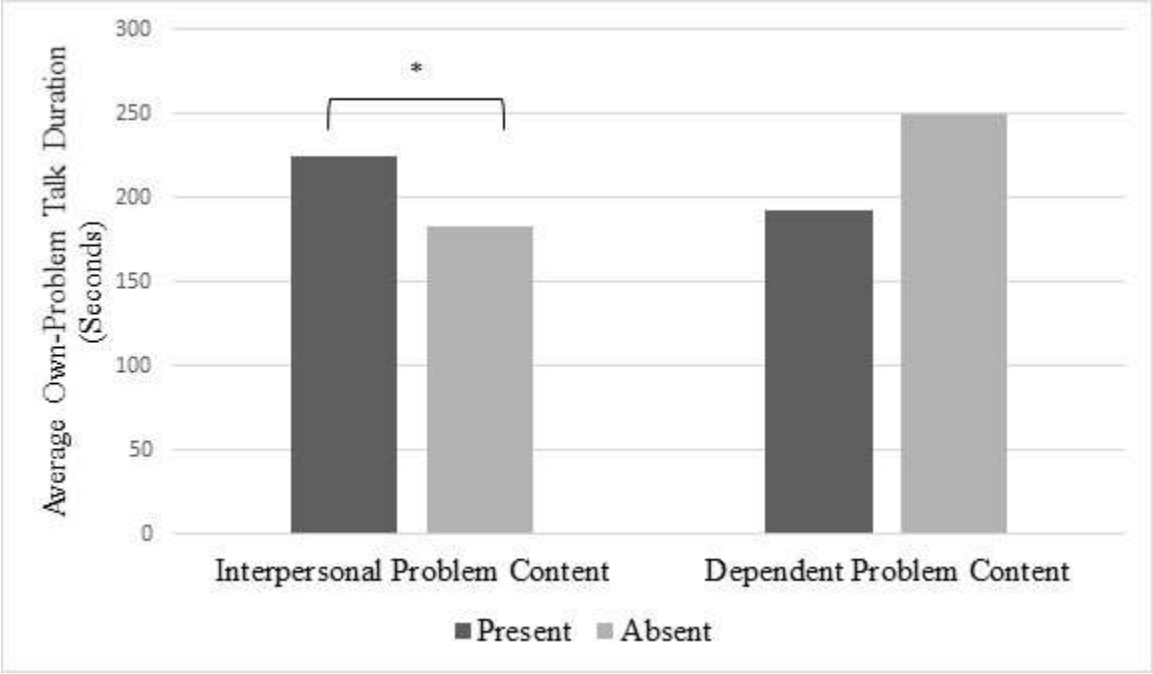
	Dyad Type					
	Female		Male		Cross-Gender	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
Total Dyad Problem Talk	644.49	238.24	573.60	285.80	596.18	243.84
Own-Problem Talk	209.61	139.52	176.70	124.51	194.93	122.71
Friend-Problem Talk	86.23	77.83	83.67	90.50	96.72	70.75
Proportion of Own-Problem Talk	0.32	0.16	0.30	0.12	0.33	0.14
Proportion of Friend-Problem Talk	0.14	0.10	0.14	0.15	0.16	0.10

Hypothesis 3a: Dyad-level mean differences in total problem talk. Examination of total problem talk means by dyad type revealed that female dyads tended to spend the most time discussing problems (mean = 644.49 seconds, SD = 238.24 seconds), followed by cross-gender dyads (mean = 596.18 seconds, SD = 243.84 seconds) and male dyads (mean = 573.60 seconds, SD = 285.80 seconds). To determine whether significant differences existed between these mean times, a one-way ANOVA comparing total dyad problem talk means of the three dyad types was used. An ANOVA was chosen for this analysis because both the independent and dependent variables are Level 2 variables; as a result, multilevel modeling procedures were not appropriate. The overall model was not significant, F (2, 165) = 1.09, p=0.34, indicating that the mean total problem talk scores of each dyad type were not significantly different from one another.

Hypothesis 3b: Gender differences in own- and friend-problem talk. Multilevel linear modeling was used to determine whether the proportion of time participants spent talking about their own problem and their friend's problem varied by gender. Multilevel models with the fixed effects of gender predicting own-problem talk (F[1, 166] = 1.12, p=0.29) and friend-problem talk (F [1, 166] = 0.82, p=0.37) were not found to be significant. Next, multilevel models with fixed effects of gender, friend's gender, and their interaction predicting own-problem talk and friend-problem talk was tested. The overall effects of participant's gender (F [1, 168] = 1.51, p=0.22), friend's gender (F[1, 168] = 0.16, p=0.69), and their interaction (F[1, 168] = 0.43, p=.51) were not significant in predicting own-problem talk. Similarly, friend-problem talk did not vary significantly based on participant's gender (F[1, 169] = 0.46, p=0.50), friend's gender (F[1, 168] = 0.12, p=0.73), or their interaction (F[1, 168] = 1.63, p=0.20). In sum, neither total dyad problem talk, own-problem talk, nor friend-problem talk varied significantly based on the effects of the gender of dyad members.

Hypothesis 3c: Problem content and problem talk duration. Multilevel linear models were used to determine whether the content of participants' problems influenced the duration of time they spent discussing their own problem. Descriptive statistics indicated that average own-problem talk duration was longer for individuals whose problem included interpersonal content (*M*= 225.12 seconds, *SD* = 129.98) than for those whose problems contained no interpersonal content (*M* = 182.31 seconds, *SD* = 127.11). In contrast, average own-problem talk was shorter for individuals whose problem contained dependent content (*M* = 192.89 seconds, *SD* = 140.06) rather than independent content (M = 249.33 seconds, *SD* = 127.38). In order to determine whether these differences were statistically significant, two multilevel models were run with fixed effects of interpersonal problem content and fixed effects of dependent problem content, respectively, predicting the proportion of own-problem talk duration. Results indicated a significant effect of interpersonal problem content, $F(1, 162.55) = 4.24$, $p = 0.41$, but not dependent problem content, $F(1, 164.59) = 3.26$, $p = 0.07$. That is, choosing to discuss a personal problem with interpersonal content predicted a significant increase in the proportion of time an individual spent discussing that problem with his/her friend, while the same was not true of problems with dependent content. These results are summarized in Figure 5.

Figure 5. *Average Own-Problem Talk Duration by Problem Content*



Note. *Difference is significant, $p<.05$

Hypothesis 3d: Effects of problem talk on depressive symptoms and positive friendship quality. To investigate the potential effects of problem talk duration on participants' depressive symptoms, three multilevel linear models were used with fixed effects of total dyad problem talk, own-problem talk, and friend-problem talk predicting BDI scores. No significant effects of total dyad problem talk were found, $F(1, 82.00) = 0.33$, $p = 0.56$. In addition, the models including own-problem talk ($F[1, 105.55] = 0.02$, $p=0.89$) and friend-problem talk ($F[1,126.62] = 0.06$, $p=0.81$) were found to be not significant. Identical models were run replacing positive friendship quality as the dependent variable. Positive friendship quality was not associated with total dyad problem talk, $F(1, 82.31) = 0.57$, $p = 0.45$, own-problem talk, $F(1, 95.79) = 0.67$, $p = 0.41$, or friend-problem talk, $F(1, 118.37) = 0.04$, $p = 0.84$. In sum, there was no evidence found of a significant relationship between problem talk duration and reported depressive symptoms.

Hypothesis 4

The final aim was to determine whether depressive symptoms varied by the interaction effects of gender, problem talk duration (either dyad total, own-problem talk, or other-problem talk), and problem content. The method of estimation on all three models was Restricted Maximum Likelihood (REML). First, a 3-way multilinear model was tested, with total dyad problem talk, problem content, participant gender, and all possible 2- and 3-way interactions entered as independent fixed variables predicting depressive symptoms. None of these variables emerged as significant predictors, nor did any 2- or 3-way interaction effects (see Table 5; all *p*s >.05). A second 3-way multilinear model with own-problem talk, problem content, and participant gender entered as independent fixed variables predicting depressive symptoms was tested, and as with the first model, no significant variable or interaction effects emerged (see Table 6; all *p*s >.05). The third model tested friend-problem talk, problem content, and gender as independent variables predicting depressive symptoms. As with the previous models, no significant variable or interaction effects emerged (see Table 7; all *p*s >.05). Thus, the current findings do not support the hypothesis that problem content and problem talk interact with gender to predict depressive symptoms.

