IRRITIABILITY, SOCIAL SUPPORT, AND DEPRESSION

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Bachelor of Science in Psychology

Oklahoma State University

Stillwater, Oklahoma

2015

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 2017

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DEPRESSION

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Date of Degree: DECEMBER, 2017

Title of Study: IRRITABILITY, SOCIAL SUPPORT, AND DEPRESSION

Major Field: PSYCHOLOGY

Abstract: Research examining social support in depressed individuals has demonstrated that they are likely to have lower levels of social support (Lakey & Cronin, 2008). Furthermore, interpersonal models of depression posit that depressed individuals engage in behaviors that maintain or further decrease their low levels of social support (Joiner, 2000). Recently, there has been some research examining the presence of irritable mood in depression, and the results suggest that many people experiencing depression also experience considerable irritable mood (Fava et al., 2010; Judd et al., 2013). Irritable mood also erodes social relationships (Smith, Pope, Sanders, Allred, & O'Keefe, 1988; Brondolo et al., 2003), but has not been studied in the context of depression and social support.

The present study sought to examine the relationship between depression, irritability, and social support. Participants (n = 194) were recruited using Amazon Mechanical Turk to complete questionnaires measuring depressive symptoms, perceived social support, irritability, and behaviors that erode social support (i.e. reassurance seeking, negative feedback seeking, interpersonal conflict avoidance). Results provided evidence to support previous findings that depression and irritability were negatively associated with social support. Additionally, an indirect effects model using bootstrapping with 5000 resamples suggested an indirect effect of depression on social support through irritability. Results also suggested that irritable mood contributes to lower levels of social support over and above reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance. The findings of the present study provide further evidence for the relationship between irritable mood and depression. Additionally, although cross sectional in nature, the data suggest a potential pathway from depression to reduced social support through increased irritability. Irritability also provides additional information over and above common erosive behaviors in predicting reduced social support. The findings from the present study suggest that irritability may help maintain depression through the erosion of social support. These findings have potential implications for the development of novel interventions targeting irritability in depression.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

Depression is a pervasive mental disorder that has substantial aversive effects on people's thoughts and behaviors. In 2014, roughly 6.7% of the population of adults in the United States had at least one Major Depressive episode within that year (NIMH, 2014). Furthermore, in 2014, about 4% of adults in the United States had at least one Major Depressive episode that caused severe impairment (NIMH, 2014). In addition, depression causes distress and impairment in those who are affiliated with the individual (Benazon & Coyne, 2000). Consequently, additional research will help us better understand depression and will help us alleviate the difficulties associated with this pervasive disorder.

Interpersonal models of depression emphasize that humans are social creatures that require strong and intimate social relationships with others in order to maintain good physical and mental health (Baumeister & Leary, 1995). At the same time, individuals with depression may engage in behaviors that erode social support (Joiner, 2000). As such, understanding the relationship between depression and the quality and consistency of social support is important. Interpersonal theories identify several processes by which depression erodes interpersonal relationships. For example, negative feedback seeking,

excessive reassurance seeking, interpersonal conflict avoidance, and blame maintenance all may contribute to the etiology and maintenance of depression (Joiner, 2000). Irritability is an emotion that is also related to depression and influences social relationships (Fava et al., 2010; Judd et al., 2013) but has not been studied in the context of both depression and social support.

Social Support and Depression

Social support is a buffering factor for psychopathology and suicidal ideation (Kleinam & Riskind, 2013). In particular, there is ample evidence that social support has a negative relationship with depression, such that higher levels of social support are related to lower levels of depression and depressive symptoms. For example, in a study examining depressed individuals with impaired and non-impaired subjective social support, 94% of participants with unimpaired social support recovered from depression at a follow-up 6 to 32 months later compared to 6% of participants with impaired support (George, Blazer, Hughes, & Fowler, 1989). Across gender and age, those who had unimpaired subjective social support had lower depression ratings than those who had impaired social support (George et al., 1989). A similar study demonstrated that higher levels of perceived social support not only predicted lower levels of depression but also predicted recovery from depression (Lara, Leader, & Klein, 1997). Specifically, baseline social support predicted lower levels of depression at a 6-month follow-up evaluation, over and above the effects of depression severity and number of depressive episodes.

In addition, individuals with depression, compared to those without, perceive that they have lower social support (for a review see Lakey & Cronin, 2008) and there is a body of research demonstrating that this lower perceived social support is related to increased depression. For example, a study of 218 individuals with major depressive disorder found that a depressed individual's perception of having poor support from others was shown to be related to longer current depressive episodes (Gladstone et al., 2007).

Interpersonal models of depression suggest that people with depression tend to wear away what social support they have when they engage in certain social and avoidance behaviors (Coyne, 1976; Klerman, Weissman, Rounsaville, and Chevron, 1984; Feldman, 1976). These models posit that a depressed individual engages in certain behaviors that at first elicit support and care from others, but quickly become problematic and irritating to those providing the support. Soon this support and care will diminish or become hostile in nature, leaving the depressed person without the benefits of a supportive social group.

Joiner (2000) defined four specific erosive behaviors that contribute to depressed persons' problems with social support: negative feedback seeking, blame maintenance, excessive reassurance seeking, and interpersonal conflict avoidance. All of these behaviors negatively affect the depressed person's social support by either wearing away what support they have and/or preventing support from others, which then leads to

continued or worsening depression. This cycle then leads to longer lasting depressive episodes for the individual (Joiner, 2000).

Irritability and Depression

Angry or irritable mood or behavior is a diagnostic symptom of many psychiatric disorders. In Major Depressive Disorder (MDD), irritable or angry mood is a diagnostic symptom only for children and adolescents (APA, 2013). However there is ample evidence that adults with depression also experience increased levels of anger and irritability (Fried & Nesse, 2015; Fava, Hwang, Rush, Sampson, & Walters, 2010; Painuly, Sharan, & Mattoo, 2007). For example, in an outpatient sample of 222 individuals with major depressive disorder, 23% of the participants had clinically relevant anger and irritability (Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004). Additionally, greater severity of a depressive episode is a strong predictor of the presence of anger during a depressive episode (Sayar et al., 2000). The overall prevalence of anger and irritability in depression has been estimated to be between 30%-49% (Sayer et al., 2000).

Despite the fact that irritability is not an official symptom of MDD, a study examining data from the National Comorbidity Survey found that irritability was endorsed as often as symptoms of disturbed sleep, changes in appetite, and psychomotor changes (Fava et al., 2010). In fact, approximately half of the sample with MDD also endorsed symptoms of irritability. Furthermore, when irritability was included as a

potential tenth symptom of MDD, it was endorsed as much, or more, than several of the other current diagnostic criteria for MDD. Moreover, age of onset of depression symptoms was significantly earlier for irritable than non-irritable individuals, as well as, persistence of a depressive episode is significantly higher for those that endorsed irritability as a symptom.

Irritability is also associated with a number of negative outcomes in the context of depression. In general, the presence of irritability in depression is associated with a worse prognosis. Specifically, in a study of 536 participants with major depression enrolled at 5 academic medical centers, those with irritability had more severe depressive symptoms and longer duration of depressive episodes (Judd et al., 2013).

Additionally, in a review of the literature for anger and irritability symptoms in depressed individuals, depressed individuals with higher levels of irritability and anger report significantly lower quality of life, lower environmental health, and lower general well-being compared to individuals who are depressed without anger (Painuly, Sharan, & Mattoo, 2005). Furthermore, approximately 30-40% of depressed individuals also endorsed anger and irritability. Among 2,307 participants from the original STAR*D study, 46% reported the presence of significant irritability (Perlis et al., 2009). Irritability was also associated with longer, more severe depression, more lifetime comorbidities with anxiety disorders, and significantly poorer quality of life.

Despite this evidence that irritability is associated with a number of negative outcomes in depression, there is little evidence as to why irritability results in these outcomes. However, there is evidence from studies of irritability in non-depressed individuals that might indicate potential factors connecting impairment associated with irritability in depression. For example, higher levels of anger are related to lower levels of perceived social support in non-depressed individuals (Maan Diong et al., 2005). In addition, hostility is negatively correlated with the frequency and intensity of positive social interactions and positively correlated with the frequency and intensity of negative social interactions (Brondolo et al., 2003). Furthermore, people who experience anger more frequently have greater discord in their relationships and lower marital satisfaction than individuals who reported lower frequency of anger experiences (Smith, Pope, Sanders, Allred, & O'Keefe, 1988).

The Current Study

There is ample evidence demonstrating that anger and irritability are common in depression and that they have a negative effect on social support in non-depressed samples. However, no research has examined the relationship between irritability and social support in the context of depression. This is an important area of study in that it may provide insight into how irritability results in negative outcomes in depression. It may also represent another important process relevant to the interpersonal model of depression vulnerability. Ultimately, better understanding the relationship between

irritability, social support, and depression may lead to more comprehensive models of depression and important targets for intervention.

The present study examined the relationship between irritability, depression symptoms, and social support. Five hypotheses were tested:

1. Higher levels of depression symptoms would be associated with lower social support.
2. Higher levels of depression symptoms would be associated with higher levels of irritability.
3. Higher levels of irritability would be associated with lower social support.
4. The present study is cross-sectional and, as such, true mediational relationships cannot be evaluated (Maxwell & Cole, 2007). However, to inform future potential longitudinal studies, we tested whether there was an indirect relationship between depression and social support through irritability.
5. Adding irritability into a regression model with other interpersonal factors (excessive reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance) would improve the model in predicting social support.[1]

[1] Blame maintenance was not measured in the current study. Blame maintenance involves how other people perceive a depressed individual. Because this study does not involve significant others of participants, blame maintenance was not assessed.

CHAPTER II

REVIEW OF THE LITERATURE

Depression is a pervasive mental disorder that has substantial aversive effects on people's thoughts and behaviors. In 2014, roughly 6.7% of the population of adults in the United States had at least one Major Depressive episode within that year (NIMH, 2014). Furthermore, in 2014, about 4% of United States adults had at least one Major Depressive episode that caused severe impairment (NIMH, 2014). The financial burden of major depression increased from $173.2 billion in 2005 to $210.5 billion in 2010 (Greenberg, Fournier, Sisitsky, Pike, & Kessler, 2015). Depression is also associated with increased mortality, with 60% of individuals with depression dying an average of 8 years earlier than their non-depressed counterparts (Pratt, Druss, Manderscheid, & Walker, 2016). In addition, depression causes distress and impairment in those who are affiliated with the individual (Benazon & Coyne, 2000). Consequently, additional research will help us better understand depression and will help us alleviate the difficulties associated with this pervasive disorder.

Interpersonal models of depression emphasize that humans are social creatures that require strong and intimate social relationships with others in order to maintain good physical and mental health (Baumeister & Leary, 1995). At the same time, individuals

with depression may engage in behaviors that erode social support (Joiner, 2000). As such, understanding the relationship between depression and the quality and consistency of social support is an important research topic. Interpersonal theories identify several processes by which depression erodes interpersonal relationships. For example, negative feedback seeking, excessive reassurance seeking, interpersonal conflict avoidance, and blame maintenance all may contribute to the etiology and maintenance of depression (Joiner, 2000). Irritability is an emotion that is also related to depression and influences social relationships (Fava et al., 2010; Judd et al., 2013) but has not been studied in the context of both depression and social support. Therefore, the present study examined the relationship between depressive symptoms, social support, and irritability.

Social Support

Social support has long been studied in the context of physical and mental health (Kaplan, Cassel, & Gore, 1977; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Schaefer, Coyne, & Lazarus, 1981; Lin, Dean, & Ensel, 2013, Marroquin, 2011, Cohen, 2004). The literature demonstrates that humans are indeed social creatures and require strong, intimate, social relationships with others. Strong social support is associated with positive physical and mental health outcomes (Siedlecki, Salthouse, & Oishi, 2014; Feeney & Collins, 2014; Nabi, Prestin, & So, 2013), whereas a lack of social support is implicated in vulnerability and maintenance of depression and other mental health disorders (Starr, 2015; Marroquin, 2011; Kleiman & Riskind, 2013).

High Levels of Social Support are Associated with Low Levels of Depression

Social support is a buffering factor for psychopathology and suicidal ideation (Kleinam & Riskind, 2013). In particular, there is ample evidence that social support has a negative relationship with depression, such that higher levels of social support are related to lower levels of depression and depressive symptoms. For example, in a study examining depressed individuals with impaired and non-impaired subjective social support, 94% of participants with unimpaired social support recovered from depression at a follow-up 6 to 32 months later (George, Blazer, Hughes, & Fowler, 1989). Across gender and age, those who had unimpaired subjective social support had lower depression ratings than those who had impaired social support (George et al., 1989). A similar study demonstrated that higher levels of perceived social support not only predicted lower levels of depression but also predicted recovery from depression (Lara, Leader, & Klein, 1997). Specifically, baseline social support predicted lower levels of depression at a 6-month follow-up evaluation, over and above the effects of depression severity and number of depressive episodes. A recent study also demonstrated that greater social support predicted fewer depression symptoms in college students experiencing cyber bullying (Tennant, Demaray, Coyle, & Malecki, 2015).

Social resources that are not related to the family are also helpful in reducing depression symptoms. For example, people who have more confidant support and helpful friends are found to be less depressed (Moos, Cronkite, & Moos, 1998). In particular,

those who had higher confidant support demonstrated fewer depression symptoms at a one year follow up. Additionally, increases in confidant support, number of helpful friends, and work support were associated with decreases in depression. In a separate study, perceived support from friends showed the strongest negative association with depression symptoms, and global perceived support had negative relationships with all measures of symptomatology (Clara, Cox, Enns, Murray, & Torgrudc, 2003).

Low Levels of Social Support are Associated with High Levels of Depression

The research reviewed above shows that higher levels of social support are associated with reduced depression in a number of contexts. In addition, individuals with depression, compared to those without, perceive that they have lower social support (for a review see Lakey & Cronin, 2008) and there is a body of research demonstrating that this lower perceived social support is related to increased depression. For example, a study of 400 working-class women with children examined the influence of social support on the risk of depression in the year following an occurrence of a stressor (Brown, Andrews, Harris, Adler, & Bridge, 1986). Lack of support from an individual that the participants considered very close at the time of the stressor was particularly associated with increased risk of depression symptoms (Brown et al., 1986). A lack of social support was also associated with increased depression in a cross-sectional study of Norwegian men and women (Grav, Hellzen, Romild, & Stordal, 2012).

Low social support is also related to increased depression in adolescents. For example, in a study of 496 female adolescents, participants completed measures of social support and depressive symptoms at a baseline session and at 1- and 2- year follow-ups (Stice, Ragan, & Randal, 2004). Deficits in parental support predicted increases in depression symptoms in the adolescent girls at the one and two year follow ups.

In addition to predicting increased depression, low social support predicts the maintenance of depression in individuals who are already depressed. For example, a study of 193 participants with major depressive disorder examined the relationship between perceived social support at baseline and depression over a year later, accounting for baseline depression and neuroticism (Leskelä et al. 2006). At the 18-month follow-up there was a significant negative relationship between baseline social support and depression symptoms ($r = -.35$), such that the less social support a person had predicted a lower likelihood of remission at the 18-month follow-up. Similarly, a study of 218 individuals with major depressive disorder found that a depressed individual's perception of having poor support from others was shown to be related to longer current depressive episodes (Gladstone et al., 2007).

Depression and Erosion of Social Support

Interpersonal models of depression suggest that people with depression tend to wear away what social support they have when they engage in certain social and avoidance behaviors (Coyne, 1976; Klerman, Weissman, Rounsaville, and Chevron,

1984; Feldman, 1976). These models posit that a depressed individual engages in certain behaviors that at first elicit support and care from others, but quickly become problematic and irritating to those providing the support. Soon this support and care will diminish or become hostile in nature, leaving the depressed person without the benefits of a supportive social group.

Joiner (2000) defined four specific erosive behaviors that contribute to depressed persons' problems with social support: negative feedback seeking, blame maintenance, excessive reassurance seeking, and interpersonal conflict avoidance. All of these behaviors negatively affect the depressed person's social support by either wearing away what support they have and/or preventing support from others, which then leads to continued or worsening depression. This cycle then leads to longer lasting depressive episodes for the individual (Joiner, 2000).

Excessive reassurance seeking is a common behavior among depressed individuals and involves the depressed individual excessively seeking reassurance from others, usually in close relationships, that they are loved and accepted (Joiner, 2000). This behavior provides relief from negative affect in the short term by providing an acknowledgement of support from social support groups. However, in the long term, this behavior becomes erosive in that the individual's social support groups become irritated with the individual and often will avoid the individual. In a seminal study on excessive reassurance seeking in depressed college students, participants were evaluated by their

roommates on their reassurance seeking behaviors, anxiety and depression symptoms, as well as their willingness to be social (Joiner & Metalsky, 1995). Higher reassurance seeking by the depressed participant was associated with increased negative evaluation by the roommate, and increased likelihood that the roommate would reject the depressed participant when asked if they would like to continue in the relationship. Consequently, this was associated with lower support from social support groups and a perception among the depressed individuals that their support was diminishing.