Table 5. *Integrated Model 1: Total Dyad Problem Talk*

	Numerator *df*	Denominator *df*	*F*	*p*
Intercept	1	152.00	3.61	.059
Dyad Problem Talk	1	151.42	.39	.535
Problem Type	3	141.23	.25	.862
Gender	1	147.45	.54	.464
Problem Type x Dyad Problem Talk	3	143.25	.33	.802
Gender x Dyad Problem Talk	1	149.49	.26	.614
Problem Type x Gender	2	134.91	1.17	.313
Problem Type x Gender x Dyad Problem Talk	2	132.92	1.17	.315

Table 6. *Integrated model 2: Own-Problem Talk*

	Numerator *df*	Denominator *df*	*F*	*p*
Intercept	1	151.25	11.05	.001
Own-Problem Talk	1	140.25	.17	.684
Problem Type	4	144.16	.23	.920
Gender	1	141.20	.14	.711
Problem Type x Own-Problem Talk	3	140.09	.06	.979
Gender x Own-Problem Talk	1	140.01	.06	.805
Problem Type x Gender	2	148.74	.05	.951
Problem Type x Gender x Own-Problem Talk	2	147.93	.18	.836

Table 7. *Integrated model 3: Friend-Problem Talk*

	Numerator *df*	Denominator *df*	*F*	*p*
Intercept	1	144.778	66.75	.000
Friend-Problem Talk	1	112.442	1.09	.298
Problem Type	3	148.977	.76	.516
Gender	1	151.210	2.52	.114
Problem Type x Friend-Problem Talk	3	114.999	.82	.487
Gender x Friend-Problem Talk	1	100.791	.21	.646
Problem Type x Gender	2	139.616	.47	.624
Problem Type x Gender x Friend-Problem Talk	2	113.613	1.99	.140

CHAPTER FOUR

DISCUSSION

The primary aim of this study was to clarify previously established gender differences in the depressogenic effects of co-rumination in adolescence. Although adolescence is a period of both increased friendship intimacy and increased risk for depressive symptoms for both males and females, the risk of depression rises much more steeply for females during this time. Recent literature has repeatedly found that co-rumination is associated with increased friendship quality for both adolescent females and males, while being associated with increased depressive symptoms for females only (Rose et al., 2007), even when males and females report engaging in comparable rates of co-rumination (Calmes & Roberts, 2008). This suggests that co-rumination may help account for the depression gender disparity that emerges in adolescence. The present study sought to extend previous findings and help to account for this gender imbalance in the depressogenic effects of co-rumination in three key ways: 1) use of a multi-method approach incorporating observational data, 2) including cross-gender friendships as well as same-gender male and female friendships, and 3) examining two aspects of co-rumination as possible sources of gender differences in the process of co-rumination; namely, the content and duration of problem talk discussions.

The first aim of this study was to use a multi-method approach, incorporating both self-report and observational variables. To date, the overwhelming majority of co-rumination research has relied solely on the use of self-report data, and often has incorporated the self-report of only one member of a friend dyad. Because co-rumination is a dyadic process, it is crucial to expand the literature to take into account the contributions of both dyad members. This study adapted an observational paradigm recently published by Rose and colleagues (Rose et al.,

2014), obtaining both self-report questionnaire data and video and audio recorded conversations between dyad members. Although obtaining an observed co-rumination score was beyond the scope of the current study, coding for both dyad-level and participant-level aspects of co-rumination (i.e., problem talk duration) enabled this study to investigate observable components of the co-ruminative process.

The next aim was to include cross-gender friend dyads. Although cross-gender friendships are known to become an increasingly normative and important source of support during mid and late adolescence (Barstead et al., 2013; Kuttler et al., 1999), the majority of research on co-rumination has included participants reporting exclusively on same-gender friendships. The inclusion of cross-gender friendships is crucial for better understanding the gender-based depressogenic effects of co-rumination, given that when late adolescents have been allowed to report on opposite-gender relationships, males have been found to report engaging in co-rumination to a similar extent as females without the associated increased risk of concurrent depressive symptoms (Day, Dieter, & Erdley, 2015). The present study included cross-gender good- and best-friend dyads along with same-gender male and female friend dyads in order to investigate whether the combination of partners' genders is relevant to the depressogenic effects of co-rumination.

The third and final aim was examining the content and duration of problem talk, to determine whether these components of co-rumination helped to explain the gender gap in associations between co-rumination and depressive symptoms. In particular, participants' problems were coded for interpersonal/dependent content, which is known to have reciprocal links with both depressive symptoms and depressive rumination (Flynn, Kecmanovic, & Alloy, 2010; Hammen, 1991; Rudolph et al., 2000), as well as co-rumination (Hankin et al., 2010). In

addition to problem content, the duration that dyads spent discussing problems was coded. This variable was further broken down into the duration each participant spent discussing his or her own problem and how long the participant spent discussing the friend's problem, in order to explore potential gender differences in conversation engagement. Given that females tend to report experiencing more interpersonal stress than males, and are more likely to engage in intimate self-disclosure, these variables were thought to offer insight into how males and females approach the discussion of problems with both their same- and opposite-gender friends.

Replication of Past Findings

Gender differences in co-rumination

In the present study, gender differences were investigated both between dyads and within dyads. When examined using the full sample, female participants did not report engaging in co-rumination significantly more than male participants. This is in opposition to numerous studies that have found a consistent gender difference in self-reported co-rumination (Rose, 2002; Rose et al., 2007; Schwartz-Mette & Rose, 2012; Stone et al., 2011). However, studies that replicate this finding have tended to use samples of young-to mid-adolescents who report exclusively on co-rumination with a same-gender friend or friends. In contrast, studies of late adolescents have tended to find that gender differences in reported co-rumination disappear when participants are allowed to report on either same- or cross-gender relationships (Barstead et al., 2013; Calmes & Roberts, 2008). Thus, this finding is consistent with existing studies that have focused on a similar sample comprised of late adolescents.

Gender differences did emerge at the dyad level, however. When co-rumination was treated as a dyad-level variable, female same-gender dyads reported significantly greater co-rumination on average than either cross-gender or male same-gender dyads. Further analysis at

the individual level revealed that female participants in same-gender dyads reported significantly more co-rumination than female participants with a male friend, while male participants in cross-gender dyads reported significantly more co-rumination than male participants with a male friend. That is, both male and female participants reported engaging in significantly more co-rumination when their co-ruminating partner was female, while female participants with female friends reported engaging in the highest rates of co-rumination overall.

These findings again echo previous studies in revealing significant gender differences in co-rumination with close same-gender friends, and comparable rates of co-rumination with cross-gender friends (Barstead et al., 2013; Calmes & Roberts, 2008). In addition, these results were in line with Barstead and colleagues' (2013) findings that male participants' reported co-rumination was greater with female friends than with same-gender friends. However, whereas Barstead and colleagues noted that co-rumination of female college students tended to remain relatively consistent regardless of their friend's gender, this study found a significant effect of dyad type for both males and females. One possible reason for this difference is sample size. Barstead and colleagues allowed participants to self-select their "closest confidant," resulting in 75 females reporting on co-rumination with a same-gender friend but only 16 reporting on co-rumination with a male friend, whereas more than half of their male participants reported on a cross-gender friendship. In contrast, the present investigation selected for friendship type, resulting in near-equal numbers of female participants in same- and cross-gender dyads, as well as more than twice as many female participants reporting on a cross-gender friendship than Barstead and colleagues' sample. As a result, it is possible that this increased number of cross-gender friendships influenced the pattern of results found here.

By including self-reported co-rumination by both members of a friendship dyad, these findings are also the first to be able to compare relative agreement in reported co-rumination between dyad partners. No significant differences were found between dyad members in either cross-gender or same-gender dyads, suggesting that dyad members tend to perceive co-rumination similarly. This lends additional support to the use of the CRQ as a reliable measure of dyadic co-rumination, and suggests that variances in both males' and females' reported co-rumination depending upon the gender of their partner are reflective of actual differences and not simply differences in perception.

Socioemotional tradeoffs of co-rumination

In line with previous findings, reported co-rumination was significantly and positively associated with positive friendship quality, for both males and females. This finding has been replicated with younger adolescents reporting on same-gender friendships (Rose et al., 2007) and late adolescents reporting on both same- and cross-gender relationships (Calmes & Roberts, 2008). Longitudinal results have even indicated bidirectional effects of co-rumination and friendship quality, such that increased closeness increases the likelihood of co-rumination, which in turn predicts improvements in friendship quality (Rose et al., 2007).

Importantly, co-rumination was also significantly and positively associated with negative friendship features (i.e., conflict and antagonism), but only for participants in female friendship dyads. This is the first known investigation to explore associations between co-rumination and negative friendship features, and it is striking that an association emerged exclusively within female dyads. Previous literature has suggested that female same-gender friendships tend to have greater positive features and fewer negative features than male same-gender friendships, and display more positive interaction behaviors and fewer negative interaction behaviors (Brendgen

et al., 2001). It is possible that although negative features may be overall less common in female friendships, female friends who co-ruminate more are also more likely to experience more negative features within their friendships. This suggests that co-rumination may in fact have some detrimental effects on female friendship quality, despite being associated with increases in intimacy. Overall, these results indicate that it is crucial to account for negative friendship features as well as positive features when investigating the impact of co-rumination within dyads.

Contrary to expectations, a positive association was not found between co-rumination and depressive symptoms. Consistent with well-established findings in the depression literature (Hilt & Nolen-Hoeksema, 2014; Nolen-Hoeksema, Larson, & Grayson, 1999), female participants reported significantly more severe depressive symptoms than males. However, co-rumination did not moderate this association, and co-rumination was not a predictor of depressive symptoms in either male or female participants.