Negative feedback seeking involves depressed individuals engaging in behaviors that will often end in people giving them negative feedback. This in turn erodes social support and further validates the negative thoughts and beliefs that a depressed person typically has (Joiner, 2000). In a study of negative feedback seeking in college students, participants were 48-pairs of same-sex roommates who were evaluated on depression and measures of self and roommate conceptions of worthiness and value at three sessions during the course of a semester (Swann, Wenzlaff, & Tafarodi, 1992). In the second session, participants were instructed to pick two open-ended questions from a list that they would like their roommate to answer about them. These questions probed for positive or negative feedback and the number of questions participants selected that elicited negative feedback served as a measure of negative feedback seeking. Participants also completed a measure to assess their willingness to remain in the roommate relationship. Results indicated that depressed students sought more negative feedback

from others and negative feedback seeking was associated with more rejection by peers, providing evidence for the erosive nature of negative feedback seeking

Blame maintenance erodes a depressed individual's social support by instilling in others a negative bias and perception regarding other's views of the depressed individual (Joiner, 2000). The depressive behaviors form a negative schema in the other individual that can remain constant even if the depressed individual is no longer in a depressive episode, thus leaving depressed people in a situation where they continue to be blamed by others for their maintained depression. Few studies have directly examined blame maintenance, but one study has examined the perceptions of the stability of positive and negative traits in depressed individuals. Once solidified, perceptions of negative behaviors are more difficult to alter than positive ones, thus providing evidence for blame maintenance as an erosive factor in depression (Sacco & Dunn, 1990).

The fourth erosive behavior identified by Joiner (2000), interpersonal conflict avoidance, is erosive to a person's social support such that depression leads to avoidance of conflict and to difficulties with skills needed to be successful in navigating conflicts. The avoidance and skills deficits in turn lead to further interpersonal conflict, which reduces social support for the individual, thus propagating the depression symptoms. A number of studies have demonstrated these deficits in people with depression. For example, individuals with depression demonstrate difficulty generating interpersonal problem solving techniques when presented with interpersonal conflict vignettes

compared to their non-depressed counterparts (Gotlib & Asarnow, 1979). Specifically, the depressed participants generated more irrelevant and "no response" answers than the non-depressed participants. Another study demonstrated that a lack of shyness (a trait commonly used to illustrate interpersonal avoidance) in childhood was predictive of better outcome over one year in a sample of depressed patients receiving treatment in a mood disorders unit (Parker et al., 1992).

Social support and depression summary

There are many studies demonstrating the importance that high levels of social support have on lessening and preventing depression. There is also considerable evidence demonstrating that low levels of social support can lead to higher levels of depression and poor prognosis. Additionally, the erosive properties that depression has on social support reveal the intricate nature of the relationship between social support and depression. Despite the wealth of research investigating the relationship between interpersonal factors and depression, other important factors related to depression that may influence social support remain unexplored. Irritability is one such factor. Interpersonal models of depression mention little to none about potential effects of irritability, despite the relationship between depression and irritability and the potential for irritability to influence social support (see below).

Irritability

Angry or irritable mood or behavior is a diagnostic symptom of many psychiatric disorders including Bipolar Disorder, Disruptive Mood Dysregulation Disorder, Posttraumatic Stress Disorder, Oppositional Defiant Disorder, Intermittent Explosive Disorder, Conduct Disorder, Antisocial Personality Disorder, and Borderline Personality Disorder (APA, 2015). In Major Depressive Disorder (MDD), irritable or angry mood is a diagnostic symptom only for children and adolescents (APA, 2015). However there is ample evidence that adults with depression also experience increased levels of anger and irritability (Fried & Nesse, 2015; Fava, Hwang, Rush, Sampson, & Walters, 2010; Painuly, Sharan, & Mattoo, 2007). For example, in an outpatient sample of 222 individuals with major depressive disorder, 23% of the participants had clinically relevant anger and irritability (Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004). It is important to note that a misdiagnosis of bipolar II disorder was an unlikely alternative explanation for the findings of this study, as less than 1% of the participants endorsed clinically relevant symptoms of hypomania. Furthermore, the participants in this study were not using antidepressants as a treatment, providing evidence that the results are not due to pharmacological treatment (Pasquini et al., 2004). Additionally, greater severity of a depressive episode is a strong predictor of the presence of anger during a depressive episode (Sayar et al., 2000). The overall prevalence of anger and irritability in depression has been estimated to be between 30%-49% (Sayer et al., 2000).

Despite the fact that irritability is not an official symptom of MDD, a study examining data from the National Comorbidity Survey found that irritability was endorsed as often as symptoms of disturbed sleep, changes in appetite, and psychomotor changes (Fava et al., 2010). In fact, approximately half of the sample with MDD also endorsed symptoms of irritability. Furthermore, when irritability was included as a potential tenth symptom of MDD, it was endorsed as much, or more, than several of the other current diagnostic criteria for MDD. Moreover, age of onset of depression symptoms was significantly earlier for irritable than non-irritable individuals, as well as, persistence of a depressive episode is significantly higher for those that endorsed irritability as a symptom.

Irritability is also associated with a number of negative outcomes in the context of depression. In general, the presence of irritability in depression is associated with a worse prognosis. Specifically, in a study of 536 participants with major depression enrolled at 5 academic medical centers, those with irritability had more severe depressive symptoms and longer duration of depressive episodes (Judd et al., 2013).

Additionally, in a review of the literature for anger and irritability symptoms in depressed individuals, depressed individuals with higher levels irritability and anger report significantly lower quality of life, lower environmental health, and lower general well-being compared to individuals who are depressed without anger (Painuly, Sharan, & Mattoo, 2005). Furthermore, approximately 30-40% of depressed individuals also

endorsed anger and irritability. Among 2,307 participants from the original STAR*D study, 46% reported the presence of significant irritability (Perlis et al., 2009). Irritability was also associated with longer, more severe depression, more lifetime comorbidities with anxiety disorders, and significantly poorer quality of life.

Despite this evidence that irritability is associated with a number of negative outcomes in depression, there is little evidence as to why irritability results in these outcomes. One hypothesis is that increased irritability negatively affects social support which, as outlined above, is associated with depression outcome. In non-depressed individuals, for example, higher levels of anger are related to lower levels of perceived social support (Maan Diong et al., 2005). In addition, hostility is negatively correlated with the frequency and intensity of positive social interactions and positively correlated with the frequency and intensity of negative social interactions (Brondolo et al., 2003). Furthermore, people who experience anger more frequently have greater discord in their relationships and lower marital satisfaction than individuals who reported lower frequency of anger experiences (Smith, Pope, Sanders, Allred, & O'Keefe, 1988).

CHAPTER III

METHODOLOGY

Participants

A strong relationship has been found between depression and social support, therefore a relatively small sample size (e.g. n = 35) was needed to achieve high power to detect that relationship. However, the relationship between irritability and social support is not as strong and a power analysis suggested that 160 participants were needed to achieve a power of .85 at $\alpha = .05$. Ultimately, 194 participants were recruited from Amazon Mechanical Turk (Mturk), an online forum that allows people across the United States to complete "Human Intelligence Tasks" (e.g., answer questionnaires) to be compensated with a small sum of money, which likely resulted in a overpowered sample. We recruited an approximately equal number of males and females and all participants were at least 18 years of age (Age: $M = 33.75$; $SD = 9.76$). See Table 1 for sample demographics.

Table 1.

Sample Characteristics (n = 194)	*n*	*%*
Gender		
Women	96	46.8
Men	98	47.8
Race/ethnicity		
American Indian/Native American	2	1.0
Asian	40	19.5
Black/African American	12	5.9
Caucasian/White	132	64.4
Hispanic/Latino	20	9.8
Multiple	6	2.9

Materials

Questionnaires.

Patient Health Questionnaire – 9 (PHQ-9). The PHQ-9 (Kroenke, Spitzer, & Williams, 2001) is a 9-item self-report measure. The items align with the 9 core symptoms for the diagnostic criteria for major depressive disorder according to the DSM-5. Participants are asked to rate on a 0 to 3 scale how often they experience each of the symptoms within the past two weeks. Response options vary between 0 ("Not at all"), 1 ("Several Days"), 2 ("More than Half the Days"), and 3 ("Nearly Every Day"). Lastly, participants are asked to rate how difficult these problems have been for them to get

along with other people or do their work at home or school. Response options range from "Not difficult at all," "Somewhat difficult," "Very difficult," or "Extremely difficult." Scores on the PHQ-9 range from 0 – 27, with scores that are ≥ 5 indicating mild levels of depression. Scores that are ≥ 10, ≥ 15 indicate moderate and severe levels of depression respectively. There have been numerous studies that have examined the psychometric properties of the PHQ-9 and have demonstrated good internal reliability (Chronbach's alpha .86- .89; Milette, Hudson, & Baron, 2010; Kroenke, Spitzer, & Williams, 2001) and test-retest reliability (.84; Kroenke, Spitzer, & Williams, 2001; Kroenke, Spitzer, Williams, & Löwe, 2010). The internal reliability for the current sample was good (Cronbach's $\alpha = .83$).

The Irritability Questionnaire (IRQ). The IRQ (Craig, Hietanen, Markova, & Berrios, 2008) is a 21-item self-report measure that assesses irritability as a multidimensional phenomenon. The participants are asked to rate on two separate 0-3 scales how often and how much they experience a particular item/situation. Response options for how often the participant experiences the situation range are: 0 ("Never), 1 ("Occasionally"), 2 ("Quite Often"), and 3 ("Most of the Time"). Response options for how much the individual experiences the situation range are: 0 ("Not at all"), 1 ("A Little"), 2 ("Moderately"), and 3 ("Very Much So"). The IRQ has previously shown good internal reliability (Cronbach's alpha = 0.90) and test-retest reliability (0.82; Craig et al., 2008). The internal reliability for the current sample was good (Cronbach's $\alpha = .89$). The

IRQ has two subscales "how much" and how often". These subscales are highly correlated (r = .94). The current study utilized the "how much" scale for all analyses.

Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS (Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item self-report questionnaire presenting individuals with statements about three dimensions of social support in their lives (e.g. Family, Friends, and Significant Other). Individuals are asked to rate how strongly they agree or disagree that the statements are true of themselves on a 7-point Likert scale (1 = *Very Strongly Disagree*, 7 = *Very Strongly Agree*).[2] Total MSPSS scores are computed by adding together the ratings for each of the subscales. Higher scores on the MSPSS indicate higher levels of perceived social support. The MSPSS has demonstrated good internal reliability (α = .88) and test-retest reliability (r = .85; Zimet et al., 1988). The internal reliability of the current sample was excellent (Cronbach's α = .96 for the overall scale). Furthermore, internal reliability for the individual subscales was excellent (Family: α = .93; Friends: α = .94; Significant Other: α = .96).

Depressive Interpersonal Relationships Inventory – Reassurance Seeking (DIRI - RS). The DIRI - RS (Metalsky, Joiner, Potthoff, et al., 1991) is a 4-item self-report scale that measures reassurance seeking. Participants are asked to rate on a 7-point scale their tendencies to seek reassurance from others. Responses range from 1 ("No, not at all") to

[2] It is important to note that the present study used a 7-point Likert scale to for the MSPSS compared to the commonly used 5-point Likert scale. Given this slight difference, the means from this current study cannot be compared to other studies utilizing the MSPSS.

7 (“Yes, very much”). Scores for the DIRI - RS are averaged across items, ranging from 1-7. Higher scores correspond to higher reassurance seeking. Previous studies have demonstrated good internal consistency (.88) for the DIRI-RS (Metalsky, Joiner, Potthoff, et al., 1991; Joiner et al., 1992). The internal reliability of the current sample was excellent (Cronbach’s $\alpha = .90$).

Feedback Seeking Questionnaire (FSQ). The FSQ (Swann, Wenzlaff, Krull, & Pelham, 1992) assesses interest in feedback from others within 5 self-relevant domains: intellectual, social, musical/artistic, athletic abilities, and physical attractiveness. Participants are asked to choose 2 out of 6 questions for each domain that they would like a close friend to answer about them. Of these 6 questions, 3 are positively phrased (“What is some evidence that the participant has good social skills?”) and 3 are negatively phrased (“Why is the participant unlikely to do well at creative activities?”). An individual’s score on the FSQ is the total number of negatively phrased questions endorsed. The range of scores therefore can range from 0-10, with higher scores representing more negative feedback seeking (Joiner, Alfano, & Matalsky, 1993). Internal consistency for the FSQ has been questionable (.63 and .68, respectively; Joiner et al., 1993; Joiner, Katz, & Lew, 1997). Test-retest reliability has been moderate for this scale ($r = .40$; Borelli & Prinstein, 2006). Consistent with prior studies, internal reliability for the current sample was .61.

Inventory of Interpersonal Problems – 32 (IIP-32). The IIP-32 (Barkham, Hardy, & Startup, 1996) assesses an individual's difficulties with interpersonal relationships. There are 8 clear and interpretable factors: hard to be assertive, hard to be sociable, hard to be supportive, too dependent, too caring, too aggressive, too open, and hard to be involved. For the present study, the factor of "hard to be assertive" will be used in order to assess for interpersonal conflict avoidance characteristics. An individual's score on the IIP-32 is calculated as the mean score of the items on the measure. Items are scored on a five-point scale ranging from 0 ("not at all") to 4 ("extremely"). Internal consistency for the IIP-32 has been good (.86; Barkham, Hardy, & Startup, 1996). Test-retest reliability has been demonstrated to be moderate for this scale (.56; Barkham, Hardy, & Startup, 1996). Internal consistency for the "hard to be assertive" scale was good (Cronbach's $\alpha = .87$).

McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD). The MSI-BPD (Zanarini, Vujanovic, Parachini, Boulanger, Frankenburg, & Hennen, 2003) is a 10 item screening measure to assess for Borderline Personality Disorder. It is based on a subset of questions from the borderline module of the Diagnostic Interview for DSM-IV Personality Disorders. The scale uses two questions to assess for the paranoia/dissociation criterion and one question to assess each of the other eight criteria (Zanarini et al., 2003). Irritable mood is often found in individuals with BPD, thus including a measure of BPD symptoms can help statistically control for those possible symptoms. The scale is a 10-item, true/false, self-report questionnaire. Scores on

the measure range from 0 to 10, with endorsement of an item equaling one point. Higher scores indicate more borderline characteristics. Internal consistency for the MSI-BPD has been adequate (.74; Zanarini et al., 2003). Test-retest reliability for this scale has been found to be good (.72; Zanarini et al., 2003). The internal reliability of the current sample was good (Cronbach's $\alpha = .88$).

Altman Self-Rating Mania Scale (ASRM). The ASRM (Altman, Hedeker, Peterson, & Davis, 1997) assesses for the presence and/or severity of manic symptoms. Irritable mood is a symptom of bipolar disorder and thus could be another confound explaining the findings of the study. In order to control for the influence of manic symptoms and bipolar disorder on irritability, the ASRM was used in the current study. An individual's score on the ASRM is calculated by summing the responses to the 5 items on the scale. Scores are based on a 5-point scale where 0 indicates that they have not experienced the symptom in the past week, and 4 indicating that they have been experiencing the symptom all of the time for the last week. Test-retest reliability for the ASRM was good (.86; Altman, Hedeker, Peterson, & Davis, 1997). The internal reliability of the current sample was good (Cronbach's $\alpha = .86$).

Social Interaction Anxiety Scale-6/Social Phobia Scale-6 (SIAS6/SPS6). The SIAS-6/SPS-6 (Peters, Rapee, Sunderland, Andrews, & Mattick, 2012) is a short form questionnaire that assess for symptoms of social anxiety and social phobia. The SIAS-6 primarily assesses for general social interaction anxiety and the SPS-6 assesses for fears

of being scrutinized during day-to-day activities, such as eating and drinking (Peters et al., 2012). The present study used the SIAS-6/SPS-6 to assess for possible relationships of social anxiety on an individual's social support. Scoring for the SIAS-6/SPS-6 is on a 5-point likert scale from 0 ("not at all") to 4 ("extremely"). The first 6 items are summed to create a total score for the SIAS, and the last 6 questions are summed to create a total score for the SPS-6. Higher scores are indicative of higher symptom expression. Additionally, internal consistency for the SIAS-6 is acceptable (SIAS-6 = 0.79). For the SPS-6, internal consistency had been demonstrated to be good (SPS = 0.85) (Le Blanc et al., 2014).The internal reliability of the current sample was excellent (SIAS Cronbach's α = .90; SPS Cronbach's α = .93).