The lack of association between co-rumination and depressive symptoms contrasts with a number of studies that have reported cross-sectional associations between these variables. Notably, however, findings are mixed with regards to whether the association between co-rumination and depressive symptoms holds for both genders, or for females only. Co-rumination has predicted concurrent depressive symptoms in females but not males in both early adolescence (Starr & Davila, 2009) and late adolescence (Barstead et al., 2013; Calmes & Roberts, 2008), and has predicted changes in depressive symptoms over time exclusively in females (Rose et al., 2007). However, evidence of this association being present for both genders is numerous as well. Co-rumination has been found to predict depressive symptoms and a history of depressive episodes in late childhood/early adolescence for both genders (Rose, 2002; Stone et

al., 2010). Several studies have found more limited associations, but in both genders, with co-rumination predicting concurrent depression only when peer communication is low in a mid-adolescent sample (Dam, Roelofs, & Muris, 2014), or only in the context of a high quality relationship (Guassi Moreira, Miernicki, & Telzer, 2016) among late adolescents. A recent investigation indicated that co-rumination may impact depressive symptoms indirectly, through an association with depressive rumination found in a sample of early adolescents (Stone & Gibb, 2015). Findings are therefore extremely mixed, with significant associations between co-rumination and depressive symptoms being found in both genders or in females exclusively, and both contrasting findings emerging across the adolescent period. Nevertheless, very few published investigations have found an insignificant association of co-rumination and depressive symptoms in either gender. It is possible that the current investigation lacked sufficient power to reliably test this association.

Problem Content

Problem content and gender

A series of analyses investigated the relationship between participants' gender and the type of problem they identified to discuss with their friend. Endorsed problems were coded as either interpersonal or non-interpersonal, and either dependent or independent. It was expected that gender would be related to problem type such that females would endorse problems that were both interpersonal and dependent significantly more often than males. Although females did report interpersonal problems, dependent problems, and their combination at a higher percentage than males, this difference was not significant.

These findings are largely inconsistent with existing literature. A considerable amount of research has documented an association between interpersonal stress events and gender, with

females consistently being found to experience interpersonal stressful life events more often than males (Calvete et al., 2013; Rudolph et al., 2000). This gender difference is documented across the lifespan. In a large-scale cross-sectional investigation of the salience of interpersonal problems across gender and age, Strough and colleagues (Strough, Berg, & Sansone, 1996) asked respondents to identify a current problem and report on the salience of various features of the problem. They found that while the majority of respondents identified an interpersonal problem, this type of problem was significantly more common among female respondents from pre-adolescence through adulthood. This trend has been replicated numerous times, and in particular with dependent interpersonal events being reported more often in females (Ge et al., 1994; Rudolph & Hammen, 1999; Shih et al., 2006). Females may tend to identify interpersonal problems more often than males because they are more likely to see interpersonal relationships as central to their self-concept than males (Feingold, 1994). As a result, females may focus more on interpersonal problems when they arise and thus be more likely to report them when prompted. This was certainly the trend in the current investigation, however, it did not reach statistical significance. It is possible that the findings of this study differ from the existing literature because of its small sample size, and in particular the small number of male participants. This may have prevented any potential gender differences from being detected.

Problem generation and depression severity

Surprisingly, no association was found between problem type and depressive symptoms. As with problem type and gender, there is also a well-established trend of an association between depressive symptoms and interpersonal, dependent problems, particularly among females. Hammen's Stress Generation Model (Hammen, 1991) suggests that depressive symptoms increase the likelihood that depressed individuals will behave in ways that generate

interpersonal, dependent stressors, and these stressors in turn exacerbate their depressive symptoms. Thus, because females are more likely to experience depressive symptoms, they may be more likely than males to behave in ways that generate interpersonal, dependent problems than males. As a result, females with depression not only may view interpersonal problems as more salient than males but also may experience more frequent interpersonal problems due in part to their symptomology. In support of this theory, interpersonal, dependent stressors have been observed to be significantly associated with concurrent depression (Rudolph & Hammen, 1999; Windle, 1992).

Interpersonal, dependent problems have also been found to help account for the depression gender gap. Females who experience interpersonal stress are more likely than males to react to these stressors with depressogenic responses (Christakos, 2004; Rudolph & Hammen, 1999). Additionally, in a longitudinal investigation of adolescents, exposure to interpersonal, dependent problems mediated the association between gender and depressive symptoms over time (Hankin et al., 2007). In even more robust support for this model, multiple longitudinal investigations have documented transactional effects between interpersonal problems and depression, such that depressive symptoms predict the emergence of interpersonal stressors, which in turn predict the increase in and maintenance of depressive symptoms over time in female adolescents but not male adolescents (Calvete et al., 2013; Rudolph et al., 2000, 2009). Although replication of these findings is not universal, a thorough review of the stress generation literature suggests that evidence indicating a bidirectional association between gender and depressive symptoms is influenced strongly by gender differences in stress generation, and in particular the generation of interpersonal, dependent problems (Liu & Alloy, 2010). The explanation for the lack of support for this association in the current investigation is not clear,

and the existing research investigating associations between problem type and depression in late adolescents is small. Further research is needed to provide additional clarity.

Co-rumination, problem type, and depression

The current study failed to find either 2- or 3-way interaction effects between co-rumination, problem type, and gender in predicting depressive symptoms. The lack of interaction effects between co-rumination and gender is perhaps unsurprising, given mixed findings for the nature of the relationship among gender, co-rumination, and depression in the extant literature. Several studies have failed to find an interaction effect of gender and co-rumination in predicting depression or depressive symptoms (Hankin et al., 2010; Stone et al., 2011, 2010), albeit exclusively within child and early adolescent samples. Stone and Gibb (2015) have argued that co-rumination may in fact have similar depressogenic effects on both males and females, and that females' greater tendency to co-ruminate is partially responsible for the depression gender gap. In support of this theory, several investigations have reported a mediational effect of co-rumination on the association between gender and internalizing symptoms (Calmes & Roberts, 2008; Stone et al., 2011; Tompkins et al., 2011).

Interestingly, a recent study (Rose, Glick, Smith, Schwartz-Mette, & Borowski, 2017) has found a different significant relationship between these variables. In a sample of middle adolescents, the generation of interpersonal stress with peers was significantly predicted by the interaction effects of co-rumination, gender, and depressive symptoms, such that the association between depressive symptoms and interpersonal stress was significant for girls who were high co-ruminators. That is, girls who co-ruminated frequently with friends and had relatively high levels of depressive symptoms were most likely to later experience interpersonal stress with their peers, suggesting that increased interpersonal stress may be an outcome of co-rumination. It

could be that co-rumination has a depressive impact regardless of the content of the problems discussed, but that co-rumination is uniquely impactful in generating additional interpersonal problems in particular. Additional research is needed to clarify the directionality of the relationships between these variables.

Problem Talk

Problem talk duration in female, male, and cross-gender dyads

The present study is the first known investigation to compare observed differences in the duration of problem talk between same- and cross-gender platonic friend dyads. When comparing the duration of each dyads' total time spent discussing problems, a significant pattern emerged with female same-gender dyads spending the most time on average discussing problems, followed by cross-gender dyads, and finally male same-gender dyads. The duration of problem talk within a dyad is an important defining component of co-rumination. Rose (2002) initially defined co-rumination as the excessive discussion of personal problems within a dyadic relationship. Psychometric evaluations of the CRQ have supported a three-factor model of the construct, consisting of rehashing features a problem, mulling over potential explanations of the problem, and actively encouraging continued problem talk (Davidson et al., 2014). In an observational study, Rose and colleagues (2014) coded for five separate components to develop a total score for observed co-rumination: extent of problem talk, measured as the total time spent discussing problems; rehashing problems; speculating about causes and potential effects of the problem; mutual encouragement of problem talk; and dwelling on negative affect associated with the problem. Thus, while the manner in which a problem is discussed is an important part of co-rumination, the duration of the problem talk itself is a key defining feature.

The finding that female same-gender dyads engaged in this core component more than male same-gender dyads is consistent with the overwhelming evidence suggesting that co-rumination is more commonly reported by females than males. However, the relative duration of observed co-rumination in general or problem talk in particular has not been investigated in cross-gender friendships. Barstead and colleagues (2013) were among the first to investigate reported co-rumination within both same- and cross-gender dyads in late adolescents, finding that females tended to report similar rates of co-rumination regardless of the gender of their partner, whereas males reported engaging in co-rumination more with female partners than male partners. The current results are somewhat aligned with this pattern: because cross-gender dyads engaged in longer problem talk than male same-gender dyads, male participants experienced longer problem talk conversations if their partner was a female than if their partner was a male. In contrast, female dyads engaged in significantly more problem talk than cross-gender dyads, meaning that female participants also experienced longer problem talk conversations when their partner was female than when their partner was male. Thus, the current results provided support for the theory that males may engage in problem talk and co-rumination at a greater rate with female partners than with male partners, whereas additional replication is needed to determine whether the problem talk and co-rumination patterns of females varies significantly according to partner gender.

There are several possible explanations for the significant differences in dyad-level problem talk found in the current study. It could be that the duration of problem talk conversations varies within individuals depending upon their partners. Given that females are known to engage in intimate disclosure more frequently than males (Buhrmester & Furman, 1987), it may be that females tend to encourage problem talk more than males. Thus, when males

and females discuss problems in cross-gender friendships, the duration of discussion is somewhat shorter than if the female interacted with a female friend, but longer than if a male interacted with another male friend. Alternately, these effects could be reflecting the well-known pattern of homophily, where individuals who are similar to each other are more likely to become friends, and tend to become more similar to each other over time (Berndt, 1982). It could be that individuals are relatively consistent in how much they tend to engage in problem talk, and seek out partners with similar tendencies. This would mean that females with a lesser tendency to engage in problem talk compared to their same-gender peers find that males with a greater tendency to engage in problem talk compared to their same-gender peers are an ideal companion. Future research may be able to address this question by assessing co-rumination between an individual and multiple relationships of both genders.