Generalized Anxiety Disorder – 7 (GAD-7). The GAD-7 (Spitzer, Kroenke, Williams, and Lowe, 2006) is a brief questionnaire that assesses for generalized anxiety disorder. The present study used the GAD-7 to assess for potential relationships of generalized anxiety on irritability (a common symptom of GAD). Scoring for the GAD-7 is on a 4-point scale ranging from 0 ("Not at all") to 3 ("Nearly Every Day"). The items are summed to create a total score with higher scores indicating more generalized anxiety symptoms (Spitzer et al., 2006). Internal consistency for the GAD-7 is excellent (Cronbach's α = .92) and test-retest reliability has also been demonstrated to be good (0.83) (Spitzer et al., 2006). The internal reliability of the current sample was excellent (α =.93).

Demographic information. Participants were also asked to report basic demographic information such as age, sex, income, and prior medical and mental health history.

Procedure

All participants were recruited through Mechanical Amazon Turk and questionnaires were administered online via Qualtrics. All participants provided consent to participate. Upon completion of the study, participants were given a unique code to enter into Mturk in order to receive compensation for their time. Participants were paid at a rate of $1.38 per hour, which resulted in a payment of $1.04 to each participant for approximately 45 minutes of time to complete the questionnaires. After completing the study, participants were provided debriefing information about the purpose of the study as well as national resources for mental health.

Analyses

Hypotheses 1, 2, and 3 were evaluated by examining the zero-order correlations between PHQ-9 and MSPSS total scores (H1), PHQ-9 and IRQ-Much total scores (H2), and IRQ-Much and MSPSS total scores (H3). Our fourth hypothesis – that there is an indirect relationship between depression symptoms and social support through irritability – was examined using a resampling process as recommended by Preacher and Hayes (2008). The PROCESS macro (Hayes, 2013) for SPSS was used to model the indirect

effect with 5000 bootstrap resamples. As noted in the hypotheses above, the cross-sectional nature of the data does not allow for a true test of mediation (Maxwell & Cole, 2007). Our fifth hypothesis was evaluated using a hierarchical regression model where, in the first step, reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance were entered as independent variables with social support as the dependent variable. In step two, irritability was added to the model. The change in R^2 was examined to determine whether adding irritability to the model improved the prediction of social support above and beyond the traditional interpersonal factors.

Given that irritability is associated with many psychiatric disorders, partial correlations controlling for manic symptoms, borderline personality characteristics, social anxiety, and generalized anxiety were conducted to examine the relationships between the variables for the first three hypotheses. Furthermore, supplemental analyses examining gender differences and racial and ethnic differences were conducted in order to determine if these differences may be contributing to our findings. The MSPSS is divided into three subscales (Significant Other, Family, and Friends). Each of these subscales were also analyzed separately to determine the relationships between the variables and specific types of social support.

CHAPTER IV

FINDINGS

Results

Hypothesized Results

Consistent with our hypotheses, we found a significant negative relationship between depression symptoms and social support ($r = -.33$; $p < .001$). A significant positive relationship was found between depression symptoms and irritability ($r = .56$; $p < .001$). A significant negative relationship was found between irritability and social support ($r = -.29$; $p < .001$). See Table 2.

Table 2. Means, standard deviations, and correlations between the variables.

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. PHQ-9	-								
2. IRQ-Much	.560**	-							
3. MSPSS	-.326**	-.290**	-						
4. ASRM	.105	.155*	-.032	-					
5. BPD	.608**	.639**	-.346**	.057	-				
6. SIAS-6	.512**	.554**	-.260**	.182*	.516**	-			
7. SPS-6	.484**	.563**	-.264**	.190**	.545**	.869**	-		
8. DIRI-RS	.437**	.501**	-.193**	.380**	.474**	.521**	.551**	-	
9. GAD-7	.661**	.672**	-.301**	.124	.669**	.711**	.711**	.574**	-
Mean	8.59	24.37	60.76	5.02	2.54	7.44	6.95	12.32	6.29
SD	7.13	11.21	17.50	4.64	2.96	6.20	6.55	6.30	5.95

Note. ** = $p < .01$; * = $p < .05$; PHQ-9 = Patient Health Questionnaire - 9; IRQ-Much = Irritability Questionnaire -Much; MSPSS= Multidimensional Scale of Perceived Social Support; ASRM = Altman Self-Rating Mania Scale; BPD = McLean Screening Instrument for Borderline Personality Disorder; SIAS-6 = Social Interaction Anxiety Scale-6; SPS-6 = Social Phobia Scale-6; DIRI_RS=Depressive Interpersonal Relationships Inventory-Reassurance Seeking; GAD-7 = Generalized Anxiety Disorder-7.

Given the significant associations between depression, social support, and irritability, these variables were entered into a bias corrected bootstrap model using procedures outlined by Preacher and Hayes (2008). Total PHQ-9 score was entered as the independent variable and total MSPSS score was entered as the dependent variable. Consistent with the correlation reported above, there was a significant direct effect of depression symptoms on social support, $\beta = -.521$, $p = .01$. Importantly, there was a significant indirect relationship of depression symptoms on social support through

irritability as indicated by a 95% confidence interval (CI) that did not include zero (95% CI = -.593 to -.043).

To test our fifth hypothesis, total DIRI-RS score, total FSQ score, and total IIP-assertive scores were entered into a hierarchical linear regression predicting social support. The model including only these three predictors significantly predicted social support, R^2 = .043, F (3, 190) = 3.86, p = .01. In this model, reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance were not significant individual predictors, β =.-.130, t(193) = -1.67, p = .096, β =.-.124, t(193) = -1.68, p = .094, and β = -.076, t(193) = -1.02, p = .311, respectively. When irritability was included in the model, the overall model was significant, R^2 = .077, F(1, 189) = 5.027, p = .001, and adding irritability significantly improved the model, ΔR^2 = .039, p < .01. In this model, reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance were not significant individual predictors, β =.-.039, t(193) = -.475, p = .64, β =.-.100, t(193) = -1.36, p = .174, and β = -.012, t(193) = -.152, p = .880, respectively. Irritability significantly predicted social support as an individual predictor in this model, β = -.240, t(193) = -2.85, p = .005.

Social Support Subscales

The MSPSS is divided into three subscales examining three domains of social support: family, friends, and significant other. In order to examine how each of these subscales impacted our results, our hypotheses were examined for each individual

subscale. Our results of bivariate zero-order correlations for the three subscales revealed similar results as our hypotheses. There were significant relationships between depression symptoms, irritability, and all three social support subscales. See Table 3.

For our fourth hypothesis, there was a significant indirect relationship through irritability only for the family subscale, as indicated by a 95% confidence interval (CI = -.1980- -.0147). There were no significant indirect relationships through irritability for the friend and significant other subscales as demonstrated by confidence intervals that contain 0 (Friends: CI = -.1685- .0065; Significant Other: CI = -.1480- .0377).

Furthermore, examining the social support subscales for our fifth hypothesis revealed similar results to our hypothesized results using the total scale. The model including only total DIRI-RS score, total FSQ score, and total IIP-assertive score significantly predicted family social support, $R^2 = .065$, $F\ (3, 190) = 5.476$, $p = .001$. When irritability was included in the model, the model was statistically significant, $R^2 = .101$, $F(1, 189) = 6.442$, $p < .001$, and was significantly improved, $\Delta R^2 = .040$, $p = .004$.

Interestingly, the model including only total DIRI-RS score, total FSQ score, and total IIP-assertive scores did not significantly predict friend social support or significant other social support (Friend: $R^2 = .016$, $F\ (3, 190) = 2.072$, $p = .105$; Significant Other: $R^2 = .022$, $F\ (3, 190) = 2.457$, $p = .064$). However, when irritability was included in the models, both models become significant (Friend: $R^2 = .048$, $F(1, 189) = 3.411$, $p = .01$; Significant Other: $R^2 = .036$, $F(1, 189) = 2.810$, $p = .03$) and irritability significantly

improves both models (Friend: $\Delta R^2 = .036$, $p = .01$; Significant Other: $\Delta R^2 = .019$, $p = .03$).

Table 3. Means, standard deviations, and correlations between variables and types of social support.