Participant and partner gender impact on own- and friend-problem talk duration

Exploratory analyses were run to attempt to determine whether males and females differed in their level of engagement in problem talk conversations, and whether such variance, if it existed, was influenced by the gender of their partner. It was hoped that measuring the amount of time participants of each gender spent talking about their own problem versus talking about their friend's problem could illuminate potential gender differences in the discussion of personal problems. For example, because females are more likely to engage in intimate disclosure (Buhrmester & Furman, 1987), they may either discuss their own problems for a longer duration than males, or encourage the discussion of their partner's problems more than males. Conversely, males report greater feelings of closeness in their cross-gender friendships than their same-gender friendships (Reeder, 2003), and report engaging in co-rumination more in cross-gender relationships than same-gender relationships (Barstead et al., 2013). Males may therefore feel

more comfortable disclosing and discussing problems with female friends than male friends. Such a distinction could account for the pattern of total dyad problem talk duration found, with either females' or males' differing engagement in longer own- and/or friend-problem talk driving dyad-level differences on total problem talk. However, results did not provide support for this possibility, as neither participants' gender, friends' gender, nor their interaction contributed significantly to the variance in either own-problem talk or friend-problem talk. It is possible that insufficient power prevented any such influence from being detected, and further replications with larger and more equally distributed sample sizes are needed.

However, it could be that while total dyad-level problem talk varied between dyad types, the proportion of own-problem talk and friend-problem talk may have remained relatively stable for males and females regardless of the gender of their partner. If this is the case, it will be necessary to look at other possible drivers of differences in problem talk duration among male, female, and cross-gender dyads. One such possibility is variation in the encouragement of problem talk. In a sample of middle adolescents, Rose and colleagues (2014) found that responding to friends' problem talk with encouragement such as relevant questions about the problem or supportive statements increased the likelihood of continued problem talk, and thus propelled co-rumination. Although gender differences were not discussed, it is possible that males and females may differ in the extent of supportive statements they provide in response to their friends' problem talk, or that this extent may differ depending upon the gender of their partner. Additional research is needed to determine whether dyad-level gender differences in problem talk and co-rumination are replicable, and if so, what dyadic processes help to account for these differences.

Problem talk duration and problem type

Although a great deal of research has focused on problem generation, little attention has been paid to how different types of problems are discussed in a dyadic context. Results indicated that problem content has a significant impact on the duration of problem talk; specifically, selecting an interpersonal problem to discuss was associated with significantly longer duration of own-problem talk. That is, individuals who were experiencing an interpersonal problem and chose to discuss it with their friend spent more time talking about their problem than those who selected a non-interpersonal problem. Notably, the same was not found for dependent problems. This finding builds on results reported by Hankin and colleagues (2010): in a sample of early and middle adolescents, reported co-rumination predicted the subsequent generation of interpersonal and dependent stressors. In conjunction with the current findings, this suggests a possible reciprocal relationship between problem content and co-rumination with interpersonal content increasing the likelihood of spending time co-ruminating, which in turn may increase the risk of generating additional interpersonal stressors.

It is possible that the nature of interpersonal problems lends them to longer discussion and even greater chances of engaging in co-rumination. Non-interpersonal problems, such as concerns about finances or schoolwork, tend to be easily understood and have more straightforward solutions. For example, a college student will likely not have to struggle to understand why his or her workload increases at the end of the semester, and will typically know that the solution is to devote more time to schoolwork, regardless of whether this is difficult to do or not. In contrast, interpersonal problems are often more complex and can require considering the thoughts or motives of another person, which can be a difficult task. Interpersonal problems may also elicit more complex emotional content than non-interpersonal problems, due to the possibility of feeling hurt, offended, or betrayed by another person. Finally,

solutions to interpersonal problems can frequently be difficult because a resolution is often dependent upon the actions of another person and is therefore at least partially outside of an individual's control. Interpersonal problems, therefore, may lend themselves more readily to key aspects of co-rumination such as speculating, dwelling on negative affect, and rehashing problem content. The current study offers evidence to suggest that at the very least, a focus on interpersonal problems may lead adolescents to spend more time talking about their problems. Future research is needed to clarify the impact of types of problem content on co-rumination.

Problem talk duration and depression severity

Co-rumination has consistently been found to be associated with concurrent and prospective depressive symptoms, and problem talk is a key component of co-rumination. Accordingly, analyses tested the hypothesis that either the amount of time dyads spend discussing problems and/or the amount of time individuals spend discussing their own or their friend's problem would be associated with reported depressive symptoms. However, no evidence was found for these associations. These results are perhaps in line with those of Rose et al. (2014), who measured the five components of co-rumination from observed problem talk conversations between same-gender middle adolescent dyads and found that the individual components of co-rumination were differently associated with socioemotional outcomes. Specifically, while excessive problem talk, mutual encouragement of problem talk, and rehashing and speculating about problems were each associated with positive friendship qualities, dwelling on negative affect was associated with internalizing problems. Thus, it may be that problem talk duration alone, whether driven by discussion of own-problem talk or friend-problem talk, may only be associated with more positive socioemotional outcomes and may not contribute to co-rumination's association with depressive symptoms.

If this is the case, investigating gender differences in the individual components of co-rumination may be necessary for explaining findings that suggest that co-rumination has different socioemotional tradeoffs for males and females in late adolescence. Few studies have investigated both internalizing symptoms and friendship quality as outcomes. Among those that have (Calmes & Roberts, 2008; Rose, 2002; Rose et al., 2007), reported co-rumination was consistently found to be associated with positive friendship quality among both males and females, whereas depressive symptoms were predicted by co-rumination only for females, regardless of friend's gender. Although the present study did not replicate the well-established association between reported co-rumination and depressive symptoms, an association between reported co-rumination and positive friendship quality was replicated for both males and females of all dyad types. This is perhaps unsurprising, as co-rumination is conceptualized as the intersection between intimate self-disclosure and depressive rumination (Rose, 2002). What is not yet known, however, is why males and females may experience differences in the socioemotional tradeoffs of co-rumination. It may be that males and females differ in the extent to which they engage in separate components of co-rumination. If problem talk duration is in fact associated with positive friendship quality, but dwelling on negative affect is associated exclusively with depressive symptoms, then perhaps females are more likely than males to engage in dwelling on negative affect, resulting in increased risk of depressive symptoms. Recent evidence that co-rumination may lead to depressive symptoms by increasing the risk of depressive rumination supports this possibility (Stone & Gibb, 2015).

Another related possibility is that males and females differ in the amount of emotional distress they experience in response to problem talk and co-rumination. In a sample of early adolescents, co-rumination was found to mediate the association between social perspective

taking (i.e., the ability to view a situation from the perspective of another person) and both positive friendship quality and empathetic distress (i.e., the ability to feel another person's distress to the point of experiencing it as your own; Smith & Rose, 2011). Importantly, empathetic distress was observed to be more common in girls than in boys. Thus, it is possible that even when rates of problem talk are similar, females are more likely than males to experience exacerbated distress in response to problem talk.

Testing an Integrated Model

Gender, problem generation, problem talk duration, and depression severity

The final aim of this study was to explore the potential interaction effects among gender, problem type, and problem talk duration in predicting depressive symptoms. In particular, it was thought that depression severity may be highest in female participants discussing interpersonal problems for a longer duration. Contrary to hypotheses, no variable or interaction effects were found, with either total problem talk duration, own-problem talk, or friend-problem talk. This is unsurprising, as while the current study did find an association between gender and depression severity, problem type and problem talk duration were not individually associated with depression severity. Past research has suggested potential interaction effects between pairs of the included variables. For example, reported co-rumination has been found to be dependent upon the gender of both members of a dyad (Barstead et al., 2013), and co-rumination about dependent and interpersonal events has been found to predict subsequent depressive symptoms (Nicolai et al., 2013). As with other analyses, it is possible that the sample size in the present study was not sufficient to detect possible variable or interaction effects. However, if these results represent a true failure to reject the null hypothesis, it could be that depressive symptoms are not significantly impacted by either the type of problem a person discusses or the length of time that

person spends discussing it. This is ultimately a hopeful conclusion, as it suggests that simply experiencing interpersonal stress and discussing it at length with friends is insufficient to influence symptoms of depression.

Implications

Although many of the hypotheses set forth by this investigation were not supported, results still suggest a number of important implications for future co-rumination research. This investigation is the first known to compare reported co-rumination by both members of the same dyad. Previous research using the CRQ has typically administered the measure to one individual and asked that person to report on either his/her co-rumination habits in general, or his/her co-rumination habits within a specific dyad. Thus, existing literature has not been able to determine whether gender differences in reported co-rumination reflect differences in subjective perceptions of problem talk in males and females because it was not possible to compare two individuals of different genders reporting on co-rumination within the same dyad. Results of the current study found no significant differences in reported co-rumination between dyad partners within any of the included dyad types. This means that even cross-gender friends tended to agree on the extent of co-rumination occurring within their dyads. This is good news for investigators of co-rumination, as it suggests that previous results that included the self-report of only one dyad member can be taken as reflective of the partner's perception of co-rumination within the dyad.