Measure	1.	2.	3.	4.	5.
1. PHQ-9	-				
2. IRQ-Much	.560**	-			
3. SS-Family	-.340**	-.315**	-		
4. SS-Friend	-.263**	-.247**	.674**	-	
5. SS-S.O.	-.267**	-.213**	.688**	.700**	-
Mean	8.59	24.37	19.87	20.02	20.87
SD	7.13	11.21	6.51	6.44	6.72

Note. ** = $p < .01$; * = $p < .05$; PHQ-9 = Patient Health Questionnaire - 9; IRQ-Much = Irritability Questionnaire -Much; SS-Family = Multidimensional Scale of Perceived Social Support-Family Subscale; SS-Friend = Multidimensional Scale of Perceived Social Support-Friend Subscale; SS-S.O. = Multidimensional Scale of Perceived Social Support-Significant Other Subscale.

Partial Correlations Controlling for Additional Psychopathology

In order to determine if symptoms of other psychological disorders that are often associated with irritable mood and reduced social support could be influencing our results, we examined our first three hypotheses using partial correlations controlling for symptoms of mania, social anxiety, generalized anxiety, and BPD. When controlling for manic symptoms, our hypothesis that depression symptoms would be associated with lower social support was supported ($r = -.32$; $p < .001$). Additionally, there was a strong positive correlation between depression symptoms and irritability when controlling for

manic symptoms (r = .55; p < .001). Our third hypothesis, that greater irritability would be associated with lower social support remained significant after controlling for manic symptoms (r = -.29; p < .001).

When controlling for social anxiety, our first three hypotheses were supported, such that greater depression was negatively related to lower social support (r = -.23; p = .001); greater irritability was positively related to depression symptoms (r = .38; p < .001), and greater irritability was negatively related to lower social support (r = -.18; p = .01). Additional analyses controlling for generalized anxiety revealed similar results for our first two hypotheses (Hypothesis 1: r = -.19; p = .01; Hypothesis 2: r = .208; p = .004). Our third hypothesis revealed a trend-level nonsignificant relationship between irritability and social support when controlling for generalized anxiety (Hypothesis 3: r = -.13; p = .07).

Interestingly, when controlling for borderline personality characteristics, our first two hypotheses were supported (H1: r = -.15, p < .05; H2: r = .28, p < .001). However, our third hypothesis that greater irritability would be negatively associated with social support revealed a nonsignificant relationship when controlling for borderline personality characteristics (r = -.10, p = .18).

Gender Effects

Additional analyses were conducted to examine potential gender differences in our primary variables of interest. Specifically, independent samples t-tests were performed to test for gender differences in the three primary measures of this current study (PHQ-9, MSPSS, IRQ-Much). Results demonstrated nonsignificant relationships between genders for depression symptoms (Females $M = 9.38$, $SD = 7.19$; Males $M = 7.83$, $SD = 7.02$), $t(191) = -1.52$, $p = .131$ and irritability (Females $M = 25.45$, $SD = 10.78$; Males $M = 23.31$, $SD = 11.57$), $t(192) = -1.33$, $p = .184$. For social support, there was a significant difference between genders (Females $M = 64.6$, $SD = 16.39$; Males $M = 57.00$ $SD = 17.82$), $t(192) = -3.10$, $p = .002$.

Given the significant gender difference in social support, our hypothesized analyses were conducted independently for women and men to determine if gender affected our hypothesized results. The results of our first three hypotheses were similar to our overall results. Depression symptoms and social support were significantly and negatively associated for both males and females (Females: $r = -.409$, $p = .001$; Males: $r = -.315$, $p = .002$) and there was not a significant difference between them ($z = -0.74$, $p = 0.46$). Similarly, irritability was significantly and positively associated with depression symptoms for males and females (Females: $r = .474$ $p = .001$; Males: $r = .632$, $p = .001$) and there was not a significant difference between them ($z = -1.57$, $p = 0.12$). In addition, irritability was significantly and negatively associated with social support for males and

females (Females: r = -.408, p = .001; Males: r = -.246, p = .01) and there was not a significant difference between them (z = -1.25, p = 0.21).

Analyses examining the presence of gender differences in our fourth hypothesis revealed similar results. Consistent with our results, there was a significant direct effect of depression symptoms on social support, β = -.635, p = .02, CI = -1.15 - -.124. Additionally, for females, there was a significant indirect effect of depression on social support through irritability, CI = -.734 - -.010. For males there was a non-significant indirect effect of depression on social support through irritability as demonstrated by a confidence interval that contains 0 (CI = -.494 - .219).

Further analyses examining our hypothesized results for each gender revealed similar results for our fifth hypothesis. For females, the model including only excessive reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance was significant, $F(3,92) = 6.18$, t = 19.92, p = .001. Excessive reassurance seeking and negative feedback seeking were non-significant predictors in the first model β =.-.135, $t(95) = -1.27$, p = .206, β =.-.017, $t(95) = -.168$, p = .867, respectively but, interpersonal conflict avoidance was a significant predictor, β =.-.335, $t(95) = -3.28$, p = .001. Adding irritability to the model significantly improved the model, ΔR^2 = .056, p = .01 for females. In this model, excessive reassurance seeking and negative feedback seeking were non-significant predictors, β =.-.051, $t(95) = -.476$, p = .635, β =.-.013, $t(95) = .128$, p = .898, respectively. Both interpersonal conflict avoidance and irritability were

significant individual predictors in the second model, β =.-.250, $t(95) = -2.38$, $p = .02$, β =.-.280, $t(95) = -2.55$, $p = .01$, respectively.

For males, the model including only excessive reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance was non-significant, $F(3,94) = 1.90$, $t = 14.13$, $p = .14$. Excessive reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance were all non-significant predictors in the first model, β =.-.134, $t(97) = -1.23$, $p = .224$, β =.-.168, $t(97) = -1.59$, $p = .11$, β =.-.119, $t(97) = 1.13$, $p = .263$, respectively. Adding irritability into the model significantly improved the model for males, $\Delta R^2 = .045$, $p = .03$. In this model, excessive reassurance seeking, negative feedback seeking, and interpersonal conflict avoidance were non-significant predictors of social support, β =.-.013, $t(97) = -.107$, $p = .915$, β =.-.135, $t(97) = -1.30$, $p = .199$, β = .181, $t(97) = 1.68$, $p = .096$, respectively. In this model, irritability was the only significant individual predictor, β =.-.270, $t(97) = -2.17$, $p = .03$.

Racial/Ethnic Effects

Additional analyses examined differences between racial/ethnic groups in our primary variables of interest. Specifically, independent samples t-tests were performed to test for racial/ethnic differences in the three primary measures of this current study (PHQ-9, MSPSS, IRQ-Much). Results demonstrated nonsignificant relationships between all racial/ethnic groups for social support and irritability. For depression symptoms, there was only a significant difference between Caucasian (M = 7.36, SD = 6.72) and Asian (M = 11.49, SD = 7.48) groups, $t(169) = -3.29$, $p = .001$. There were no significant differences between any other racial/ethnic groups on depression symptoms.

CHAPTER V

CONCLUSION

Discussion

The relationship between irritability and depression has been understudied in the literature. Currently, the most compelling research demonstrates that for a subset of individuals with depression, irritability is a significant characteristic of their depressive state (Fava et al., 2010; Judd et al., 2013). Much of the literature examining the relationship between irritability and depression focuses on the absence or presence of said relationship. There is little research examining the relationship between irritability and factors that may cause or maintain depression such as low social support. The current study provides the first examination of the relationship between irritable mood, symptoms of depression, and social support.

First, it is important to note that the results of the current study support findings from several disparate literatures. For example, in the current study depression and social support had a negative relationship, such that more depression was associated with lower levels of social support. This is consistent with prior studies showing that lower levels of depression are associated with higher levels of social support, and that higher levels of

depression are associated with lower levels of social support (e.g., Lakey & Cronin, 2008).

Furthermore, in the current study there was a positive relationship between irritability and depression, such that more depression was associated with more irritability. This is consistent with recent evidence which suggests that many people who experience depression also experience irritable mood (Fava et al., 2010). Our findings are consistent with the idea that irritable mood may be an important feature of depression that is often overlooked. Future studies will need to determine whether irritability is a symptom of depression, a comorbid condition, or a marker of depression severity.

We also found a negative relationship between irritability and social support, which is consistent with prior work (Brondolo et al., 2003; Smith et al., 1988). It is important to note that the data from the current study are correlational and therefore no causal inferences can be drawn. However, the results of the current study suggest that irritable mood may be detrimental to social support. This information is important for informing future studies as to the exact mechanisms that influence the relationship between irritability and social support.

Importantly, we found a significant indirect relationship between depression and low social support through irritability. While the data are cross-sectional, this suggests that depression may lead to lower social support through the mechanism of irritability. This is an important finding in understanding depression and its maintaining factors. If

there is a causal relationship, it may be helpful to identify and target irritability in the course of psychotherapy to improve social support and, by extension, depression. Future studies should use longitudinal designs or attempt to manipulate irritability in order to test for true mediational relationships.

The current study also found that adding irritability into a model with known socially erosive behaviors (reassurance seeking, interpersonal conflict avoidance, negative feedback seeking; see Joiner, 2000) significantly improved the prediction of low social support. That is, irritability provides additional information above and beyond the typically-identified erosive behaviors. This argues for a place for irritability in interpersonal models of depression as the behaviors associated with the emotion appear to contribute uniquely to the erosion of social support.

The social support scale used in the current study is made up of three subscales. These subscales reflect the different areas a person often perceives social support, Family, Friends, and Significant Other. Each of these subscales were examined to determine whether there were specific relationships between depression, irritability, and specific areas of social support. Results were similar for the first three hypotheses for each of the subscales. This suggests that depression and irritability have negative relationships and are detrimental to several areas of social support. Interestingly, there was not a significant indirect effect of depression on friend or significant other social support through irritability. This suggests that irritability may not explain the relationship

between depression symptoms and friend and significant other social support. However, results from hierarchical linear regressions suggest that adding irritability into the models significantly improves the prediction of all types of social support above and beyond the traditionally-identified erosive behaviors. Future work will be needed to better understand the relationship between irritability and the different sources of social support in the context of depressive symptoms.

Provided that irritability is often found in other forms of psychopathology, analyses controlling for these disorders were conducted. After controlling for other pathology our results generally remained consistent. This suggests that irritability has a negative relationship with depression and social support outside the context of other pathology. However, partialling out symptoms of GAD and borderline personality disorder did reduce the strength of the relationship between irritability and social support. This suggests that anxiety and affective instability may at least partially account for the relationship between irritability and social support. Future work could help us better understand the relationships between irritability, anxiety, general affective instability, and social support.

Additional analyses examining each individual gender revealed similar results to our overall hypotheses. This suggests that for both males and females, depression has a negative relationship with social support in addition to irritability's negative relationship with depression. That is, males and females are not substantially different in the way

depression, irritability, and social support relate to each other for the current sample. Our findings suggest that for females irritability may have a more indirect relationship with depression and social support than for males. Further longitudinal research should be conducted to test for true mediation. Interestingly, our findings did suggest that females indicated greater social support than males. This is consistent with the idea that females are more likely to seek out social support and utilize social support compared to males (Burda, Vaux, & Schill, 1984; Lowenthal & Haven, 1968). Future research should examine the specific relationship that men and women have with social support in the context of irritability and depression.

Furthermore, analyses examining racial and ethnic group differences for our primary measures of interest generally did not reveal significant results. The one exception was for depression symptoms in Caucasian and Asian groups. Specifically, Asian groups tended to have higher depression scores than Caucasian groups in the current sample. It is possible that there are significant differences in depression symptoms, social support, or irritability between the racial/ethnic groups sampled in our study, but that our sample sizes for groups other than Caucasian and Asian were too small to detect significant effects. Future research should examine the relationship and mechanisms of depression, irritability, and social support specifically for each racial and ethnic group with larger sample sizes for each group.

Limitations

Though our results suggest that depression symptoms may affect social support through irritability, the current study is cross sectional in nature and therefore causal relationships cannot be determined based on our results. A potential explanation could be that depression and irritability are caused by negative social interactions. Furthermore, stressors in an individual's life could contribute to irritable mood and some depressive symptoms that may affect social support. Additionally, our sample was primarily of Caucasian descent. This is a limitation of our ability to generalize our results to other racial and ethnic groups.

Strengths

Although there are limitations to the current study, there are several strengths. The current study is the first to examine the relationships between irritability, depression, and social support in a single sample. This will further the knowledge base of our understanding of the heterogeneity of depression and the mechanisms that potentially maintain the disorder. Additionally, the sample of the current study was more diverse in age and depression symptoms than is typically found in college student samples. This adds to the literature providing evidence for these potential relationships in a more diverse and representative sample. Furthermore, the current study was the first to demonstrate that irritability adds to the prediction of low social support above and beyond other already identified erosive behaviors.

Conclusion

The current study demonstrates a relationship between depression symptoms, irritability, and social support. In particular, these results support a model where increased depressive symptoms lead to increased irritability which, in turn, leads to reduced social support. The reduced social support then leads to maintaining or worsening of the depression, creating a vicious cycle. Furthermore, irritability appears to be important in contributing uniquely to lower social support above and beyond typically-identified erosive behaviors such as reassurance seeking, interpersonal conflict avoidance, and negative feedback seeking. Additional work is needed to advance beyond simply identifying irritability as a symptom associated with depression and focus on how irritability may play a role in the etiology or maintenance of depressive states. The current study is a first step in this direction.

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APPENDICES

APPENDIX A

Questionnaires

Demographic Information

To start with, we would like to get some background information from you.

1. What is your age? _____

2. What is your gender? _____

3. What is your current marital situation (please check one)?

_____ Married _____ Separated _____ Never married/Single

_____ Common law marriage _____ Divorced _____ Widowed

4. Do you consider yourself to be Hispanic or Latino (see definition below)? ☐ Yes ☐ No

Hispanic or Latino. A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race.

5. What is your race? (please check one)

☐ American Indian or Alaska Native	A person having origins in any of the original peoples of North, Central, or South America, and who maintains tribal affiliations or community attachment.
☐ Asian	A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
☐ Black or African American	A person having origins in any of the black racial groups of Africa.
☐ Native Hawaiian or Other Pacific Islander	A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
☐ White	A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
☐ Multiple races	
☐ None of the above	

6. What is the highest grade in school you have completed (please check one)?

_____ Less than High School (**record actual grade**) _____ A.A. or other degree that is not a B.A. or B.S.

_____ High School _____ 4 years of college with degree

_____ 1 year of college or technical school _____ Postgraduate, M.D., Ph.D.

_____ 2 or more years of college but did not graduate

7. How many people do you live with (not including yourself)?

_____ Number of children _____ Number of adults

8. During the past year, what was your total family income? $ _____

9. Do you ***currently*** take medication for emotional, mental, or psychological problems (e.g., depression, anxiety, ADHD, insomnia/sleep problems)? ☐☐No ☐☐Yes

If yes, please list below (if you need additional room, please continue on the back of this page):

Date Prescribed	Medication name	Dosage	Reason for medication

10. ***In the past,*** did you take medication for emotional, mental, or psychological problems (e.g., depression, anxiety, ADHD, insomnia/sleep problems)?☐☐☐No ☐☐Yes

If yes, please list below (if you need additional room, please continue on the back of this page):

Duration	Medication name	Dosage	Reason for medication

From to			
From to			
From to			
From to			

11. Have you ever been in therapy or counseling for emotional, mental, psychological, or addiction problems? ☐☐No ☐☐Yes

If yes, please list below (if you need additional room, please continue on the back of this page):

Duration	Type of provider (PhD, MD, priest, social worker)	# of sessions	Reason for therapy
From to			
From to			
From to			

12. Have you ever been hospitalized for emotional, mental, or psychological problems (e.g., anxiety, depression, drugs)? ☐☐No ☐☐Yes

If yes, please list below (if you need additional room, please continue on the back of this page):

Duration	Length of stay	Reason for hospitalization
From to		
From to		
From to		

13. Has anyone in your family (parents, grandparents, brothers, sisters, aunts, uncles, cousins) ever had an emotional, mental, or psychological problem? ☐☐No ☐☐Yes

If yes, please list below:

Person's Relationship to you (e.g., mother, paternal aunt, etc.)	Diagnosis/Problem(s) or Symptom(s)	Treatment Received? (Y/N)	Type of Treatment

14. Do you have any of the following medical problems:

	Yes	No	Prefer not to answer
Thyroid Problems			
Seizures			
Migraine Headaches			
Diabetes/pre-diabetes			
Hypoglycemia (low blood sugar)			
Anemia			
Asthma			
Irritable Bowel Syndrome			
Fibromyalgia			
Cancer			
Heart Disease			

15. How old is your biological mother? If you are not sure, please take your best guess.

_____

16. How old is your biological father? If you are not sure, please take your best guess.

_____

Date _____ Subid:_____

MSPSS (Multidimensional Scale of Perceived Social Support)

Please rate how much you agree or disagree with the statements below.