This study also revealed important patterns of gender differences in both reported co-rumination and dyad-level problem talk, which is an important component of co-rumination. By assessing both reported co-rumination and observed problem talk, this study provided the first opportunity to directly compare self-report and observed behavior. Results showed that members

of female dyads reported significantly higher rates of co-rumination compared to both cross-gender and male same-gender dyads, who reported similar rates. At the individual level, both females and males reported engaging in co-rumination more if they had a female friend than a male friend. A similar pattern was revealed in observed dyad problem talk, with female dyads spending the most time discussing problems, followed by cross-gender dyads, and finally male dyads. Importantly, these findings offer the first evidence that dyad members' reported co-rumination habits can be mapped onto observable behavior. This provides yet more support for the use of the CRQ as a valid representation of individuals' actual dyadic interactions.

These gendered patterns of self-reported co-rumination and observed problem talk also have significant implications for understanding gender differences in co-rumination and, by extension, the depression gender gap. Results seem to indicate that both males and females are more likely to co-ruminate when their discussion partner is a female friend, replicating a pattern that has been found previously in young adults (Barstead et al., 2013). Thus, females may be exposed to problem talk significantly more than males. This may have deleterious effects for a number of reasons. First, because problem talk is a key component of co-rumination, engaging in more problem talk creates additional opportunities for co-rumination. Second, in another potential pathway, spending greater time engaged in problem talk may also increase the risk of experiencing empathetic distress (Smith & Rose, 2011). Thus, while adolescents of both genders seeking out female partners to discuss problems with can contribute to greater intimacy over time, it may also contribute to increased distress. Future research is needed to test these potential pathways and determine whether these hypothesized effects are cumulative.

Although previous research has suggested that co-rumination may be related to future interpersonal problems, no research to date has demonstrated an impact of problem content on

the tendency to co-ruminate. The current investigation sought to determine whether the type of problem an adolescent chose to discuss impacted the duration of the discussion, and found that selecting an interpersonal problem predicted a significant increase in the amount of time individuals spent discussing their problem. Thus, the current investigation has offered the first evidence that problem content is related to a key component of co-rumination, namely, the duration of problem talk. Although the current study did not find significant gender differences in the selection of interpersonal problems, this is in contrast to the majority of existing literature. Viewed in this context, this association between problem type and problem talk duration suggests a potential pathway whereby females' increased likelihood of choosing to discuss interpersonal problems with a friend increases their risk of co-rumination. As a result, it is important to account for problem content in future research in order to clarify these effects.

The findings of the current study have also indicated that determining the socioemotional effects of co-rumination in late adolescents requires additional clarification. As expected, reported co-rumination predicted friendship quality within dyads regardless of gender. Notably, co-rumination was also significantly associated with negative friendship features, but only within female same-gender dyads. This suggests that it is important to account for negative friendship features when investigating the socioemotional tradeoffs of co-rumination; co-rumination may have uniquely deleterious effects on the quality of female same-gender friendships. However, very few studies have evaluated positive friendship features, and none to date have evaluated negative features. As a result, it is difficult to draw meaningful conclusions regarding the impact of co-rumination on features of friendship. Additional research is sorely needed to clarify these effects.

Surprisingly, there was no association between reported co-rumination and depressive symptoms in the current sample. This is in contrast to the majority of published co-rumination literature. Furthermore, recent literature has suggested that individual components of co-rumination may be differently associated with depressive symptoms, and in particular, that dwelling on negative affect may drive the previously documented association between co-rumination and depression (Rose et al., 2014). Observed problem talk duration was not associated with either friendship quality or depressive symptoms in the current sample, demonstrating a different pattern of associations than reported co-rumination. However, the relative associations of rehashing, speculating, dwelling on negative affect, and encouraging problem talk with either friendship quality or depressive symptoms have not been explored either in late adolescent samples or with observational paradigms.

The null findings for interaction effects of co-rumination and gender predicting depressive symptoms add to a growing literature suggesting that co-rumination's relationship to the depression gender gap may not be explained by moderation effects. Instead, accumulating evidence suggests a series of mediational pathways, whereby females are more likely than males to encounter a series of risk factors for depression. Results of the current study could be explained by a potential pathway where interpersonal problem generation increases the likelihood of increased problem talk, which creates the opportunity for co-rumination, which could increase the likelihood of subsequent depressive rumination, thereby increasing the likelihood of internalizing symptoms. Because interpersonal problems are more likely to be encountered by females and/or are more likely to be selected as a focus for conversation or rumination, females could be more susceptible to this potential pathway. Overall, the results of this investigation illuminate the need for further clarification of gender differences in the

associations among problem content, co-rumination, and depression, especially in samples of late adolescents.

Limitations

The current investigation possessed several methodological strengths that expanded upon existing literature in important ways. Nevertheless, a number of limitations must be considered when interpreting results. Perhaps most significant are the limitations that derive from the study's imbalanced sample size. Two notable strengths of this investigation were the inclusion of dyads rather than single reporters, and the inclusion of male participants in both same-gender and cross-gender dyads. Due to the planned use of dyadic data analysis, power estimates prior to recruitment necessitated doubling the number of participants needed to achieve desired power in order to account for analyses that used dyads as the level of analysis. Thus, in order to recruit the desired 108 dyads, 216 participants were needed. Despite the ambitious sample size, female same-gender dyads were recruited quickly, and cross-gender dyads were also recruited within the expected timeframe. In contrast, recruitment of male same-gender dyads progressed much more slowly than anticipated based on a pilot investigation of an identical protocol, and recruitment was terminated before reaching the desired number of male participants due to time constraints. As a result, while appropriate sample sizes were obtained for female same-gender and cross-gender dyads, the sample size of male same-gender dyads was less than half of what was desired. The current study was therefore limited both by small overall sample size and unequal sample sizes between comparison groups. Fortunately, the multilevel modeling approach is tolerant of heterogeneity of variance (Field, 2013) which can be an effect of unequal sample size that is more concerning in other types of analysis. Nevertheless, the reduced sample size and its corresponding reduction of power should be considered when interpreting these results.

Another concern related to the limited recruitment of male participants is the potential for selection effects. Males are known to engage in intimate disclosure less than females, and therefore may be less interested in participating in a study that requires identifying and discussing a personal problem. It is therefore unclear whether the males who did participate are representative of the population of late adolescent males as a whole, or whether they represent a sample that is more prone to intimate disclosure. It is possible that some gender differences in dyad communication would be more pronounced with a more representative sample. Despite this limitation inherent in observed dyadic interaction research, it is crucial for future investigations to continue to expand co-rumination literature by conducting research using observational paradigms, with an effort made to include male participants at an equal rate to female participants.

The sample used for this investigation was drawn from the general student population at a large university. It is therefore not surprising that the range of reported depressive symptoms was relatively narrow, and heavily skewed towards the lower end of the severity spectrum. Depressive symptoms that are subthreshold of a full depressive disorder are still impairing, and worth investigating. Nevertheless, it is not possible to say with certainty whether the patterns of null findings involving depressive symptoms in this study would generalize to populations with clinically significant levels of depression. In addition, the restricted range of depression symptomatology limited the ability of the current study to detect smaller differences in variability. It is therefore unknown whether the results found here reflect a true null finding, or are influenced by limited variability.

There are some important limitations generating from the coding methodology used in this study. A strength of the current investigation was the inclusion of an analysis of problem

content. Problem content was determined by asking participants to identify and describe a single current personal problem, which they were then asked to discuss with their friend. In order to generate as naturalistic a discussion as possible, no restrictions were placed on the content of conversation apart from requesting that the selected problem of each member be discussed at some point. As a result, it sometimes occurred that dyad members discussed multiple problems throughout the conversation. When coding was done to identify and time problem talk, all problem discussion was included regardless of whether it was related to the initial identified problems or not. As a result, the total problem talk time of each dyad is not always reflective of the content of the original problems. For example, an individual who initially identified a dependent, noninterpersonal problem may have been reminded of an interpersonal problem during the observed task and then brought it up for discussion, prolonging his or her own-problem talk and the total problem talk time of the dyad. This problem talk time would be associated with the originally identified noninterpersonal problem, despite later interpersonal content.

Other potential limitations associated with problem content coding are present. Friends are more similar to each other than nonfriends, and spend more time together than nonfriends (Berndt & Keefe, 1995; Boivin & Vitaro, 1995). As a result, it is unsurprising that friend dyads occasionally share problems, such as conflict with a shared acquaintance. In the rare occurrences where both dyad members discussed an identical problem, the conversation contribution of both members was coded as own-problem talk. As a result, the friend-problem talk scores of each member were artificially deflated. The friend-problem talk variable can therefore not always be taken as an indicator of level of engagement in discussing a friend's problem. This coding method was chosen in order to represent naturalistic interactions as closely as possible by

allowing participants maximal freedom in directing their conversations. A more restrictive method used by problem generation studies is to provide participants with a list of common problems pre-coded for interpersonal and dependent content (e.g., Bouchard & Shih, 2013). This method is less naturalistic, but allows researchers to account for the number and range of problems a given adolescent may be experiencing simultaneously. Future research should not only continue to include problem content in investigations of co-rumination, but also make use of multiple methods of problem content assessment.

Conclusions and Future Directions

The initial goal of this investigation was to shed light on the nature of the contribution of co-rumination to the depression gender gap. Although the lack of support for any association between co-rumination and depressive symptoms in the current study prevents definitive conclusions on this topic, this study has nevertheless highlighted a number of important future directions for co-rumination research. In particular, it is evident that cross-gender relationships play a key role in clarifying the gendered effects of co-rumination. Cross-gender friendships, in particular, offer a unique view into gender differences and similarities in dyadic interactions. Cross-gender friendships are both common and significant sources of important social provisions by late adolescence. Nevertheless, both late adolescents and cross-gender dyads continue to be underrepresented in co-rumination literature.