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1.	There is a special person who is around when I am in need.	1	2	3	4	5
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5
3.	My family really tries to help me.	1	2	3	4	5
4.	I get the emotional help and support I need from my family.	1	2	3	4	5
5.	I have a special person who is a real source of comfort for me.	1	2	3	4	5
6.	My friends really try to help me.	1	2	3	4	5
7.	I can count on my friends when things go wrong.	1	2	3	4	5
8.	I can talk about my problems with my family.	1	2	3	4	5
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5
11.	My family is willing to help me make decisions.	1	2	3	4	5
12.	I can talk about my problems with my friends.	1	2	3	4	5

PHQ-9

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself-or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? Circle one:

Not difficult at all Somewhat difficult Very difficult Extremely difficult

Irritability Questionnaire

The following statements are about feelings that everyone experiences from time to time. Please circle the number that best shows how you have been feeling over the last **2 weeks**. Don't take too long with your answers. Your immediate response is probably the most accurate.

1. I find myself bothered by past insults or injuries.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
2. I become impatient easily when I feel under pressure.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
3. Things are going according to plan at the moment.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
4. I lose my temper and shout or snap at others.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
5. At times I find everyday noises irksome.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Intensely
6. When I flare up, I get over it quickly.	

How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
7. Arguments are a major cause of stress in my relationships.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
8. I have been fairly even tempered.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
9. Lately I have felt frustrated.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Intensely
10. I am quite sensitive to others' remarks.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
11. When I am irritated, I need to vent my feelings immediately.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
12. I have been feeling relaxed.	
How often?	*How much?*
0 — Never	0 — Not at all

1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
13. I feel as if people make my life difficult on purpose.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
14. Lately I have felt bitter about things.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
15. At times I can't bear to be around people.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
16. When I look back on how life treated me, I feel a bit disappointed and angry.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so
17. Somehow I don't seem to be getting the things I actually deserve.	
How often?	*How much?*
0 — Never	0 — Strongly disagree
1 — Occasionally	1 — Disagree
2 — Quite often	2 — Agree
3 — Most of the time	3 — Strongly agree
18. I've been feeling like a bomb, ready to explode.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately

3 — Most of the time	3 — Very much so
19. Other people always seem to get the breaks.	
How often?	*How much?*
0 — Never	0 — Strongly disagree
1 — Occasionally	0 — Strongly disagree
2 — Quite often	2 — Agree
3 — Most of the time	3 — Strongly agree
20. Lately I have been getting annoyed with myself.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Intensely
21. When I get angry, I use bad language or swear.	
How often?	*How much?*
0 — Never	0 — Not at all
1 — Occasionally	1 — A little
2 — Quite often	2 — Moderately
3 — Most of the time	3 — Very much so

DIRI-RSS

For the following questions, please circle the **number** most appropriate to you, using the following scale:

1 = No, not at all; **2** = No, hardly ever; **3** = Not really; **4** = I'm not sure;

5 = Yes, somewhat; **6** = Yes, quite often; **7** = Yes, **very** much

1) In general, do you find yourself often asking the people you feel close to how they **truly** feel about you?

No, not at all	No, hardly ever	Not really	I'm not sure	Yes, somewhat	Yes, quite often	Yes, very much
1	2	3	4	5	6	7

2) In general, do you frequently seek reassurance from the people you feel close to as to whether they **really** care about you?

No, not at all	No, hardly ever	Not really	I'm not sure	Yes, somewhat	Yes, quite often	Yes, very much
1	2	3	4	5	6	7

3) In general, do the people you feel close to sometimes become irritated with you for seeking reassurance from them about whether they **really** care about you?

No, not at all	No, hardly ever	Not really	I'm not sure	Yes, somewhat	Yes, quite often	Yes, very much
1	2	3	4	5	6	7

4) In general, do the people you feel close to sometimes get "fed up" with you for seeking reassurance from them about whether they **really** care about you?

No, not at all	No, hardly ever	Not really	I'm not sure	Yes, somewhat	Yes, quite often	Yes, very much
1	2	3	4	5	6	7

Feedback Seeking Questionnaire

Over the next 5 pages, we will ask you about what kind of information you would like to learn about yourself from a friend. Each page will have 6 questions. On each page, please choose the two (2) questions which you would most like to have a close friend answer about you. Click the box next to each question you would like to have a close friend answer about you. Please choose exactly two questions on each page.

Area I (Social)

1) What is some evidence you have seen that the participant has good social skills?

2) What is some evidence you have seen that the participant doesn't have very good social skills?

3) What about the participant makes you think s/he would be confident in social situations?

4) What about the participant makes you thinks/he doesn't have much social confidence?

5) In terms of social competence, what is the participant's best asset?

6) In terms of social competence, what is the participant's worst asset?

Area II (Intellectual)

7) What are some signs you have seen that the participant is above average in overall intellectual ability?

8) What are some signs you have seen that the participant is below average in overall intellectual ability?

9) What about the participant makes you think s/he will have academic problems at OSU?

10) What about the participant makes you think s/he will do well at OSU academically?

11) What academic subjects would you expect the participant to be especially good at?

12) What academic subjects would you expect to prove difficult for the participant? Why?

Area III (Artistic/Musical)

13) What about the participant makes you think he or she would be a poor artist or musician?

14) What about the participant makes you think he or she is musically or artistically talented?

15) What is the participant's greatest artistic or musical talent?

16) Why is the participant unlikely to do well at creative activities?

A = include B = do not include

17) What about the participant makes you think s/he is very imaginative?

18) In the area of art or music, what is the participant's biggest limitation?

Area IV (Physical Appearance)

19) Why do you think people would find the participant physically attractive?

20) Why do you think people would find the participant physically unattractive?

21) What do you see as the participant's least physically attractive features?

22) What do you see as the participant's most physically attractive features?

23) Why should the participant feel confident of his/her appearance?

24) Why might the participant have low confidence in his/her appearance?

Area V (Sports)

25) What are some sports you would expect the participant to be especially good at? Why?

26) What are some sports you would expect the participant to have problems with? Why?

27) What about the participant allows him/her to be a good athlete?

28) What about the participant prevents him/her from becoming a good athlete?

29) What is the participant's greatest natural athletic talent?

30) What natural athletic ability does the participant possess least?

Finally, please rank the five areas below according to which areas you would most like to get feedback about Please give each of the five areas below a ranking between 1 and 5 where 1 means you want most to hear about that area and 5 means you want least to hear about that area.

Social

Intellectual

Art/Music

Physical Appearance

Sports

Inventory of Interpersonal Problems

1. I find it hard to be assertive with another person.

0	1	2	3	4
Not at All	Somewhat	Neutral	Quite a Bit	Extremely

2. I find it hard to be firm when I need to be.

0	1	2	3	4
Not at All	Somewhat	Neutral	Quite a Bit	Extremely

3. I find it hard to be aggressive towards other people with the situation calls for it.

0	1	2	3	4
Not at All	Somewhat	Neutral	Quite a Bit	Extremely

4. I find it hard to disagree with other people.

0	1	2	3	4
Not at All	Somewhat	Neutral	Quite a Bit	Extremely

APPENDIX B

Oklahoma State University Institutional Review Board

Date: Wednesday, May 31, 2017
Proposal Title: Irritability, Social Support, and Depression
Principal
Investigator(s):
Protocol Expires: 5/30/2020
IRB Application No AS1746
Reviewed and
Processed as:
Exempt
Status Recommended by Reviewer(s): Approved
Cassandra Krug
Stillwater, OK 74078
116 N Murray
Tony Wells
Stillwater, OK 74078
Sincerely,
Hugh Crethar, Chair

Institutional Review Board
The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.
The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.
As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the
IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone:
405-744-5700, dawnett.watkins@okstate.edu).

VITA

Cassandra Paige Krug

Candidate for the Degree of

Master of Science

Thesis: IRRITABILITY, SOCIAL SUPPORT, AND DEPRESSION

Major Field: Clinical Psychology

Biographical:

Education:

Completed the requirements for the Master of Science in Clinical Psychology at Oklahoma State University, Stillwater, Oklahoma in December, 2017.

Completed the requirements for the Bachelor of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2015.

Experience:
Behavior, Affect, and Thinking Laboratory August 2015- Present
Stillwater, Oklahoma
Graduate Research Assistant, Oklahoma State University
Supervisor: Dr. Tony T. Wells

Professional Memberships:
Association for Behavioral and Cognitive Therapies 2015-Present
Student Member