The current study has also clearly indicated that not all problem content is created equal. Interpersonal problems appear to have unique effects on the duration of problem talk conversation, and a great deal of preexisting literature suggests that interpersonal problems are more likely to be encountered by females than males. The field of co-rumination literature would therefore benefit tremendously from accounting for problem content and problem generation in

future investigations, as it is reasonable to suspect that problem content may contribute to previously documented gendered effects of co-rumination, and, by extension, depression.

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Appendices

Appendix A

Sona Study Summary, Same-gender Female Friends

Are you a woman with a best or close female friend? You and your friend can each receive one credit for an hour of your time! We are interested in learning about students' friendships with members of the same- and opposite-gender. This study will ask you and your female close friend to answer questions about yourselves and your relationship, as well as participate in a short videotaped conversation with each other. You must have a best or close female friend who is willing and able to participate in the study with you, and you and your friend must each be between 18 and 25 years of age. Additionally, you and your friend must not currently be in a romantic relationship with each other, and not related to one another. If your friend is not enrolled in a psychology course and cannot receive research credit, she can be compensated with a $15 Target gift certificate. If you are both eligible, you and your friend will complete the study activities in a single appointment together, which should take approximately one hour altogether.

Appendix B

Sona Study Summary, Same-gender Male Friends

Are you a man with a best or close male friend? You and your friend can each receive one credit for an hour of your time! We are interested in learning about students' friendships with members of the same- and opposite-gender. This study will ask you and your male close friend to answer questions about yourselves and your relationship, as well as participate in a short videotaped conversation with each other. You must have a best or close male friend who is willing and able to participate in the study with you, and you and your friend must each be between 18 and 25 years of age. Additionally, you and your friend must not currently be in a romantic relationship with each other, and not related to one another. If your friend is not enrolled in a psychology course and cannot receive research credit, he can be compensated with a $15 Target gift certificate. If you are both eligible, you and your friend will complete the study activities in a single appointment together, which should take approximately one hour altogether.

Appendix C

Sona Study Summary, Cross-gender Friends

Do you have a best or close friend of the opposite gender? You and your friend can each receive one credit for an hour of your time! We are interested in learning about students' friendships with members of the same- and opposite-gender. This study will ask you and your opposite-gender close friend to answer questions about yourselves and your relationship, as well as participate in a short videotaped conversation with each other. You must have a best or close friend of the opposite gender who is willing and able to participate in the study with you, and you and your friend must each be between 18 and 25 years of age or related to one another. Additionally, you and your friend must not currently be in a romantic relationship with each other. If your friend is not enrolled in a psychology course and cannot receive research credit, he or she can be compensated with a $15 Target gift certificate. If you are both eligible, you and your friend will complete the study activities in a single appointment together, which should take approximately one hour altogether.

Appendix D

Targeted Recruitment Notice, Same-gender Female Friends

Close female friends are needed for research study on friendship processes.
You and your friend can each earn a $15 Target gift certificate for your participation!

Researchers at the University of Maine are looking for pairs of best or close female friends to participate in a research study investigating how the gender of friends influences social processes. You and your friend would participate in an hour-long laboratory session in Little Hall which would involve completing several questionnaires about yourself and your friendship, and then engaging in a videotaped conversation with your friend. You and your friend must each be between 18 and 25 years of age, not currently in a romantic relationship with each other, and not related to one another. For more information, or to determine if you are eligible to participate, please email Helen Day at helen.day@umit.maine.edu.

Appendix E

Targeted Recruitment Notice, Same-gender Male Friends

Close male friends are needed for research study on friendship processes.
You and your friend can each earn a $15 Target gift certificate for your participation!

Researchers at the University of Maine are looking for pairs of best or close male friends to participate in a research study investigating how the gender of friends influences social processes. You and your friend would participate in an hour-long laboratory session in Little Hall which would involve completing several questionnaires about yourself and your friendship, and then engaging in a videotaped conversation with your friend. You and your friend must each be between 18 and 25 years of age, not currently in a romantic relationship with each other, and not related to one another. For more information, or to determine if you are eligible to participate, please email Helen Day at helen.day@umit.maine.edu.

Appendix F

Targeted Recruitment Notice, Cross-gender Friends

Do you have a close friend of the opposite gender?
Undergraduate cross-gender friends are needed for research study on friendship processes.
You and your friend can each earn a $15 Target gift certificate for your participation!

Researchers at the University of Maine are looking for pairs of best or close opposite-gender friends to participate in a research study investigating how the gender of friends influences social processes. You and your friend would participate in an hour-long laboratory session in Little Hall which would involve completing several questionnaires about yourself and your friendship, and then engaging in a videotaped conversation with your friend. You and your friend must each be between 18 and 25 years of age, not currently in a romantic relationship with each other, and not related to one another. For more information, or to determine if you are eligible to participate, please email Helen Day at helen.day@umit.maine.edu.

Appendix G

Screening Survey: Sona Recruitment Version

U Maine Friendship Study: Screening Questionnaire

Thank you for your interest in the University of Maine Friendship Study!
Researchers at the University of Maine are looking for pairs of best or close same-gender and opposite-gender friends to participate in a research study investigating how the gender of friends influences social processes. You and your friend would participate in an hour-long laboratory session in Little Hall which would involve completing several questionnaires about yourself and your friendship, and then engaging in a videotaped conversation with your friend. You and your friend must each be between 18 and 25 years of age, not currently in a romantic relationship with each other, and not related to one another. Participants who are part of the Sona subject pool will receive one research credit for their participation. All other participants will receive a $15 Target gift certificate for their participation.

If you and your best or close friend would like to participate, you will need to complete this short screening survey before signing up for the study in Sona. You will receive the password needed to sign up in Sona at the end of this survey.

All information you provide here will be seen only by trained research staff and will be kept confidential.

1. Your full name: _____
2. Your age (Note: You must be between 18-25 years old to participate):
3. Your gender identity:
    a. Male
    b. Female
    c. Other: _____
4. Your preferred phone number:
5. Are you in the Sona subject pool?
    a. Yes
    b. No
6. Your friend's full name: _____
7. Your friend's age (Note: You must be between 18-25 years old to participate): _____
8. Your friend's gender identity:
    a. Male
    b. Female
    c. Other: _____
9. Your friend's preferred phone number:
10. Is your friend in the Sona subject pool?
    a. Yes

   b. No
11. How would you describe his/her relationship to you?
   a. Best friend
   b. Good friend
   c. Just a friend
   d. Not a friend
12. Have you ever had a romantic relationship with him/her?
   a. Yes
   b. No
13. Do you currently have a romantic relationship with him/her?
   a. Yes
   b. No
14. Are you related to him/her?
   a. Yes (if so, how:) _____
   b. No

If responses indicate that eligibility criteria are not met, the following message appears:

Thank you for completing this survey. Unfortunately, your responses indicate that you and/or your friend are not eligible to participate in the UMaine Friendship Study. You may contact research staff at umainefriendshipstudy@gmail.com if you have any questions.

If responses indicate that eligibility criteria are met, the following message appears:

Thank you for completing this brief preliminary survey. You may now sign up for a time to complete the UMaine Friendship Study in Sona using this password:

PEERS

All Sona times allow only 1 person to register in order to prevent someone who is not your close/best friend from signing up for the same time as you. If your friend is also in Sona and participating for credit, he or she will be added manually by a researcher to the Sona time you choose.

Appendix H

Screening Survey: General Student Recruitment Version

U Maine Friendship Study: Screening Questionnaire
Thank you for your interest in the University of Maine Friendship Study!

Researchers at the University of Maine are looking for pairs of best or close same-gender and opposite-gender friends to participate in a research study investigating how the gender of friends influences social processes. You and your friend would participate in an hour-long laboratory session in Little Hall on the University of Maine Orono campus which would involve completing several questionnaires about yourself and your friendship, and then engaging in a short videotaped conversation with your friend. You and your friend must each be between 18 and 25 years of age, not currently in a romantic relationship with each other, and not related to one another. Participants will each receive a $15 Target gift certificate for their participation.

If you and your best or close friend would like to participate, you need to complete this short screening survey which will ask you basic questions about you, your friend, your relationship, and your scheduling availability. It should take approximately 5 minutes to complete. If your responses indicate that you are not eligible to participate, the survey will inform you immediately. If you are eligible, after submitting the survey a researcher will contact you by email to let you know when you are scheduled to participate.
All information you provide here will be seen only by trained research staff and will be kept confidential.

1. Your full name: _____
2. Your age (Note: You must be between 18-25 years old to participate):
3. Your gender identity:
    a. Male
    b. Female
    c. Other: _____
4. Your preferred phone number:
5. Are you in the Sona subject pool?
    a. Yes
    b. No
6. Your friend's full name: _____
7. Your friend's age (Note: You must be between 18-25 years old to participate): _____
8. Your friend's gender identity:
    a. Male
    b. Female
    c. Other: _____
9. Your friend's preferred phone number:
10. Is your friend in the Sona subject pool?

   a. Yes
   b. No
11. How would you describe his/her relationship to you?
   a. Best friend
   b. Good friend
   c. Just a friend
   d. Not a friend
12. Have you ever had a romantic relationship with him/her?
   a. Yes
   b. No
13. Do you currently have a romantic relationship with him/her?
   a. Yes
   b. No
14. Are you related to him/her?
   a. Yes (if so, how:) _____
   b. No

If responses indicate that eligibility criteria are not met, the following message appears:

Thank you for completing this survey. Unfortunately, your responses indicate that you and/or your friend are not eligible to participate in the UMaine Friendship Study. You may contact research staff at umainefriendshipstudy@gmail.com if you have any questions.

If responses indicate that eligibility criteria are met, the following message appears:

Study sessions are scheduled in 1-hour blocks. Below are listed the weekly times that are available to schedule study sessions. Please click EACH 1-hour block that you and your friend are both available to participate. You may select as many blocks as you are free. You and your friend will be assigned one session based on the availability you indicate here, so please make sure your responses are accurate.

Mondays

- ☐ 9:00 AM - 10:00 AM
- ☐ 10:00 AM - 11:00 AM
- ☐ 11:00 AM - 12:00 PM
- ☐ 12:00 PM - 1:00 PM
- ☐ 1:00 PM - 2:00 PM
- ☐ 2:00 PM - 3:00 PM
- ☐ 3:00 PM - 4:00 PM
- ☐ 4:00 PM - 5:00 PM

- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

Tuesdays

- [ ] 9:00 AM - 10:00 AM
- [ ] 10:00 AM - 11:00 AM
- [ ] 11:00 AM - 12:00 PM
- [ ] 12:00 PM - 1:00 PM
- [ ] 1:00 PM - 2:00 PM
- [ ] 2:00 PM - 3:00 PM
- [ ] 3:00 PM - 4:00 PM
- [ ] 4:00 PM - 5:00 PM
- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

Wednesdays

- [ ] 9:00 AM - 10:00 AM
- [ ] 10:00 AM - 11:00 AM
- [ ] 11:00 AM - 12:00 PM
- [ ] 12:00 PM - 1:00 PM
- [ ] 1:00 PM - 2:00 PM
- [ ] 2:00 PM - 3:00 PM
- [ ] 3:00 PM - 4:00 PM
- [ ] 4:00 PM - 5:00 PM
- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

Thursdays

- [ ] 9:00 AM - 10:00 AM
- [ ] 10:00 AM - 11:00 AM
- [ ] 11:00 AM - 12:00 PM
- [ ] 12:00 PM - 1:00 PM

- [ ] 1:00 PM - 2:00 PM
- [ ] 2:00 PM - 3:00 PM
- [ ] 3:00 PM - 4:00 PM
- [ ] 4:00 PM - 5:00 PM
- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

Fridays

- [ ] 9:00 AM - 10:00 AM
- [ ] 10:00 AM - 11:00 AM
- [ ] 11:00 AM - 12:00 PM
- [ ] 12:00 PM - 1:00 PM
- [ ] 1:00 PM - 2:00 PM
- [ ] 2:00 PM - 3:00 PM
- [ ] 3:00 PM - 4:00 PM
- [ ] 4:00 PM - 5:00 PM
- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

Saturdays

- [ ] 9:00 AM - 10:00 AM
- [ ] 10:00 AM - 11:00 AM
- [ ] 11:00 AM - 12:00 PM
- [ ] 12:00 PM - 1:00 PM
- [ ] 1:00 PM - 2:00 PM
- [ ] 2:00 PM - 3:00 PM
- [ ] 3:00 PM - 4:00 PM
- [ ] 4:00 PM - 5:00 PM
- [ ] 5:00 PM - 6:00 PM
- [ ] 6:00 PM - 7:00 PM

If there are any EXCEPTIONS to the availability indicated above (e.g., if you are generally free Tuesdays from 1-2 but have a one-time conflict on a certain date) please list them here:

_____

_____

Thank you for completing this brief preliminary survey. A researcher will contact you by email to inform you and your friend of your scheduled participation time, based on the availability you indicated.

Appendix I

Informed Consent

You are being asked to participate in a University of Maine research project. This study is conducted by Helen Day, a doctoral candidate in the Department of Psychology, and Dr. Cynthia Erdley, Professor in the Department of Psychology. You must be between 18 and 25 years old to participate in this study. The purpose of this research is to learn more about your thoughts and feelings, features of your relationship with a close friend, and how you and your friend approach discussing personal problems.

What's involved? This study session takes approximately 1 hour to complete. Participation involves responding to a series of surveys, followed by a conversation with your friend that will be videotaped. The questionnaires will take approximately 30 minutes to complete, and the conversation task lasts for 20 minutes.

Questionnaires

You will be asked to respond to a series of questionnaires online at a secure website (www.qualtrics.com)
You will be asked to answer questions about:
Feelings of depression
The quality of your relationship with your close friend
How you and your close friend typically discuss personal problems
Examples of items you will be responding to include:
How much do you and your friend disagree and quarrel?
How much do you protect and look out for your friend?
When I have a problem, my friend always tries really hard to keep me talking about it.

Conversation Task

Following the completion of the surveys, you and your friend will be asked to participate in a videotaped task where you will have two short conversations with each other. First, you will be asked to plan a party together for 5 minutes. Then, you and your friend will discuss personal problems that each of you identified during the questionnaire portion of the study. You will have 16 minutes to discuss both your problem and your friend's chosen problem, spending as much of that time on either problem as you wish. If you complete your conversation before the 16 minutes are up, you will be able to talk about any other topic you choose, or work on a puzzle that will be provided for you.

What are the risks? Some individuals may feel uncomfortable during the conversation task with their friend due to the nature of the discussion. While similar conversations happen naturally in any close relationship, it is possible that talking about problematic issues in your

relationship during a videotaped laboratory session could have a negative effect on your relationship.
There is also a chance that you may feel uncomfortable answering some of the questionnaire items, or while having a conversation with your friend in front of a video camera. On the questionnaires, you may leave any question blank that you do not feel comfortable answering. You are also free to control the topic and duration of your recorded conversation. You may choose to end participation at any time during the course of the study. If you choose to end your participation early, you will still receive 1 research credit or one gift card as compensation.
If you experience any distress after completing the questionnaires or discussion task and would like to seek counseling, we encourage you to contact the University of Maine Counseling Center (207-581-1392), which provides free services to UMaine students. Information about the Counseling Center, including their hours of operation, can be found at http://umaine.edu/counseling/contact-us/
Risks associated with completing the online questionnaires at Qualtrics are thought to be no greater than the risks encountered during routine internet access. Qualtrics has enhanced security and safety measures in place to protect the website and its users from fraud, and states that customers' information will not be used for any other purposes. You can find out more information about their security by clicking on the privacy statement found at www.qualtrics.com.

What are the Benefits? While there are no direct benefits to you or your friend, your participation will be very valuable in helping us learn the kinds of social processes people use in their relationships with others, how such interactions might be related to negative thoughts and feelings, and whether these factors are influenced by the gender of our friends. This knowledge will help psychologists design more effective intervention programs for individuals who use less adaptive social behaviors.

Is there Compensation? Students who have registered for this study through Sona will receive one research credit in their psychology course for participating in this study. All other participants will each receive a $15 Target gift card as compensation. All participants will receive full compensation (1 credit, or one gift card).

Will my answers be private? Names will not be directly attached to the data collected and the information will only be used for research purposes. A code number (e.g., 101A) will be used on the information that you provide in this study to protect your identity. Your partner will also be assigned a code number (e.g., 101B). A key connecting your name to your ID number will be kept in an electronic file so that your survey responses and conversation data can be linked. This key will be made inaccessible to anyone other than the primary investigator and a small number of laboratory assistants trained to work on this study using special software, in order to protect your privacy. This file will then be destroyed by December 31, 2015. The computer holding all electronic files associated with the study will be kept in a locked laboratory room. The survey data and video files, identified by only a code number, will be kept indefinitely on a computer in Dr. Erdley's locked laboratory room for use in future data analysis.

There are some important limits to the confidentiality of your participation. If you provide information that you are at *immediate* risk of harming yourself or someone else, this will be reported to the counseling center. In addition, if you report any incidence of child abuse or neglect, this will in turn be reported to the Department of Health and Human Services, in accordance with mandated reporting laws. This information will not be asked for directly at any point on the study procedure.

Is this Voluntary? Your participation is voluntary. You do not have to answer any questions or ask any questions that you do not want to. If a question makes you uncomfortable, you can skip it and move onto the next question. You can end participation at any time and still receive compensation.

Questions/Concerns? If at any time you have questions or concerns about your participation in this project, you may contact Helen Day via first class. You may also contact Dr. Cynthia Erdley at 581-2040 or via first class. If you have any questions about your rights as a research participant, please contact Gayle Jones, Assistant to the University of Maine's Protection of Human Subjects Review Board. Gayle Jones can be reached on FirstClass, (207) 581-1498, or at 114 Alumni Hall, Orono, ME 04469.

Your signature below indicates that you have read the above information and agree to participate. You will receive a copy of this form.

_____ _____

Signature Date

_____

Print name

Appendix J

Demographics and Personal History Questionnaire

Please provide the following information about yourself:

1. What is your gender?
    a. Male
    b. Female
2. Please enter your age: _____
3. Please select the ethnic group(s) you identify with (select all that apply):
    a. Caucasian
    b. Asian
    c. Hispanic
    d. African American
    e. American Indian
    f. Other (please specify)
4. What year are you at UMaine?
    a. First Year
    b. Sophomore
    c. Junior
    d. Senior
    e. Non-degree student

Please provide the following information about the friend who is completing this study with you:

1. How would you describe his/her relationship to you?
    a. Best friend
    b. Good friend
    c. Just a friend
    d. Not a friend
2. Have you ever had a romantic relationship with him/her?
3. How long have you known him/her?
    a. ____ years, ____ months
4. How long have you been friends with him/her?
    a. ____ years, ____ months

Appendix K

Beck Depression Inventory- II

Instructions: This questionnaire consists of 20 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. If several statements in the group seem to apply equally well, choose the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness
   0 I do not feel sad.
   1 I feel sad much of the time.
   2 I am sad all the time.
   3 I am so sad or unhappy that I can't stand it.

2. Pessimism
   0 I am not discouraged about my future.
   1 I feel more discouraged about my future than I used to be.
   2 I do not expect things to work out for me.
   3 I feel my future is hopeless and will only get worse.

3. Past Failure
   0 I do not feel like a failure.
   1 I have failed more than I should have.
   2 As I look back, I see a lot of failures.
   3 I feel I am a total failure as a person.

4. Loss of Pleasure
   0 I get as much pleasure as I ever did from the things I enjoy.
   1 I don't enjoy things as much as I used to.
   2 I get very little pleasure from the things I used to enjoy.
   3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings
   0 I don't feel particularly guilty.
   1 I feel guilty over many things I have done or should have done.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. Punishment Feelings
 0 I don't feel I am being punished.
 1 I feel I may be punished.
 2 I expect to be punished.
 3 I feel I am being punished.

7. Self-Dislike
 0 I feel the same about myself as ever.
 1 I have lost confidence in myself.
 2 I am disappointed in myself.
 3 I dislike myself.

8. Self-Criticalness
 0 I don't criticize or blame myself more than usual.
 1 I am more critical of myself than I used to be.
 2 I criticize myself for all of my faults.
 3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
 0 I don’t have any thoughts of killing myself.
 1 I have thoughts of killing myself, but I would not carry them out.
 2 I would like to kill myself.
 3 I would kill myself if I had the chance.

10. Crying
 0 I don't cry any more than I used to.
 1 I cry more than I used to.
 2 I cry over every little thing.
 3 I feel like crying, but I can't.

11. Agitation
 0 I am no more restless or wound up than usual.
 1 I feel more restless or wound up than usual.
 2 I am so restless or agitated that it's hard to stay still.
 3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest
 0 I have not lost interest in other people or activities.
 1 I am less interested in other people or things than before.

2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness
0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness
0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless

15. Loss of Energy
0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern
0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual
3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability
0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite
0 I have not experienced any change in my appetite.
1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty
0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue
0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex
0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix L

The Network of Relationships Inventory: Social Provision Version

Everyone has a number of people who are important in his or her life. These questions ask about your relationships with the friend who is participating in this study with you.

1. **How much free time do you spend with your friend?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

2. **How much do you and your friend get upset with or mad at each other?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

3. **How much does your friend teach you how to do things that you don't know?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

4. **How much do you and your friend get on each other's nerves?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

5. **How much do you talk about everything with your friend?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

6. **How much do you help your friend with things she/he can't do by her/himself?**

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

7. How much does your friend like you?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

8. How much does your friend treat you like you're admired and respected?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

9. Who tells the other person what to do more often, you or your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
S/he always does S/he often does About the same I often do I always do

10. How sure are you that this relationship will last no matter what?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

11. How much do you play around and have fun with your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

12. How much do you and your friend disagree and quarrel?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

13. How much does your friend help you figure out or fix things?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

14. How much do you and your friend get annoyed with each other's behavior?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

15. How much do you share your secrets and private feelings with your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

16. How much do you protect and look out for your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

17. How much does your friend really care about you?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

18. How much does your friend treat you like you're good at many things?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

19. Between you and your friend, who tends to be the BOSS in this relationship?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
S/he always does S/he often does About the same I often do I always do

20. How sure are you that your relationship will last in spite of fights?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

21. How much do you go places and do enjoyable things with your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

22. How much do you and your friend argue with each other?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

23. How much does your friend help you when you need to get something done?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

24. How much do you and your friend hassle or nag one another?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

25. How much do you talk to your friend about things that you don't want others to know?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

26. How much do you take care of your friend?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

27. How much does your friend have a strong feeling of affection (liking) toward you?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

28. How much does your friend like or approve of the things you do?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

29. In your relationship with your friend, who tends to take charge and decide what should be done?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
S/he always does S/he often does About the same I often do I always do

30. How sure are you that your relationship will continue in the years to come?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
Little or none Somewhat Very Much Extremely Much The most

Appendix M

Co-Rumination Questionnaire

Think about the way you usually are with your friend who is completing this study with you and circle the number for each of the following statements that best describes you.

1. We spend most of our time together talking about problems that my friend or I have.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

2. If one of us has a problem, we will talk about the problem rather than talking about something else or doing something else.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

3. After my friend tells me about a problem, I always try to get them to talk more about it later.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

4. When I have a problem, my friend always tries really hard to keep me talking about it.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

5. When one of us has a problem, we talk to each other about it for a long time.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

6. When we see each other, if one of us has a problem, we will talk about the problem even if we had planned to do something else together.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

7. When my friend has a problem, I always try to get them to tell me every detail about what happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

8. After I've told my friend about a problem, they always try to get me to talk more about it later.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

9. We talk about problems that my friend or I are having almost every time we see each other.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

10. If one of us has a problem, we will spend our time together talking about it, no matter what else we could do instead.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

11. When my friend has a problem, I always try really hard to keep them talking about it.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

12. When I have a problem, my friend always tries to get me to tell every detail about what happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

When we talk about a problem that one of us has….

13. We will keep talking even after we both know all of the details about what happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

14. We talk for a long time trying to figure out all of the different reasons why the problem might have happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

15. We try to figure out every one of the bad things that might have happened because of the problem.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

16. We spend a lot of time trying to figure out parts of the problem that we can't understand.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

17. We talk a lot about how bad the person with the problem feels.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

not at all true a little true somewhat true pretty true really true

18. We'll talk about every part of the problem over and over.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

When we talk about a problem that one of us has…..

19. We talk a lot about the problem in order to understand why it happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

20. We talk a lot about all of the different bad things that might happen because of the problem.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

21. We talk a lot about parts of the problem that don't make sense to us.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

22. We talk for a long time about how upset it has made one of us with the problem.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

23. We usually talk about that problem every day even if nothing new has happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

24. We usually talk about all of the reasons why the problem might have happened.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

25. We spend a lot of time talking about what bad things are going to happen because of the problem.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

26. We try to figure out everything about the problem, even if there are parts that we may never understand.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

27. We spend a long time talking about how sad or mad the person with the problem feels.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
not at all true a little true somewhat true pretty true really true

Appendix N

Problem Generation and Salience Questionnaire

List a problem that you have and answer the following questions about the problem.

PROBLEM:_____

1. How upsetting is this problem?

1	2	3	4	5
Not at All Upsetting				Very Upsetting

2. How important is this problem?

1	2	3	4	5
Not at All Important				Very Important

3. How hard would it be to solve this problem?

1	2	3	4	5
Not at All Hard				Very Hard

4. How hard would it be to feel better about this problem?

1	2	3	4	5
Not at All Hard				Very Hard

5. How much do you want to feel better about this problem?

1	2	3	4	5
Not At All				Very Much

6. How much do you want this problem not to bother you?

1	2	3	4	5
Not At All				Very Much

7. How much do you want to not be upset about this problem?

1	2	3	4	5
Not At All				Very Much

Appendix O

Thank-You and Resource List

Thank you for your time and participation in our study! Your responses will help us to better understand the social and personal experiences of college students and they are greatly appreciated. You have earned one credit towards your research participation requirement for your psychology course; if you are not enrolled in a psychology course which requires research credit, you have earned a $15 gift certificate to Target.

If you are experiencing any distress after completing the questionnaires or discussion task and would like to seek counseling, we encourage you to contact the University of Maine Counseling Center (207-581-1392), which provides free services to UMaine students. Information about the Counseling Center, including their hours of operation, can be found at http://umaine.edu/counseling/contact-us/

BIOGRAPHY OF THE AUTHOR

Helen J. Day was born in New York, NY on June 29, 1987. She was raised in several locations throughout the Northeast, eventually settling in Syracuse, NY. She graduated from the Manlius Pebble Hill School in 2005. Helen completed her undergraduate studies at Wellesley College, graduating with her BA in psychology in 2009. She worked as a research assistant for three years in the department of Pediatric Psychopharmacology at Massachusetts General Hospital. Helen entered the dual Developmental-Clinical track of the Clinical Psychology Program at the University of Maine in 2012, with Dr. Cynthia A. Erdley as her advisor. During her time working with Dr. Erdley, Helen conducted a course of research investigating co-rumination in late adolescents, culminating in her dissertation study. Helen has presented her research as a first- or co-author at 7 national conferences. She has also co-authored a chapter with Dr. Erdley on childhood and adolescent friendship, which appeared in the Oxford University Press publication *The Psychology of Friendship*. Helen is completing her predoctoral internship at Didi Hirsch Mental Health Services in Inglewood, CA. She is a candidate for the Doctor of Philosophy degree in Psychology with a concentration in Clinical Psychology from the University of Maine in December 2018. After receiving her degree, Helen will begin a Postdoctoral Fellowship at the Center for Cognitive and Dialectical Behavior Therapy in Lake Success, NY.